2020

ANNUAL REPORT

Traumatic Brain Injury Center of Excellence

MHS Military Health System
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Content

Letter from the Division Chief, TBICoE

Dear Colleagues and Collaborators:

Reflecting on the COVID-19 pandemic in 2020, I am profoundly impressed with our resilience as the Defense Health Agency's (DHA) Traumatic Brain Injury Center of Excellence (TBICoE). Not only did we continue to deliver new research, quality clinical products, and educational materials, but we also supported each other to become a stronger organization for the future.

Our research network ended the year with 36 studies in its portfolio. Because of the pandemic, we could not present at as many conferences and were forced to move many of our educational events into virtual formats. Nevertheless, we still published 69 manuscripts and delivered 58 research presentations; our regional education coordinators (RECs) planned 3,725 separate events, including 679 trainings.

In all of these endeavors, I am inspired by how our Research, Clinical Affairs, and Education Branches have worked together productively. Last year, our researchers demonstrated that training providers to use our tools and clinical recommendations improves patient outcomes and enhances readiness. These results led to the revision of some of our products—such as the Progressive Return to Activity Following Acute Concussion/mild Traumatic Brain Injury clinical recommendation—that now shape the organization's activities going forward.

Notably, our change in preferred name, from the Defense and Veterans Brain Injury Center (DVBIC) to TBICoE, occurred in November in tandem with migrating from our stand-alone website to the DHA's Health.mil platform. These events align us with the other centers of excellence within the DHA's Research and Development Directorate.

The annual March Brain Injury Awareness Month was the highlight of the year, involving an array of activities to educate our stakeholders about our traumatic brain injury (TBI) products and services. This builds on our yearlong outreach efforts, such as our podcasts and the use of social media.

The coming year will provide more opportunities for engaging with military providers, ensuring that TBICoE supports DHA's strategic priorities, such as a "medically ready force and a ready medical force." In 2021, we will deliver an interim report on a prominent TBICoE-led congressionally mandated effort, continue our efforts on warfighter brain health, collaborate with the Vision Center of Excellence and the Hearing Center of Excellence on vision and dizziness clinical recommendations (CRs), align the work of the RECs with DHA markets, and welcome a new Division Chief.

We can feel proud of all the work we did to sustain our mission of supporting service members, veterans, and their families affected by TBI. Continue to cultivate excellence in the year ahead.

Scott W. Pyne, M.D.
CAPT, MC, USN
Division Chief
Traumatic Brain Injury Center of Excellence (TBICoE)
Research and Development Directorate (J-9)
Defense Health Agency (DHA)

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"I am inspired by how our Research, Clinical Affairs, and Education Branches have worked together productively."
- Division Chief CAPT Scott Pyne

TBICoE Leadership

Division Chief
U.S. Navy Captain Scott W. Pyne

Captain Pyne heads TBICoE and directs the Department of Defense (DOD) TBI Pathway of Care. He holds a Bachelor of Science from Muhlenberg College in Allentown, Pennsylvania, and a Doctorate of Medicine from Temple University School of Medicine in Philadelphia, Pennsylvania. Prior to joining TBICoE in 2018, he served at the Naval Health Clinic Annapolis. He also worked as the Naval Academy admissions medical officer, clinical staff physician, concussion clinic coordinator, and doctor for the varsity football and rugby teams. He is board-certified in family medicine (with a Certificate of Added Qualification in Primary Care Sports Medicine), an assistant professor of family medicine at the Uniformed Services University of the Health Sciences, Bethesda, Maryland, and is a member of several family and sports medicine professional associations. He has authored several scientific publications. His military decorations include Meritorious Service Medal (3), Navy Commendation Medal, Navy Achievement Medal (2).

Katharine Stout, P.T., DPT, NCS, MBA
Chief, Clinical Affairs Branch; Acting Chief of the Education Branch; Acting Division Deputy Director

Dr. Stout is a board-certified neurological specialist by the American Board of Physical Therapy Specialties. For more than a decade, she has worked in TBI and military medicine in a variety of roles including direct clinical care, research portfolio management and program management within telehealth. She has authored several publications and a book chapter. She holds doctorate in physical therapy from Northeastern University, Boston, Massachusetts and master's degree in business administration in healthcare administration from the University of Scranton, Pennsylvania.

Emma Gregory, Ph.D.
Chief, Research Branch

Prior to joining TBICoE in 2014, Dr. Gregory worked as a postdoctoral fellow in the Department of Cognitive Science at the Johns Hopkins University studying the impact of brain damage on memory processes, and as a postdoctoral researcher at its Neuro-education Initiative in the School of Education to study application of cognitive science to classroom teaching and learning. She received her Ph.D. in Cognitive Science in 2010 from John Hopkins where her research focused on cognition, using both quantitative and qualitative research methods and testing a range of populations in various skills such as spatial processing and vision. She has co-authored over 20 peer-reviewed articles and serves as an ad hoc reviewer for various journals.

U.S. Public Health Service Capt. James A. Blankenship
Chief, TBI Mission Support

In 1986, he enlisted in the U.S. Navy and was commissioned as an Ensign in the U.S. Navy Reserve in 1996. In 1998, he transitioned from the U.S. Navy Reserve to the U.S. Public Health Service, and was assigned to the Bureau of Prisons. He received his Bachelor of Science in nursing from the College of West Virginia in 1995, and his Master of Science in nursing from the Uniformed Services University of Health Sciences in 2001. In 2013, he was assigned to the TBICoE Headquarter Process Improvement and Program Evaluation Office.

TBICoE's mission is to promote state-of-the-science brain injury care, from point-of-injury to reintegration, of service members, veterans, and their families. The organization is a division of the Research and Development Directorate (J-9), and its mission aligns with the DHA priorities—great outcomes, a ready medical force, satisfied patients, and a fulfilled staff.

The three TBICoE branches collaborate to engage key stakeholders and develop products. Their core activities are as follows:

- **Research** generates hypothesis-driven, clinically-focused studies by identifying knowledge gaps in the scientific literature, responding to congressional mandates, and evaluating the clinical tools we produce.
- **Clinical Affairs** develops TBI CRs for military health care providers, supports clinical outcomes analyses, and produces quarterly TBI surveillance reports.
- **Education** translates scientific findings into products to support education on TBI-related topics, and uses a network of RECs to disseminate educational material to military health care providers, service members, and their families.

02 TBICoE as an Organization

History

Following important clinical and research information gleaned from the Vietnam Head Injury Study, which began in 1974, a registry to record head injuries was established during the first Persian Gulf War in the early 1990s. In 1992, Congress appropriated funds to stand up the Defense and Veterans Head Injury Program. For many years named the Defense and Veterans Brain Injury Center, the organization changed its preferred name to TBICoE in 2020 to align with other DHA centers of excellence.

