# The Department of Defense's (DOD) Warfighter Brain Health Initiative: Maximizing Performance On and Off the Battlefield

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October 17, 2024
0800-1000 ET

# Presenter

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(Health Affairs)
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# Kathy Lee, M.S., A.R.N.P.

Ms. Lee currently serves as the Director of Warfighter Brain Health Policy supporting the Deputy Assistant Secretary of Defense for Health Readiness Policy and Oversight. She brings considerable clinical, educational, research and policy experience in the field of neuroscience and neurotrauma to include more than 250 regional, national and international presentations and more than 30 peer reviewed publications.

Ms. Lee has served in a variety of leadership, advisory and operational roles in the US Department of the Army and US Department of Defense for 20 years; including the Assistant Chief of the Defense and Veterans Brain Injury Center (DVBIC) and the Deputy Director for the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury.

Prior to working in Washington DC, Ms. Lee worked in two academic, Level I trauma centers as a nurse practitioner/clinical care coordinator at the University of Louisville Hospital; and clinical research coordinator in the Division of Neurosurgery at the Medical College of Virginia Hospitals/Virginia Commonwealth University. Ms. Lee holds both bachelor's and master's degrees in nursing from Virginia Commonwealth University, as well as a Bachelor of Science in family and child development from Virginia Tech University.

# Disclosures

- Ms. Lee has no relevant financial or non-financial relationships to disclose relating to the content of this activity.
- The views expressed in this presentation are those of the authors and do not necessarily reflect the official policy or position of the Department of Defense, nor the U.S. Government.
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- Commercial support was not received for this activity.

# Learning Objectives

At the conclusion of this activity, participants will be able to:

1. Summarize the scope and activities that support the DOD's Warfighter Brain Health Initiative (WBHI).
2. Discuss the clinical aspects of the WBHI with a focus on brain threats: blast overpressure (operational/ training environments) and directed energy (anomalous health incidents).
3. Outline WBHI key partnerships and ongoing improvements across the DOD enterprise to protect our Warfighter's brain health.

# Scope of Traumatic Brain Injuries (TBIs) in Military Health System

- Between 2000-Q1 2024,  505,896 Service members were diagnosed with TBIs.
- 82.2% were mild, followed by 11.4% moderate, 1% severe and 1.2% penetrating. (4.2% non-classifiable)
- Between 78% (Army) and 93% (Marines) of all TBI is from the Active-Duty Component.
- The annual number of TBIs grew from just above 10,000 per year in 2000 to a peak of close to 33,000 per year by 2011.
- The Military Health System (MHS) sees an estimated 14,000 to 17,000 visits per month for TBI.

# DOD Warfighter Brain Health Initiative (WBHI): Purpose

- Alignment to overall DOD mission
- Defend the Homeland
  - Maximize deployability
  - Optimize Service member performance on and off battlefield
- DOD-wide initiative
- Traumatic brain injury is now integrated into the DOD WBHI

(defense.gov, 2012)

# Warfighter Brain Health: Definition

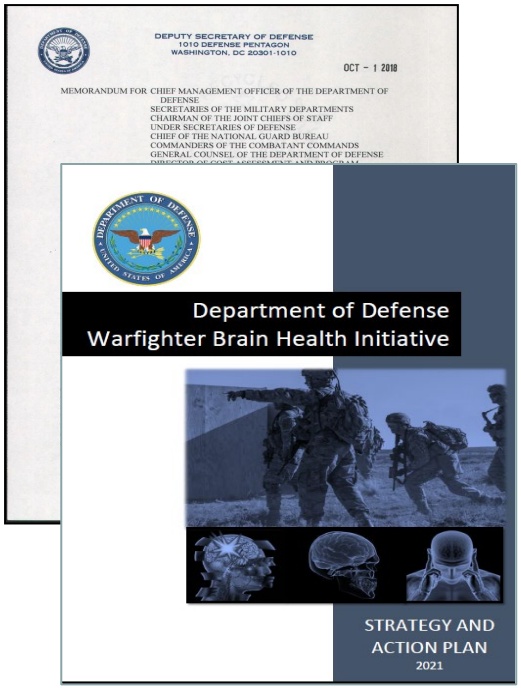
Warfighter brain health is defined as the physical, psychological, and cognitive status that affects a warfighter's capacity to function adaptively in any environment and impacts readiness, operational capability, mission effectiveness, and the goal to achieve overmatch or superior lethality.

(Deputy Secretary of Defense Memorandum, 2018)
(National Defense Strategy, 2018)

(defense.gov, 2009)

# DOD WBHI: Drivers/ Mandate

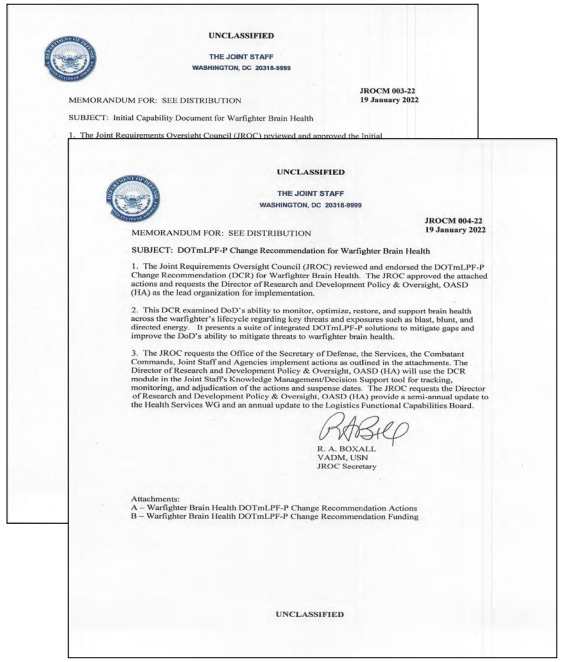
## WBH Initiative Strategy & Action Plan




On 1 October 2018, the Deputy Secretary of Defense provided direction for a Comprehensive Strategy and Action Plan for Warfighter Brain Health

Signed on 8 JUN 22, the Strategy and Action Plan synchronized and prioritized efforts into a single brain health approach to produce more efficient and effective results

## WBH Joint DOTmLPF-P Change Recommendation (DCR)/ Initial Capabilities Document (ICD)




The WBH CBA assessed DOD's ability to monitor, optimize, restore, and support brain health across the warfighter's lifecycle regarding key threats and exposures such as blast, blunt, directed energy, etc.

Signed on 19 JAN 22 the Final Product: 36 solutions and 74 R&D activities to support optimization of Warfighter brain health

## FY23 NDAA, Sec 735: Brain Health Initiative of Department of Defense

SEC. 735. BRAIN HEALTH INITIATIVE OF DEPARTMENT OF DEFENSE.

(a) IN GENERAL.—The Secretary of Defense, in con-

(d) PILOT PROGRAM RELATING TO MONITORING OF BLAST COVERAGE.—

(1) AUTHORITY.—The Director of the Defense Health Agency may conduct, as part of the Initiative, a pilot program under which the Director shall monitor blast overpressure exposure through the use of commercially available, off-the-shelf, wearable sensors, and document and evaluate data collected as a result of such monitoring.

(2) LOCATIONS.—Monitoring activities under a pilot program conducted pursuant to paragraph (1) shall be carried out in each training environment that the Director determines poses a risk for blast overpressure exposure.

Signed 23 DEC 22Congressional language focused on brain health initiative.