The Warfighter Brain Health Initiative

Based on memoranda issued by the Deputy Secretary of Defense in October 2018 and the Assistant Secretary of Defense for Health Affairs in February 2019, this initiative promotes the following goals:

- Improve mental and physical performance
- Monitor and mitigate threats to brain health
- Prevent, recognize, and minimize the effects of TBI
- Reduce or eliminate long-term and late effects of TBI
- Advance warfighter brain health science

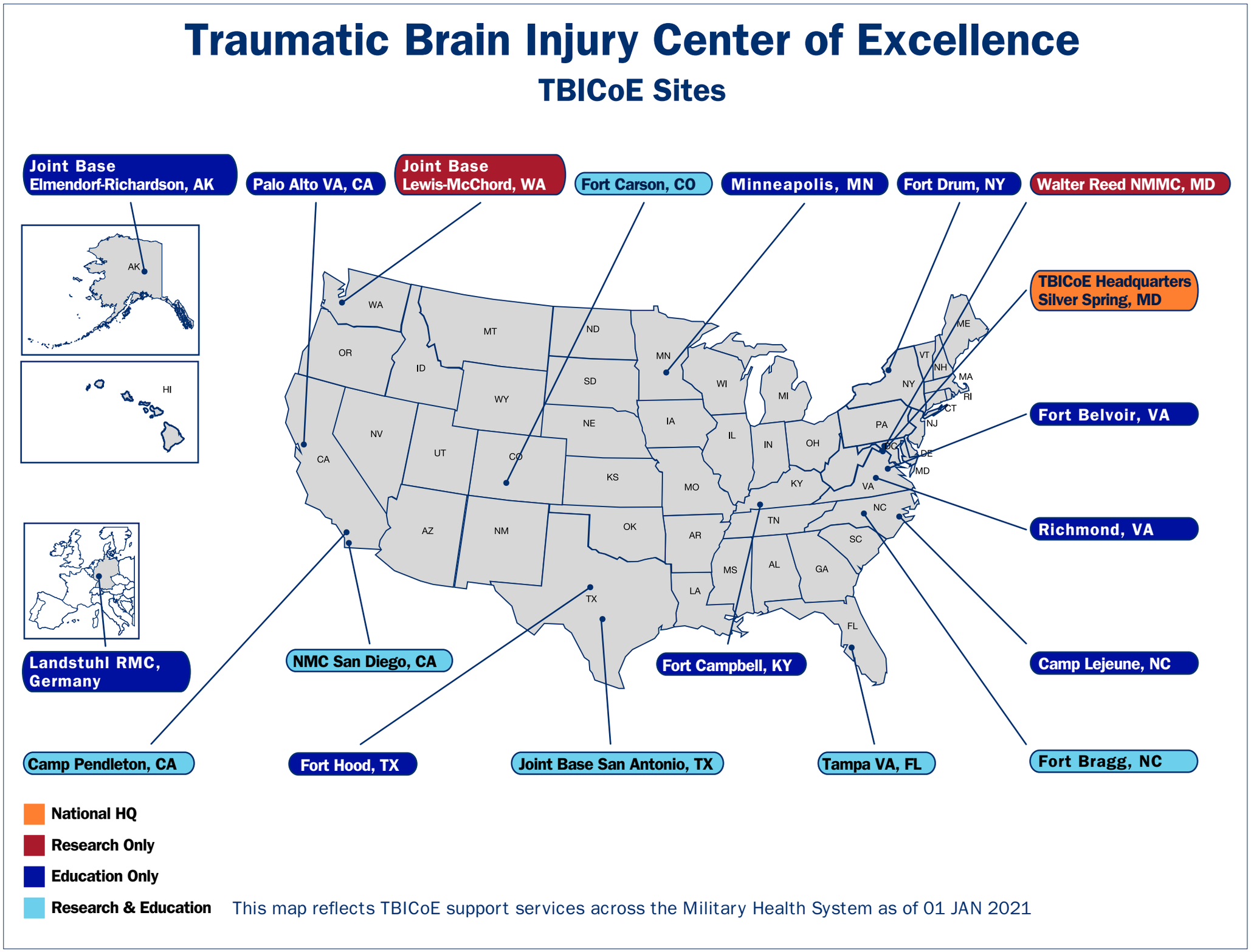
These goals—especially preventing and minimizing the effects of TBI by advancing warfighter brain health—relate directly to the key missions of TBICoE's Clinical Affairs, Education, and Research Branches.

Working Groups and Committees

TBICoE staff participated in a number of working groups and committees that further its mission:

- Combat Casualty Care Research Program Research and Analysis
- Combat Casualty Care Capabilities Based Assessment
- NDAA FY07 Section 721 Working Group for Report to Congress
- NDAA FY18 Section 734
- Neuromusculoskeletal Clinical Community
- Non-invasive Neuro Assessment Device Integrated Product Team
- TBI Advisory Committee (TAC)
- TBI-Drug Treatment Integrated Product Team
- TBI Endpoints Development Government Steering Committee
- The National Institute on Disability, Independent Living, and Rehabilitation Research
- Traumatic Brain Injury Model Systems
- VA/DOD mTBI Clinical Practice Guideline Revision Workgroup
- Warfighter Brain Health Capabilities Based Assessment
- Warfighter Brain Health Element 1 (Research), 3 (Clinical) and 4 (Education)

TBICoE as an Organization



Research Highlights

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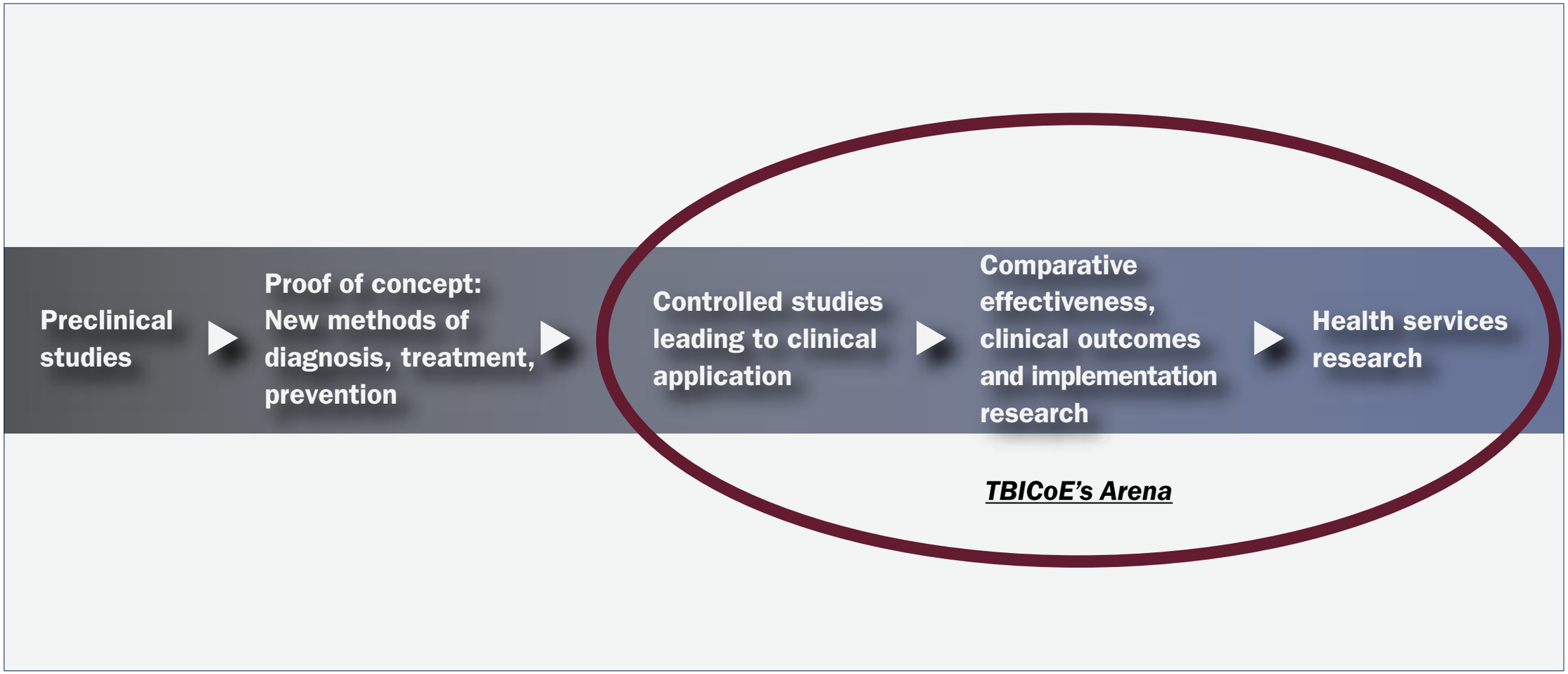
TBICoE conducts, supports, implements, and translates military relevant TBI research addressing DOD gaps. It advances state-of-the-science knowledge about TBI prevention, diagnosis, treatment, recovery, rehabilitation, and reintegration.