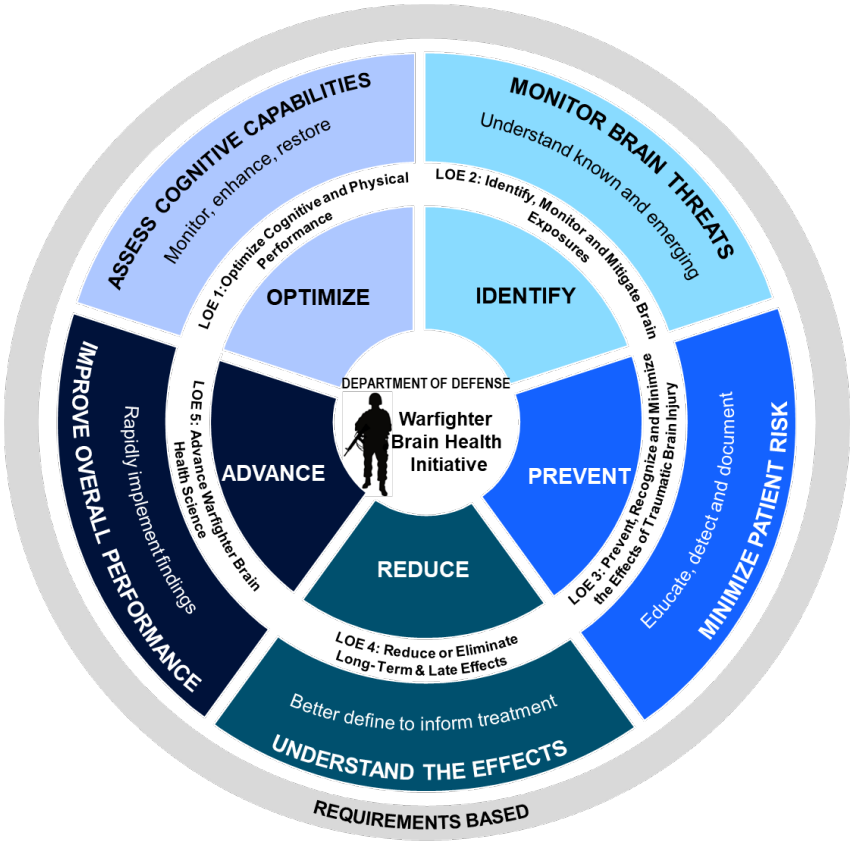


CAB: Capabilities Based Assessment
R&D: research and development

# DOD WBHI: Optimizing Brain Health* Through Five Lines of Effort (LOEs)

**Mission:** Act rapidly to provide products, practices, and policies to directly impact warfighter brain health and performance

**End State:** Optimize warfighter brain health and performance to maximize Joint Force superiority and lethality in all operating environments




**LOE 1: Optimize Cognitive and Physical Performance**

**LOE 2: Identify, Monitor, and Mitigate Brain Exposures**

**LOE 3: Prevent, Recognize and Minimize the Effects of TBI**

**LOE 4: Reduce or Eliminate Long-Term & Late Effects**

**LOE 5: Advance Warfighter Brain Health Science**

(Department of Defense Warfighter Brain Health Initiative: Strategy and Action Plan, 2022)*

# DOD WBHI: Efforts

- Optimize Cognitive and Physical Performance
  - Establish Cognitive Monitoring Program
- Identify, Monitor, and Mitigate Brain Exposures
  - Blast Overpressure (BOP) and Anomalous Health Incidents (AHI)
- Prevent, Recognize and Minimize the Effects of TBI
  - Oversight Plan for Management of TBI Care
- Reduce or Eliminate Long-Term & Late Effects
  - Defense Intrepid Network and DOD Brain Tissue Repository
- Advance Warfighter Brain Health Science
  - DOD WBH Research Strategy
- New WBH DODI policy (to address all above)

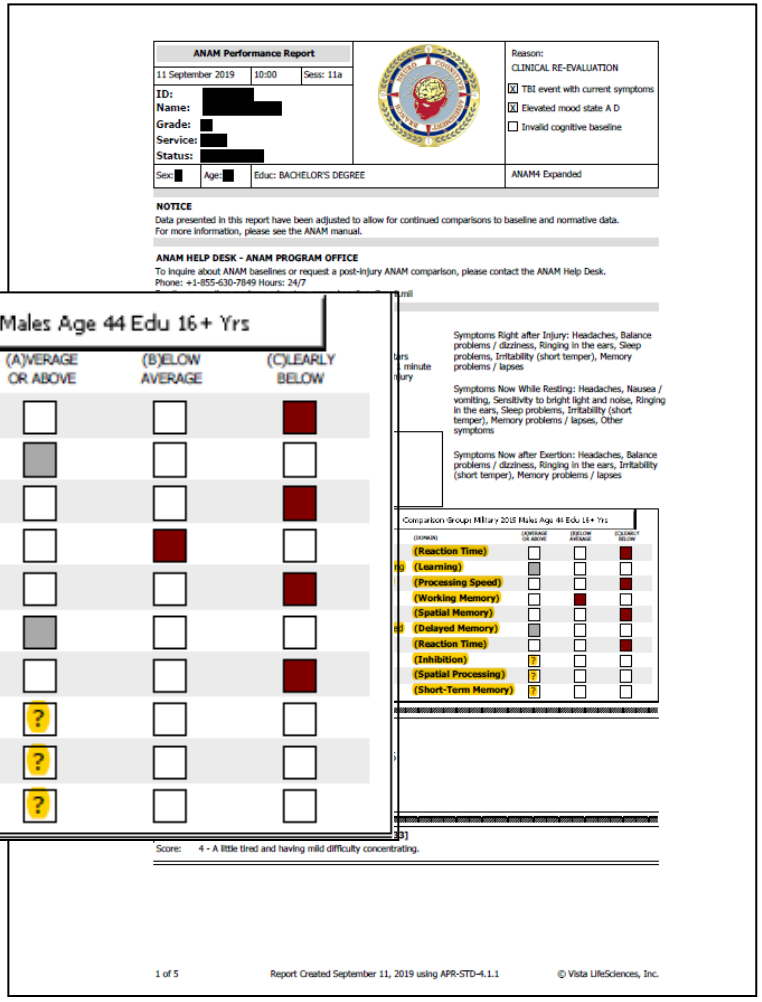
# DOD WBHI: Optimize Cognitive & Physical Performance (LOE 1)