Across the continuum of possible research approaches, TBICoE focuses its efforts on clinical application, effectiveness, and implementation.

Congressionally Mandated Studies

Multiple congressional mandates shape TBICoE's research activities, taskers, and other efforts in which the TBICoE Research Branch is engaged. Several congressionally mandated efforts are described below.

Blast Research

Recent National Defense Authorization Acts (NDAAs) guide current DOD blast research efforts. In accordance with NDAA Section 734 for fiscal year 2018, TBICoE serves as the Office of Primary Responsibility for the Health & Performance Line of Inquiry (LOI5). In this role, TBICoE's LOI5 efforts track a portfolio of 26 research studies focused on the health effects of blast pressure exposure of members of the U.S. Armed Forces during combat and training; assist in refining efforts to capture blast exposure history to determine whether a future illness or injury is service-connected; and inform interim standards for blast exposure risk mitigation efforts of the DOD.

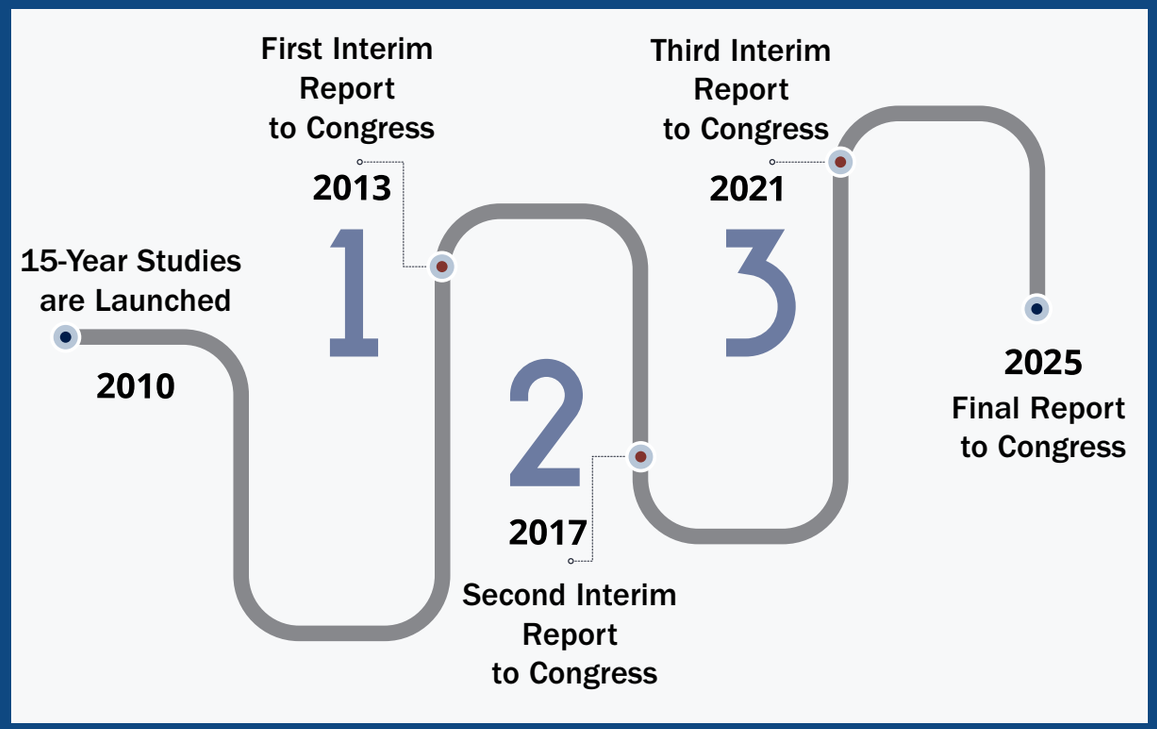
A Marine observes an explosion from a safe distance April 15 during a four-day basic demolition training course at Camp Schwab. (U.S. Marine Corps photo by Cpl. Jose Lujano)

NDAA Section 721: 15-Year Longitudinal Studies of TBI

In 2020, TBICoE reached several milestones in the 15-Year Studies–longitudinal research on the effects of TBI on U.S. Armed Forces members who served in Operation Iraqi Freedom or in Operation Enduring Freedom, as well as their families. Congressionally mandated by NDAA FY07 Section 721, these 15-Year Studies include a Natural History of TBI Study, a Caregiver and Family Member Study, and the Archival Studies. In 2015, a Veteran Affairs (VA) based study, the Improved Understanding of Medical and Psychological (IMAP) of Needs in Service Members and Veterans with Chronic Traumatic Brain Injury, was launched to complement the DOD research. IMAP focuses on TBI rehabilitation and supplements the VA Traumatic Brain Injury Model Systems existing infrastructure.

The Section 721 research studies, which are still actively collecting data, have produced 32 publications and 36 presentations in 2020. Since data collection began in 2010, the studies have produced more than 175 peer-reviewed manuscripts and over 400 conference presentations. These studies have generated important findings on the effects of mood, sleep, chronic pain, and PTSD on TBI, as well as data about long-term quality-of-life issues in both rehabilitating persons with TBI and on the needs of their caregivers.

Through these studies, TBICoE and its partners have produced the largest dataset for examining U.S. service members, veterans, and their caregivers across all levels of TBI severity.



Timeline of Reports to Congress

Preparing the 11-Year Report for Congress

Part of the congressional mandate requires that TBICoE produce interim reports after three, seven, 11, and 15 years. In preparation for the 11-year report to Congress in 2021, TBICoE hosted three virtual stakeholder meetings in 2020. Attendees included TBICoE senior leadership and Research Branch staff at headquarters, Section 721 investigators, VA, Military Health System (MHS), and academic experts in TBI and mental health policy. These sessions helped TBICoE prioritize research findings to include in the report.