- Cognitive monitoring program goal is to obtain a cognitive baseline to determine the need to restore or enhance cognitive health and performance
  - Expansion from pre deployment cognitive testing program; 3M baselines obtained
- Current Office of the Secretary of Defense (OSD) requirement for cognitive monitoring
  - First baseline for Active and Reserve Component accessions at Initial Military Training (IMT) Sites by 31 DEC 24
  - High risk for BOP Active Duty (AD) by end of Fiscal Year (FY) 25
  - Minimal standard retest every five years

    (may change to three years based on congressional requirements)
- Initiated expanded cognitive monitoring program
  - Fort Knox: 3 June (5620 assessments)
  - Fort Sill:  28 June (3096 assessments)
  - Naval Academy: 2 July (1069 assessments)
  - Fort Moore, 26 AUG
  - Parris Island 10 SEP
- Co-occurring analysis of other neurocognitive assessment tools
- Additional Fixed testing sites and Outside the Continental United States (OCONUS) capability to be planned

# DOD WBHI: DOD Neurocognitive Assessment Program (Background)

Automated Neuropsychological Assessment Metrics (ANAM)
(10 Cognitive Domains )



**ANAM Performance Report**

11 September 2019 | 10:00 | Sess: 11a

ID: [redacted]
Name: [redacted]
Grade: [redacted]
Service: [redacted]
Status: [redacted]

Sex: [redacted] Age: [redacted] Educ: BACHELOR'S DEGREE

Reason: CLINICAL RE-EVALUATION
[X] TBI event with current symptoms
[X] Elevated mood state A D
[ ] Invalid cognitive baseline

ANAM4 Expanded

**NOTICE**
Data presented in this report have been adjusted to allow for continued comparisons to baseline and normative data.
For more information, please see the ANAM manual.

**ANAM HELP DESK - ANAM PROGRAM OFFICE**
To inquire about ANAM baselines or request a post-Injury ANAM comparison, please contact the ANAM Help Desk.
Phone: +1-855-630-7849 Hours: 24/7

Symptoms Right after Injury: Headaches, Balance problems / dizziness, Ringing in the ears, Sleep problems, Irritability (short temper), Memory problems / lapses

Symptoms Now While Resting: Headaches, Nausea / vomiting, Sensitivity to bright light and noise, Ringing in the ears, Sleep problems, Irritability (short temper), Memory problems / lapses, Other symptoms

Symptoms Now after Exertion: Headaches, Balance problems / dizziness, Ringing in the ears, Irritability (short temper), Memory problems / lapses

Score: 4 - A little tired and having mild difficulty concentrating.

1 of 5 Report Created September 11, 2019 using APR-STD-4.1.1 © Vista LifeSciences, Inc.

NOTES

**PERFORMANCE AT A GLANCE**

Comparison Group: Military 2015 Males Age 44 Edu 16+ Yrs

| RELIABLE CHANGE (BASELINE) | TEST | (DOMAIN) | (A)VERAGE OR ABOVE | (B)ELOW AVERAGE | (C)LEARLY BELOW |
|---|---|---|---|---|---|
| -5.23 | SRT-Simple Reaction Time | (Reaction Time) | | | ■ |
| -1.2 | CDS-Code Substitution - Learning | (Learning) | ■ | | |
| -2.94 | PRO-Procedural Reaction Time | (Processing Speed) | | | ■ |
| -1.44 | MTH-Mathematical Processing | (Working Memory) | | ■ | |
| -1.11 | M2S-Matching to Sample | (Spatial Memory) | | | ■ |
| -3.6 | CDD-Code Substitution - Delayed | (Delayed Memory) | ■ | | |
| -4.63 | SR2-Simple Reaction Time (R) | (Reaction Time) | | | ■ |
| 1.87 | GNG-Go/No-Go | (Inhibition) | ? | | |
| 0.46 | SPD-Spatial Processing | (Spatial Processing) | ? | | |
| -2.54 | ST6-Memory Search (6) | (Short-Term Memory) | ? | | |