Each interim report presents cumulative findings and policy recommendations across four mandated areas:

1. Long term physical and mental health effects of TBI
2. Long term health care, mental health care, and rehabilitation needs following TBI
3. Type and availability of long-term care TBI rehabilitation programs and services
4. Long term effects of TBI on the family

Vice Adm. Luke McCollum is shown during a live-broadcast of a congressional hearing with members of Congress. (U.S. Navy photo by Chief Mass Communication Specialist Stephen Hickok)

Research Gaps and Priorities, 2020–2022

The TBICoE Research Branch ensures that its research closely aligns with current and future needs of the DOD and VA by periodically reassessing a list of prioritized TBI "research gaps." A working group composed of key members from headquarters and the network sites collaborated to develop the following data-driven list of relevant and actionable research gaps centered on DOD and MHS priorities of readiness and prolonged field care:

1. Assess objective measures and clinical support tools to quantify risk and provide guidance regarding diagnosis and return to duty decisions following TBI. This may include leveraging existing U.S. Food and Drug Administration-cleared devices to associate severity of functional impairment with return to duty performance.
2. Characterize the effects of single, repetitive, and cumulative blast exposure, including sub-concussive exposure from heavy weapons during training or deployment, on neurological and psychiatric health, fitness for duty, and career outcomes.
3. Identify optimal assessment tools and biological correlates (such as blood biomarkers, neuroimaging, and neurosensory function) to detect and manage blast-induced effects on the brain.
4. Characterize the profiles (such as injury history, demographics, and genetics) of treatment responders versus treatment non-responders to identify indicators of successful recovery following TBI.
5. Integrate objective mild TBI patient data and outcomes-based measures through various approaches including computational modeling to inform return-to-duty capability.
6. Assess novel, mobile digital medical technology (such as biomarker panels and wearable sensors) to aid in prolonged TBI field care or in austere environments.
7. Conduct warfighter-relevant clinical trials to assess TBI rehabilitation interventions and practices in DOD and VA health systems.
8. Assess materiel and neuroprotective measures to decrease or prevent TBI and secondary effects from blast exposure.
9. Optimize treatment for moderate and severe TBI in austere environments or during prolonged field care, including improved evaluation, stabilization, and triage.

TBICoE Research Literature Summaries

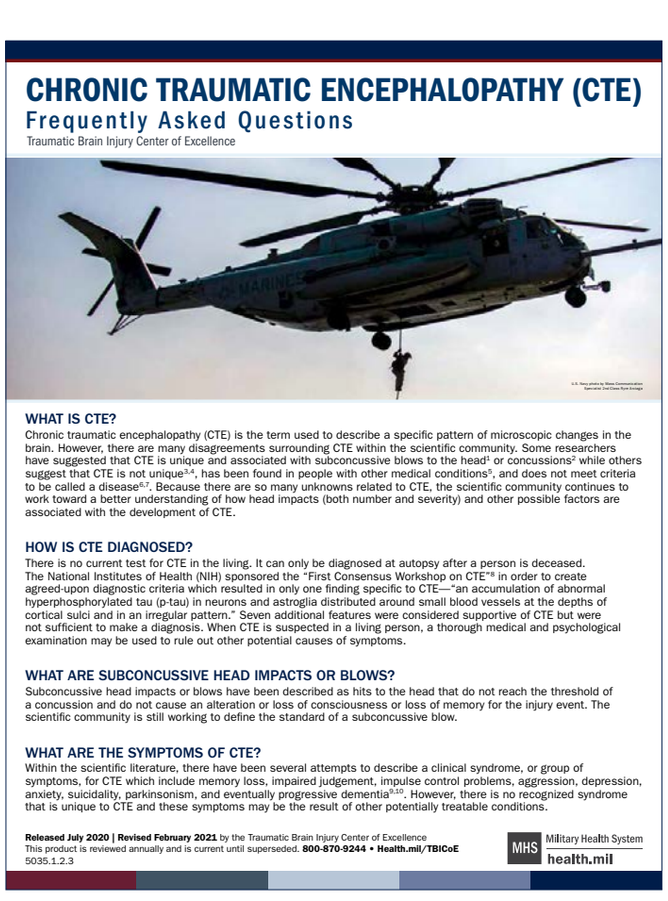
The Research Branch produces several summaries of key advances in TBI research that include its TBI Hot Topics Bulletin and Research Reviews.

Featuring articles from online media and peer-reviewed sources, the TBI Hot Topics Bulletin shares brief overviews of scientific studies and technological developments in TBI research, diagnostics, treatment, and rehabilitation. In 2020, each of the three newsletters discussed six to eight articles and their relevance to TBICoE or military populations.

Research Reviews discuss the latest peer-reviewed science on TBI topics in more depth, and some are posted on the Health.mil website. These Research Reviews were created or updated in 2020:

- Multiple Traumatic Brain Injury/Multiple Concussion Information Paper
- Mild Traumatic Brain Injury and Post-Traumatic Stress Disorder Research Review
- FAQ Factsheet of Chronic Traumatic Encephalopathy

The Research Branch produces Research Reviews when new areas of interest develop, or ongoing research needs to be updated to reflect advancements and new knowledge.



CHRONIC TRAUMATIC ENCEPHALOPATHY (CTE)

Frequently Asked Questions

Traumatic Brain Injury Center of Excellence

WHAT IS CTE?

Chronic traumatic encephalopathy (CTE) is the term used to describe a specific pattern of microscopic changes in the brain. However, there are many disagreements surrounding CTE within the scientific community. Some researchers have suggested that CTE is unique and associated with subconcussive blows to the head[1] or concussions[2] while others suggest that CTE is not unique[3,4], has been found in people with other medical conditions[5], and does not meet criteria to be called a disease[6,7]. Because there are so many unknowns related to CTE, the scientific community continues to work toward a better understanding of how head impacts (both number and severity) and other possible factors are associated with the development of CTE.

HOW IS CTE DIAGNOSED?

There is no current test for CTE in the living. It can only be diagnosed at autopsy after a person is deceased. The National Institutes of Health (NIH) sponsored the "First Consensus Workshop on CTE"[8] in order to create agreed-upon diagnostic criteria which resulted in only one finding specific to CTE—"an accumulation of abnormal hyperphosphorylated tau (p-tau) in neurons and astroglia distributed around small blood vessels at the depths of cortical sulci and in an irregular pattern." Seven additional features were considered supportive of CTE but were not sufficient to make a diagnosis. When CTE is suspected in a living person, a thorough medical and psychological examination may be used to rule out other potential causes of symptoms.

WHAT ARE SUBCONCUSSIVE HEAD IMPACTS OR BLOWS?

Subconcussive head impacts or blows have been described as hits to the head that do not reach the threshold of a concussion and do not cause an alteration or loss of consciousness or loss of memory for the injury event. The scientific community is still working to define the standard of a subconcussive blow.

WHAT ARE THE SYMPTOMS OF CTE?

Within the scientific literature, there have been several attempts to describe a clinical syndrome, or group of symptoms, for CTE which include memory loss, impaired judgement, impulse control problems, aggression, depression, anxiety, suicidality, parkinsonism, and eventually progressive dementia[9,10]. However, there is no recognized syndrome that is unique to CTE and these symptoms may be the result of other potentially treatable conditions.

Released July 2020 | Revised February 2021 by the Traumatic Brain Injury Center of Excellence
This product is reviewed annually and is current until superseded. **800-870-9244 • Health.mil/TBICoE**
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> "The results of this study [ORION] have the potential to shape clinical practice guidelines for concussion across the DOD, producing purposefully tailored treatment protocols that improve return-to-work in the short-run and decrease negative outcomes across the lifespan."
>
> - Jacques Arrieux, senior scientist

Collaborations

TBICoE works with many internal and external collaborators in grant application, data collection and management, analysis and interpretation, and publication. In 2020, 64% of our 36 active studies engaged one or more external partners.