Source: Screenshot of ANAM

# DOD WBHI: Cognitive Enhancement and Restoration


(af.mil, 2016)

- Enhancement
  - Cognitive Readiness
  - Brain Fitness Centers
  - Research : Software Products
- Restoration
  - Clinical Practice Guidelines on Cognitive Rehabilitation (DOD/VA)
  - National Intrepid Center of
  - Excellence and Intrepid Spirit Network



VA: Veterans Affairs

# DOD WBHI: Identify, Monitor & Mitigate Brain Exposures (LOE 2)

To improve understanding and mitigation of brain exposures to the warfighter, the WBH requirements highlights a need for sensor, gauge, and health monitoring capabilities

- Monitor, measure, and store data on exposures to the brain
- Can be used in both training and operational environments
- Do not overwhelm and weigh down the warfighter's kit
- Transmit data to relevant Service and joint data systems

**IDENTIFY, MONITOR, AND MITIGATE**

# DOD WBHI: Known and Emerging Brain Exposures*

- Ballistic Projectiles
- Blast overpressure** (include underwater and subterranean exposures)
- Blunt force impact
- Chemical-Biological-Gas toxins
- Directed energy (i.e., pulsed high power microwave)
- High G acceleration/vibration/recoil
- Incoming/Near missed impact (ex. Ballistic Missiles)
- Other environmental hazards
- Pressure fluctuations (i.e., aviators)