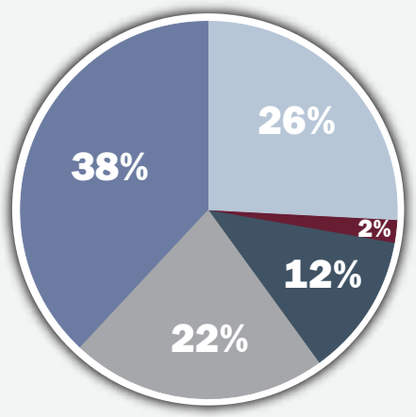
Collaborative Studies

There are many collaborations between at least two sites. Here is an example of a multi-site project with external partners:

In 2021, data collection will begin on a study called **Optimizing Rehabilitation InterventiONs (ORION)** for Patients with Persistent Multi-symptom Post Concussive Presentations, with TBICoE participation at Fort Bragg, Naval Medical Center San Diego, Camp Pendleton, and headquarters. The study, done in collaboration with University of Utah Salt Lake City, tries to identify patient characteristics and treatment circumstances that improve outcome and successfully return service members to duty. It is an example of how collaboration between sites and external partners can help TBICoE achieve its mission.

Overview of TBICoE Research With External Portfolio (as of Dec. 31, 2020)

Academia	13
Industry	1
DoD Partners	6
Non-DoD Federal Organizations	11
Civilian Medical Research Foundations, Organizations, and Hospitals	19
Total	**50**



Presentations at Scientific Meetings

Military Health System Research Symposium

This annual August meeting focuses on the unique medical needs of the warfighter. Before the symposium was cancelled due to the COVID-19 pandemic, TBICoE had 26 posters and five oral presentations accepted.

To promote the traditional information sharing and collaboration that is a large part of Military Health System Research Symposium (MHSRS), TBICoE hosted a virtual breakout session focused on blast exposure in support of our role as Office of Primary Responsibility for Health & Performance under NDAA FY18 Section 734. The virtual session shared relevant presentations from the cancelled MHSRS, and reached an online audience of 110 stakeholders. Two TBICoE neuropsychologists, Lisa Lu, Ph.D., and Jason Bailie, Ph.D., were among the key presenters.

National Academy of Neuropsychology Conference

Based on the conference poster list, more than 15 TBICoE researchers contributed to the virtual 40th annual National Academy of Neuropsychology (NAN) conference on October 14–16, 2020. NAN's mission is to advance neuropsychology by generating and disseminating knowledge of brain-behavior relationships. Scientist-practitioners, clinicians, and researchers in the field of neuropsychology comprise its membership.

Public Dissemination of TBI-Related Scientific Research

In 2020, TBICoE's researchers published 69 peer-reviewed articles. To disseminate scientific findings to the wider audience, TBICoE engaged in many outreach activities.

The TBICoE Clinical Updates in Brain Injury Science Today (CUBIST) podcast is aimed at health care providers, and discusses the latest TBI research relating to patient care. Topics for each episode are based on current and trending research. In 2020, 11 episodes were released, receiving a total of 1,015 plays.

The TBICoE Communications Team posted seven articles on Health.mil publicizing the Research Branch's work. Collectively, these seven stories received 12,296 page views.

- DVBIC blood plasma study assists in TBI and PTSD diagnosis*
- DVBIC study focuses on concussion-related headaches*
- DVBIC eye tracking tech may help service members with concussions*
- Medical providers need to be aware of the language of anger and depression
- Improving training of health care providers boosts post-concussion care among service members
- Caring for the caregivers of TBI patients
- Female and male service members and veterans recover from concussion differently study finds

* When these articles appeared, the organization's preferred name was the Defense and Veterans Brain Injury Center (DVBIC).

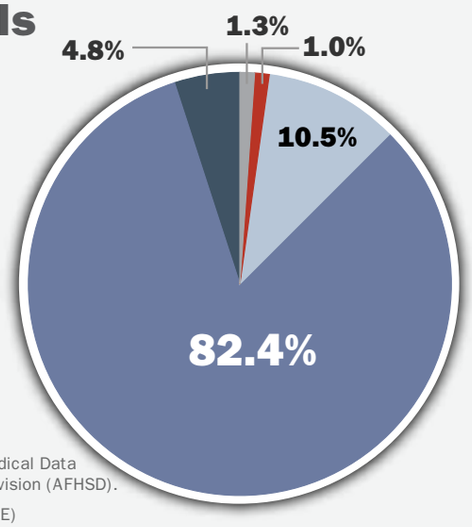
04 Clinical Affairs Highlights

Surveillance

DoD Numbers for Traumatic Brain Injury Worldwide — Totals

2000–2020 Q4

Penetrating	5,502
Severe	4,492
Moderate	45,477
Mild	358,088
Not Classifiable	21,059
Total - All Severities	**434,618**



Source: Defense Medical Surveillance System (DMSS), Theater Medical Data Store (TMDS) provided by the Armed Forces Health Surveillance Division (AFHSD).

Prepared by the Traumatic Brain Injury Center of Excellence (TBICoE)

**Percentage may not add to 100% due to rounding.*

2000–2020 Q4, as of Feb 16, 2021

As the DOD office responsible for TBI surveillance, TBICoE has been analyzing the number of active-duty service members with a first-time TBI diagnosis since 2000. These data are compiled and posted on the website each quarter.

Working closely with DHA's Armed Forces Health Surveillance Division, TBICoE serves as a DOD surveillance authority in TBI methodologies, which includes being a key authority on how TBI is officially defined.

TBICoE engaged in epidemiological studies on TBI incidence and prevalence, and in assessing their surveillance methods. In 2020, this included assessing how switching to the new electronic health record system (MHS GENESIS) affected TBI data and TBICoE furnished reports. Other studies included one that estimated long-term disability among service members, published in the Journal of Head Trauma Rehabilitation. This effort used data from the South Carolina Traumatic Brain Injury and Follow-up Registry to estimate the probability of long-term disability among hospitalized service members with TBIs. In another major effort, a TBICoE study applied statistical models to electronic health care records to estimate a second TBI. Accepted by the Journal of Military Medicine, this effort provided a statistical model to the research community to address the limitations of the MHS in coding secondary TBI using its electronic health care record system.

Other ongoing efforts included a study in collaboration with the DOD Joint Trauma System-Trauma Registry on TBI incidence in evacuated patients, studies to determine symptom clusters present in a TBI cohort, and explorations of clinical profiles of patients seeking TBI care. In addition, TBICoE worked closely with clinics to examine site-specific questions, such as TBI patient pathways when diagnosed at the emergency department, typical duty specialties of marines with TBIs, and which military treatment facilities are most likely to see newly diagnosed TBI patients.

> "The intent of the study was ... to get a sense of the complexity of the patient."
> - Tajrina Haj, epidemiologist and program analyst

Tajrina Haj, epidemiologist and program analyst in the Office of Surveillance at DVBIC Headquarters. (DVBIC Photo by Vincent White)

In March, TBICoE epidemiologists Tajrina Haj, Yll Agimi, and Clinical Affairs Branch Chief Katharine Stout, presented at the 10th Annual National Capital Area TBI Research Symposium on the National Institutes of Health Bethesda campus. Haj, who spoke at the conference, reported on a study of 47,000 service member who had sustained TBIs. Their medical records showed that TBI's leading comorbidities were cognitive, sleep, emotional and anxiety disorders, as well as post-traumatic stress disorder. The data also identified less prevalent comorbid conditions, such as headaches, and alcohol and substance abuse. Haj noted that many TBI patients come to providers with other medical conditions.