* Exposures not prioritized

**Mandated by National Defense Authorization Act Fiscal Year 2018 Section 734

# DOD WBHI: Identify, Monitor & Mitigate Brain Exposures Anomalous Health Incidents (AHI)

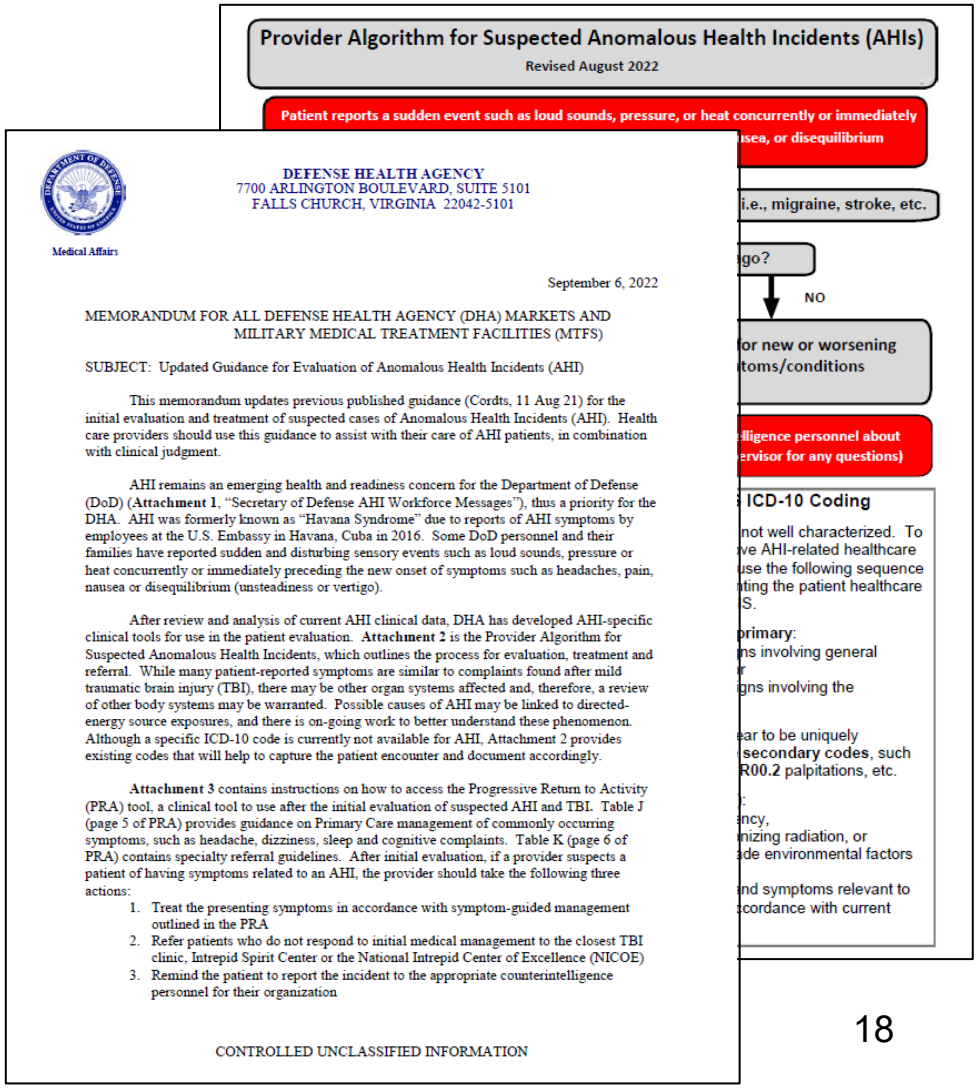

- AHI is an emerging brain threat and a priority for the Secretary of Defense (SECDEF) commonly referred to as “Havana Syndrome”
- Over the course of the last several years, some DOD personnel have reported a series of sudden and troubling sensory events
- AHI are thought to be caused by directed energy
- In 2022, SECDEF directed the establishment of a Cross Functional Team (CFT) to coordinate all DOD and interagency activities

(gettyimages.fi, 2018)

# DOD WBHI: DHA AHI Clinical Guidance

- Provider Algorithm for Suspected AHIs
- Progressive Return to Activity Following Acute Concussion/Mild TBI
- DHA Form 244 AHI Acute Assessment
- Frequently asked questions (FAQs) on AHI for Healthcare Providers and Patients and Families

**AHI Call Center Contact:**
**dha.bethesda.j-11.mbx.nicoe-ubi@health.mil**



Provider Algorithm for Suspected Anomalous Health Incidents (AHIs)
Revised August 2022

Patient reports a sudden event such as loud sounds, pressure, or heat concurrently or immediately

...sea, or disequilibrium

...i.e., migraine, stroke, etc.

...go?

NO

...for new or worsening ...toms/conditions

...lligence personnel about ...ervisor for any questions)

ICD-10 Coding

...not well characterized. To ...ve AHI-related healthcare ...use the following sequence ...ting the patient healthcare ...S.

...primary: ...ns involving general ...r ...gns involving the

...ear to be uniquely ...secondary codes, such ...R00.2 palpitations, etc.

...ncy, ...nizing radiation, or ...de environmental factors

...nd symptoms relevant to ...cordance with current

DEFENSE HEALTH AGENCY
7700 ARLINGTON BOULEVARD, SUITE 5101
FALLS CHURCH, VIRGINIA 22042-5101

Medical Affairs

September 6, 2022

MEMORANDUM FOR ALL DEFENSE HEALTH AGENCY (DHA) MARKETS AND MILITARY MEDICAL TREATMENT FACILITIES (MTFS)

SUBJECT: Updated Guidance for Evaluation of Anomalous Health Incidents (AHI)

This memorandum updates previous published guidance (Cordts, 11 Aug 21) for the initial evaluation and treatment of suspected cases of Anomalous Health Incidents (AHI). Health care providers should use this guidance to assist with their care of AHI patients, in combination with clinical judgment.

AHI remains an emerging health and readiness concern for the Department of Defense (DoD) (**Attachment 1**, "Secretary of Defense AHI Workforce Messages"), thus a priority for the DHA. AHI was formerly known as "Havana Syndrome" due to reports of AHI symptoms by employees at the U.S. Embassy in Havana, Cuba in 2016. Some DoD personnel and their families have reported sudden and disturbing sensory events such as loud sounds, pressure or heat concurrently or immediately preceding the new onset of symptoms such as headaches, pain, nausea or disequilibrium (unsteadiness or vertigo).