TBI Pathway of Care Manager

TBICoE has managed DOD TBI Pathway of Care (PWoC) and has chaired the DOD TAC. The TAC is the DOD coordinating body chartered to promote organized and efficient TBI care—from prevention and education through reintegration to active duty. The TBICoE Clinical Affairs Branch supports the PWoC efforts through evaluation of TBI Surveillance data, provides TBI outcomes collection recommendations, and develops state of the science clinical recommendations to support clinical practice for TBI in the DOD. Although Clinical Affairs plays a prominent role in this initiative, PWoC affects all TBICoE endeavors.

Congressional Mandate

The NDAA FY20 Section 750 has required the Secretary of Defense to analyze the scientific literature on TBI mitigation efforts, and produce a report for Congress in 2020. The report is intended to provide a roadmap of TBI care within the MHS by addressing outcomes, cost, access to care, and patient and command satisfaction with treatment, as well as the implementation of recommended reforms.

TBICoE's Clinical Affairs Branch has drafted this report, and the final version will be submitted to Congress by the DOD in the spring of 2021.

Quadruple Aim Performance Process

As part the DHA Quadruple Aim Performance Process (QPP) initiative, the TAC and TBICoE collaborated on which metrics to submit to the Deputy Assistant Director of Medical Affairs for measuring the outcomes of acute concussion patients. TBICoE's Clinical Affairs and Education Branches supported developing a standardized, military-specific approach to diagnosing and managing concussions that reduces chronic symptoms and increases service member readiness after injury. Standardizing treatment and the metrics to assess its effectiveness will contribute to DHA's four-fold mission of better health, better care, lower cost, and mission readiness.

On September 24, 2020, the TAC military service leads, Captain Pyne, the Division Chief, and Dr. Stout, the Acting Assistant Division Chief, presented on this process initiative as part of the DHA's Clinical Community Speaker Series; the online QPP presentation offered continuing education credit.

The four aims of the QPP.

Completed and Ongoing Clinical Recommendation Revisions

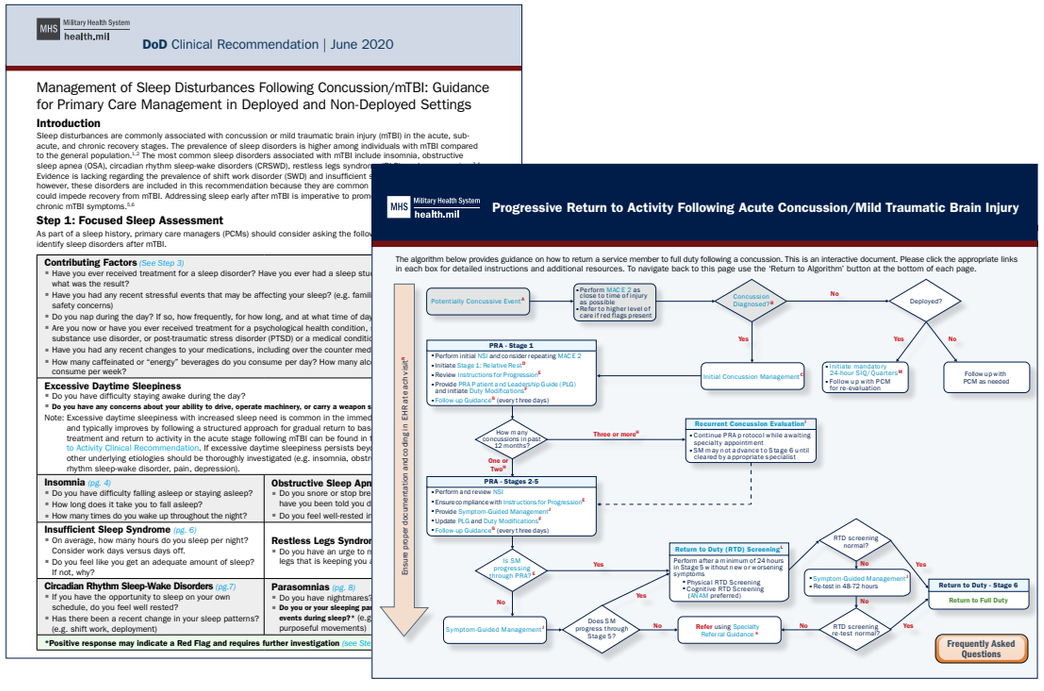
In June, the Clinical Affairs Branch published a revised clinical recommendation (CR) on sleep following concussion, which updated the 2014 version. The sleep CR provides step-by-step guidance to help primary care managers assess and manage sleep disturbances associated with mild TBI. The 2020 update includes dosing recommendations for relevant medications, clearer specialty referral timelines, and a more comprehensive coverage of sleep disturbances. An article on the sleep CR appeared on Health.mil in July.

TBICoE revised its CR on progressive return to activity (PRA) following concussion to be released in spring 2021.

The PRA emphasizes the need for a staged approach in returning service members to full duty by gradually increasing activity over the course of rehabilitation. The PRA revision will include six major changes to the current tools:

- Combined several TBICoE products to create a simplified TBICoE clinical suite, allowing providers to smoothly transition from performing the Military Acute Concussion Evaluation 2 (MACE 2) at point of injury to managing the concussion across the continuum of care with the PRA
- Updated PRA progression criteria to improve usability
- Updated the definition of "rest" to "relative rest" to reflect recent evidence showing early introduction of symptom-limited activity may hasten recovery
- Clarified activity recommendations and simplified restrictions in each stage to be more relevant to service members
- Added primary care management strategies to provide treatment options for various post-concussion symptoms, as well as guidelines for specialty referral
- Expanded the return to duty screening to include both physical and cognitive components with clear performance guidelines

In 2020, the Clinical Affairs Branch began revising its CRs on vision and dizziness.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DoD Clinical Recommendation | June 2020

Management of Sleep Disturbances Following Concussion/mTBI: Guidance for Primary Care Management in Deployed and Non-Deployed Settings

Introduction

Sleep disturbances are commonly associated with concussion or mild traumatic brain injury (mTBI) in the acute, sub-acute, and chronic recovery stages. The prevalence of sleep disorders is higher among individuals with mTBI compared to the general population.[1,2] The most common sleep disorders associated with mTBI include insomnia, obstructive sleep apnea (OSA), circadian rhythm sleep-wake disorders (CRSWD), restless legs syndro
Evidence is lacking regarding the prevalence of shift work disorder (SWD) and insufficient s
however, these disorders are included in this recommendation because they are common
could impede recovery from mTBI. Addressing sleep early after mTBI is imperative to prom
chronic mTBI symptoms.[3,4]

Step 1: Focused Sleep Assessment

As part of a sleep history, primary care managers (PCMs) should consider asking the follo
identify sleep disorders after mTBI.

Contributing Factors (See Step 3)
- Have you ever received treatment for a sleep disorder? Have you ever had a sleep stu
what was the result?
- Have you had any recent stressful events that may be affecting your sleep? (e.g. famil
safety concerns)
- Do you nap during the day? If so, how frequently, for how long, and at what time of da
- Are you now or have you ever received treatment for a psychological health condition,
substance use disorder, or post-traumatic stress disorder (PTSD) or a medical conditi
- Have you had any recent changes to your medications, including over the counter med
- How many caffeinated or "energy" beverages do you consume per day? How many alc
consume per week?