After review and analysis of current AHI clinical data, DHA has developed AHI-specific clinical tools for use in the patient evaluation. **Attachment 2** is the Provider Algorithm for Suspected Anomalous Health Incidents, which outlines the process for evaluation, treatment and referral. While many patient-reported symptoms are similar to complaints found after mild traumatic brain injury (TBI), there may be other organ systems affected and, therefore, a review of other body systems may be warranted. Possible causes of AHI may be linked to directed-energy source exposures, and there is on-going work to better understand these phenomenon. Although a specific ICD-10 code is currently not available for AHI, Attachment 2 provides existing codes that will help to capture the patient encounter and document accordingly.

**Attachment 3** contains instructions on how to access the Progressive Return to Activity (PRA) tool, a clinical tool to use after the initial evaluation of suspected AHI and TBI. Table J (page 5 of PRA) provides guidance on Primary Care management of commonly occurring symptoms, such as headache, dizziness, sleep and cognitive complaints. Table K (page 6 of PRA) contains specialty referral guidelines. After initial evaluation, if a provider suspects a patient of having symptoms related to an AHI, the provider should take the following three actions:

1. Treat the presenting symptoms in accordance with symptom-guided management outlined in the PRA
2. Refer patients who do not respond to initial medical management to the closest TBI clinic, Intrepid Spirit Center or the National Intrepid Center of Excellence (NICOE)
3. Remind the patient to report the incident to the appropriate counterintelligence personnel for their organization

CONTROLLED UNCLASSIFIED INFORMATION

# DOD WBHI: Recent Media Coverage

The New York Times

***Army's Blast Safety Limit May Miss Risks From Powerful Weapons Like Tanks***

Researchers say troops' brains may be injured by blast

***Was Maine Gunman's Brain Damaged by Blast Exposure in the Army?***

***U.S. Troops Still Train on Weapons With Known Risk of Brain Injury***

Pentagon researchers say weapons like shoulder-fired rockets expose troops who fire them to blast waves far

***Pentagon Starts Outreach Program on Blast Risks from Weapons Use***

Federal officials have been contacting veterans who

***Senators Seek Answers From Pentagon on Troops' Blast Exposure***

A bipartisan group of senators is demanding to

otect

***A Secret War, Strange New Wounds and Silence From the Pentagon***

Many U.S. troops who fired vast numbers of artillery rounds against the Islamic State c life-shattering mental and...

(Nov 5, 2023)

***Traumatic Brain Injury Found in Maine Gunman Could Have Wide Ramifications***

Federal officials have been contacting veterans who may have been injured by blast exposure in the service, including some who were cut off...

(Mar 3, 2024)

# DOD WBHI: Identify, Monitor & Mitigate Brain Exposures (BLAST)

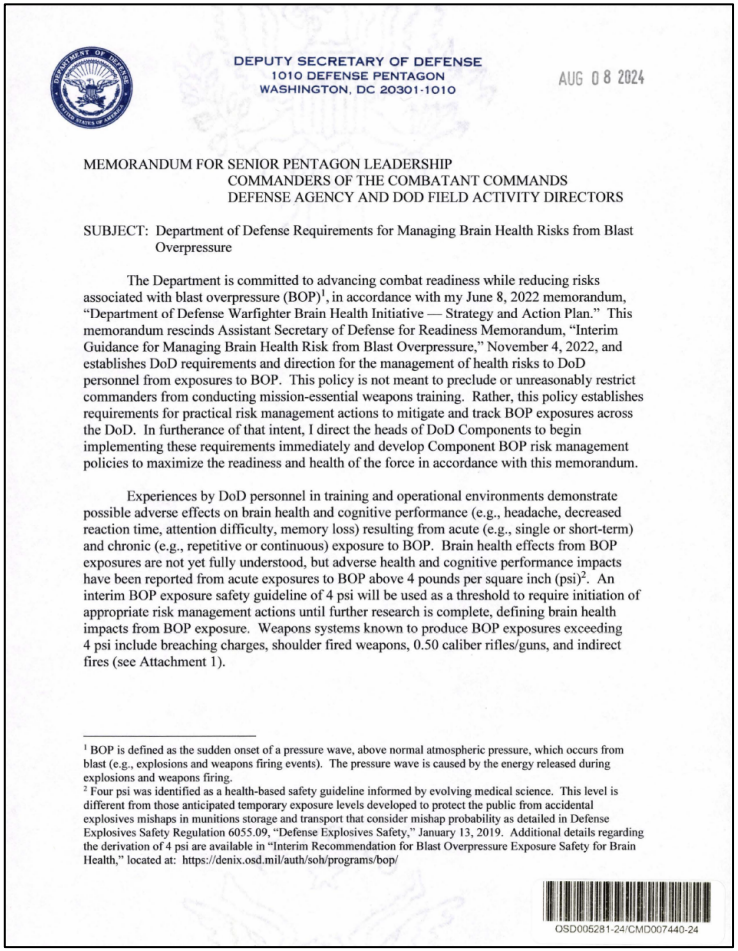
- Completed a Longitudinal Medical Study of Blast Overpressure Exposure in Members of the Armed Forces
- Linkage of Blast Exposure and Health/Performance Effects (areas of symptoms, neurocognitive and sensory)
- International (North Atlantic Treaty Organization [NATO]) efforts to facilitate the development of blast exposure monitoring capability and the capture of health and performance information
- Monitoring, documenting and safety mitigation in training/garrison