Excessive Daytime Sleepiness
- Do you have difficulty staying awake during the day?
- **Do you have any concerns about your ability to drive, operate machinery, or carry a weapon s**

Note: Excessive daytime sleepiness with increased sleep need is common in the immed
and typically improves by following a structured approach for gradual return to bas
treatment and return to activity in the acute stage following mTBI can be found in t
to Activity Clinical Recommendation. If excessive daytime sleepiness persists beye
other underlying etiologies should be thoroughly investigated (e.g. insomnia, obstr
rhythm sleep-wake disorder, pain, depression).

Insomnia (pg. 4)
- Do you have difficulty falling asleep or staying asleep?
- How long does it take you to fall asleep?
- How many times do you wake up throughout the night?

Obstructive Sleep Apn
- Do you snore or stop bre
have you been told you d
- Do you feel well-rested in

Insufficient Sleep Syndrome (pg. 6)
- On average, how many hours do you sleep per night? Consider work days versus days off.
- Do you feel like you get an adequate amount of sleep? If not, why?

Restless Legs Syndro
- Do you have an urge to r
legs that is keeping you

Circadian Rhythm Sleep-Wake Disorders (pg.7)
- If you have the opportunity to sleep on your own schedule, do you feel well rested?
- Has there been a recent change in your sleep patterns? (e.g. shift work, deployment)

Parasomnias (pg. 8)
- Do you have nightmares?
- **Do you or your sleeping pa**
events during sleep? (e.g.
purposeful movements)

*Positive response may indicate a Red Flag and requires further investigation (see Ste

MHS Military Health System health.mil

Progressive Return to Activity Following Acute Concussion/Mild Traumatic Brain Injury

The algorithm below provides guidance on how to return a service member to full duty following a concussion. This is an interactive document. Please click the appropriate links in each box for detailed instructions and additional resources. To navigate back to this page use the 'Return to Algorithm' button at the bottom of each page.

Ensure proper documentation and coding in EHR at each visit

Potentially Concussive Event
Perform MACE 2 as close to time of injury as possible
Refer to higher level of care if red flags present
Concussion Diagnosed?
No
Deployed?
Yes
No
Yes
PRA - Stage 1
Perform initial NSI and consider repeating MACE 2
Initiate Stage 1: Relative Re
Review Instructions for Progression
Provide PRA Patient and Leadership Guide (PLG) and initiate Duty Modifications
Follow-up Guidance (every three days)
Initial Concussion Management
Initiate mandatory 24-hour SIQ/Quarters
Follow up with PCM for re-evaluation
Follow up with PCM as needed
How many concussions in past 12 months?
One or Two
Three or more
Recurrent Concussion Evaluation
Continue PRA protocol while awaiting specialty appointment
SM may not advance to Stage 6 until cleared by appropriate specialist
PRA - Stages 2-5
Perform and review NSI
Ensure compliance with Instructions for Progression
Provide Symptom-Guided Management
Update PLG and Duty Modifications
Follow-up Guidance (every three days)
Is SM progressing through PRA?
Yes
No
Return to Duty (RTD) Screening
Perform after a minimum of 24 hours in Stage 5 without new or worsening symptoms
Physical RTD Screening
Cognitive RTD Screening (ANAM preferred)
RTD screening normal?
No
Yes
Symptom-Guided Management
Re-test in 48-72 hours
Return to Duty - Stage 6
Return to Full Duty
Symptom-Guided Management
Does SM progress through Stage 5?
No
Yes
Refer using Specialty Referral Guidance
No
RTD screening re-test normal?
Yes
Frequently Asked Questions

05 Education Highlights

In 2020, the Education Branch revised several stand-alone patient education fact sheets, which focused on managing post-concussion symptoms, neck pain, memory loss, and on the behavior, personality, and mood changes that can occur after a TBI.

Education staff developed two new multimedia educational products—the Line Leader Management of Mild Traumatic Brain Injury/Concussion in the Deployed Setting micro-learning video and the TBICoE Helmet Challenge Game.

Available to MHS providers, the Headache Interactive Provider Training (iPT), an online, self-guided course in evaluating and treating post-traumatic headaches, was renewed by DHA's Continuing Education Program Office (CEPO). In 2020, 248 continuing education (CE) credits and 61 certificate of attendance (CA) credit hours were awarded to 421 participants of this asynchronous training.

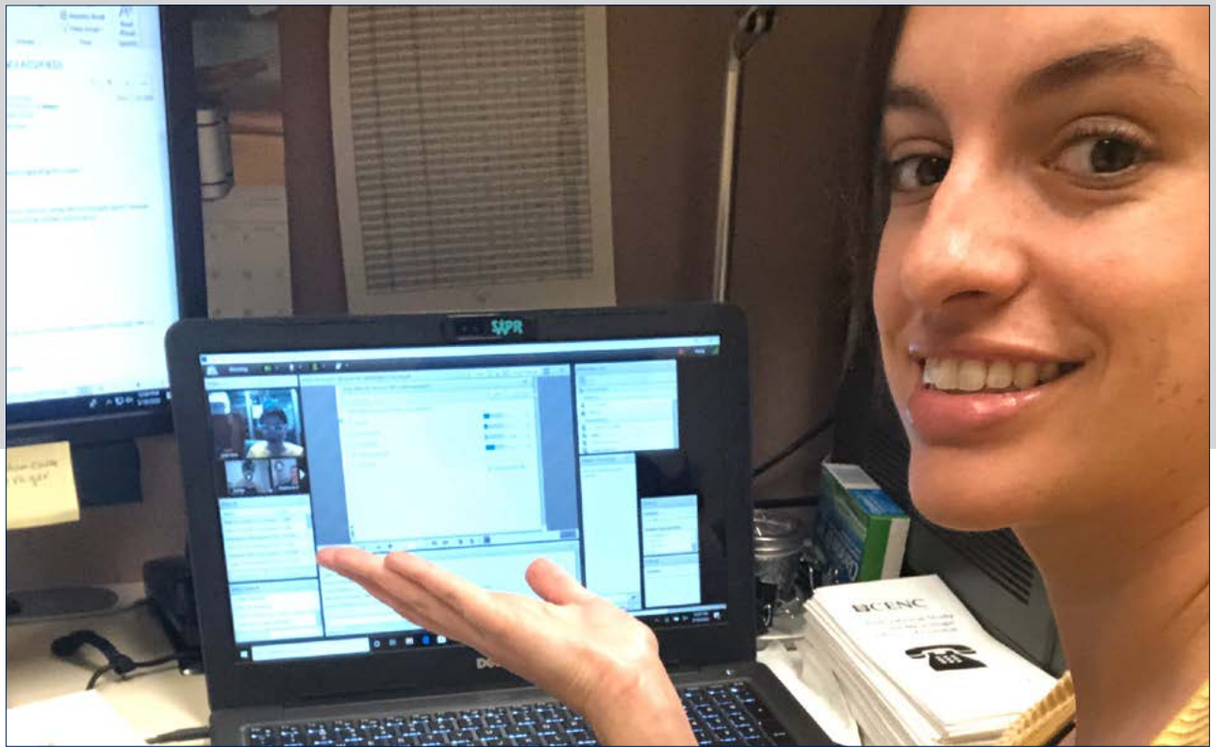
Education also produced training for primary care managers to support of the CR for PRA. These educational materials included a slide deck, instructor guide, and student workbook for facilitating a two-hour, instructor-led presentation. The structured training was approved by CEPO, which will award CE credits and CA credit hours to providers who have completed it successfully.

To support the release of the new Management of Sleep Disturbances Following Concussion/mTBI: Guidance for Primary Care Management in Deployed and Non-Deployed Settings CR, the Education staff developed a patient fact sheet and infographic, and a provider infographic and motion graphic.

The provider training suite for MACE 2 received renewed CEPO approval for CE credit. It includes training slides, instructor guide, and student workbook. By the end of 2020, a total of 174 CE credits and 87 CA credit hours had been awarded to the 194 learners who participated in these instructor-led training sessions.

Education Products Created or Revised

- **Military Acute Concussion Evaluation 2 (MACE 2)**
  - Training Slideshow (revised)
  - Training Instructor Guide (revised)
  - Training Student Workbook (revised)
- **Healthy Sleep Following Concussion/mTBI**
  - Fact Sheet
  - Sleep Patient Infographic
  - Sleep Provider Infographic
  - Sleep Motion-graphic
- **Progressive Return to Activity (PRA)**
  - Primary Care Manager Training Slides
  - Primary Care Manager Instructor Guide
  - Primary Care Manager Student Workbook
- **Other Products**
  - Managing Neck Pain After Concussion Fact Sheet (revised)
  - For Line Leaders: Management of Mild Traumatic Brain Injury/Concussion in the Deployed Setting Micro-learning Video
  - TBICoE Helmet Challenge Game
  - Mild TBI Symptom Management Fact Sheet: Changes in Behavior, Personality or Mood (revised)
  - Ways to Improve Your Memory: Concussion/Mild Traumatic Brain Injury Fact Sheet (revised)



Gabriela Ryan, regional education coordinator at VA Tampa Hospital, spoke to military health providers as part of Brain Injury Awareness Month in March. (TBICoE Photo)

Regional Education Coordinators

Located in the U.S. and Germany, the 16 TBICoE regional education coordinators (RECs) are responsible for disseminating educational materials and products, and facilitating TBI training of care providers in the MHS. They also promote TBI awareness and outreach to U.S. Armed Forces leadership, active-duty service members and veterans, their families, and to the surrounding civilian community. Each REC is responsible for a particular region of the country.

In 2020, many notable changes were implemented in the REC program:

- Successfully pivoted from in-person training to virtual working environment because of the pandemic
- Increased collaboration among the branches in developing, revising, and implementing products
- Introduced peer-to-peer mentoring and presentations, which focused on the unique practices of each region, and served as educational tools for other RECs

Brain Injury Awareness Month

Every year, the DOD recognizes March as Brain Injury Awareness Month (BIAM). The annual event seeks to increase stakeholder understanding of the signs and symptoms of TBI. It also emphasizes TBICoE's role as the TBI Center of Excellence and manager of the TBI Pathway of Care. Activities had been planned to publicize TBI research, clinical support, and education efforts throughout the center's network. Although some were cancelled because of the pandemic, almost 76% of all originally planned activities still occurred in virtual environments.

An REC event from March 2020 before the move to virtual delivery following the COVID pandemic. (TBICoE Photo)

2020 BIAM Theme

The year's theme was "TBI: Me, You, Us"—each pronoun designating a different TBI stakeholder. "Me" referred to both service members and veterans, and the activities focused on them occupied weeks one and two, respectively. "You" referred to health providers and was the focus of week three. Finally, "Us" referred to caregivers and family members, and rounded out the discussion topics in week four.

Specific Outreach Activities

Each REC had scheduled a minimum of four BIAM events; many occurred virtually because of the pandemic.

The TBICoE Communications Team developed and posted a four-part special podcast series entitled "Picking Your Brain" to explain key ideas on TBI to a wider audience. Every week, the podcast addressed another topic:

- **Week 0** (last week of February): An extended trailer previewing the upcoming podcast series
- **Week 1**: Active-Duty Service Members (Me)
  - Return to activity; TBI prevention
- **Week 2**: Veterans (Me)
  - Long-term care; Resources
- **Week 3**: Providers, Researchers, and Clinicians (You)
  - Outcomes; Blast exposure research
- **Week 4** Caregivers and Family Members (Us)
  - Stories of recovery

During BIAM, the trailer and four episodes were played 373 times, and nine promotional audiograms related to the series were viewed more than 7,000 times as Facebook posts. The podcasts continued after March; three more episodes were released in 2020, and the seven-episode Picking Your Brain series received 833 plays by year's end.

At the beginning of the month, a BIAM activities overview article appeared in Health.mil, the official online publication of the DHA and TBICoE published three more articles later in March. During BIAM, many of these activities were promoted by posts on TBICoE's Facebook page.

A Head for the Future

Established in 2014, A Head for the Future (AHFTF) is a TBICoE initiative that provides resources on TBI prevention, recognition, and recovery targeted to the military community, particularly to its largest stakeholder group—service members, veterans, and their families. These resources include videos, blogs, social media content, and educational materials.

AHFTF Accomplishments:

In 2020, AHFTF continued its video series profiling "TBI Champions" (individuals who showed remarkable resilience after experiencing TBIs), and expanded "Talking TBI," which combined animated segments with audio sound bites from caregiver conversations. There were 13 paid-promotion posts to social media (12 TBI Champions videos, and one education-focused infographic animation) that reached more than 1.3 million viewers. They also created four blog posts. When the initiative ended this year, AHFTF created a compilation video showcasing the many veterans and caregivers who had appeared in the Champions series. The compilation and some of the series videos can be viewed on Health.mil. AHFTF videos were also featured in a Health.mil story on caregivers published in November for National Family Caregivers Month.

In addition to these online activities, initiative members attended 31 events and distributed more than 350 products and virtual resources in 2020. These activities reached 1,255 attendees, and included connecting with new military women's and veterans groups.

AHFTF Social Media:

In 2020, AHFTF's Facebook page merged with TBICoE's Facebook page.

- AHFTF "Talking Heads" public service announcements (PSAs), featuring TBI Champions, ran on the Armed Forces Network (AFN) during most of 2020.
- Two audio PSAs featuring TBI champions Calvin Smith and Jasmine (and Wally) Blair started airing on AFN on Sept. 23, 2019 and ran for a year until Sept. 23, 2020.
- AFN orders each of their eight AFN TV services to air spots twice per day on average, which amounts to 480 times a month (5,760 per PSA—totaling 11,520 times).

During BIAM, AHFTF created five short videos featuring several of TBICoE's RECs. AHFTF's BIAM social media efforts resulted in 28,369 impressions and 1,444 media views on Twitter and 4,400 video views on Facebook, reaching more than 21,000 users.

Retired Army Special Operations instructor Derek Poor pictured with his son. Poor was featured in AHFTF blog and video. (AHFTF photo)

Image from AHFTF video on Facebook featuring U.S. Marine Corps Sgt. Maj. Gary Moran and his son. (AHFTF photo)

U.S. Army retired Staff Sgt. Beth King, featured in AHFTF blog, participates in the track event during the 2019 Department of Defense Warrior Games. (U.S Army photo by PFC Dominique Dixon)

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