# DOD WBHI: Identify, Monitor & Mitigate Brain Exposures (BLAST)

- Improve understanding and mitigation of brain exposures
- Characterization of 15 weapons systems (Tier 1 weapons)*
- Linkage of Blast Exposure and Health/Performance Effects (areas of symptoms, neurocognitive and sensory)
- Completion of a DOD Blast Overpressure (BOP) Reference and Information Guide (D-BOP RIG)
  - Provides stand off distance for all Tier 1 weapons
- BOP Business Case Analysis (BCA)
  - Blast monitoring Chief of the Army Staff (CoAs)
- New Developmental Special Duty (DSD) blast overpressure (BOP) memorandum released

[NDAA for Fiscal Year (FY) 2018 (Public Law 115-91)]*

# DOD WBHI: New DSD Blast Overpressure Memo (Medical)



DEPUTY SECRETARY OF DEFENSE
1010 DEFENSE PENTAGON
WASHINGTON, DC 20301-1010

AUG 08 2024

MEMORANDUM FOR SENIOR PENTAGON LEADERSHIP
COMMANDERS OF THE COMBATANT COMMANDS
DEFENSE AGENCY AND DOD FIELD ACTIVITY DIRECTORS

SUBJECT: Department of Defense Requirements for Managing Brain Health Risks from Blast Overpressure

The Department is committed to advancing combat readiness while reducing risks associated with blast overpressure (BOP)[1], in accordance with my June 8, 2022 memorandum, "Department of Defense Warfighter Brain Health Initiative — Strategy and Action Plan." This memorandum rescinds Assistant Secretary of Defense for Readiness Memorandum, "Interim Guidance for Managing Brain Health Risk from Blast Overpressure," November 4, 2022, and establishes DoD requirements and direction for the management of health risks to DoD personnel from exposures to BOP. This policy is not meant to preclude or unreasonably restrict commanders from conducting mission-essential weapons training. Rather, this policy establishes requirements for practical risk management actions to mitigate and track BOP exposures across the DoD. In furtherance of that intent, I direct the heads of DoD Components to begin implementing these requirements immediately and develop Component BOP risk management policies to maximize the readiness and health of the force in accordance with this memorandum.

Experiences by DoD personnel in training and operational environments demonstrate possible adverse effects on brain health and cognitive performance (e.g., headache, decreased reaction time, attention difficulty, memory loss) resulting from acute (e.g., single or short-term) and chronic (e.g., repetitive or continuous) exposure to BOP. Brain health effects from BOP exposures are not yet fully understood, but adverse health and cognitive performance impacts have been reported from acute exposures to BOP above 4 pounds per square inch (psi)[2]. An interim BOP exposure safety guideline of 4 psi will be used as a threshold to require initiation of appropriate risk management actions until further research is complete, defining brain health impacts from BOP exposure. Weapons systems known to produce BOP exposures exceeding 4 psi include breaching charges, shoulder fired weapons, 0.50 caliber rifles/guns, and indirect fires (see Attachment 1).

[1] BOP is defined as the sudden onset of a pressure wave, above normal atmospheric pressure, which occurs from blast (e.g., explosions and weapons firing events). The pressure wave is caused by the energy released during explosions and weapons firing.
[2] Four psi was identified as a health-based safety guideline informed by evolving medical science. This level is different from those anticipated temporary exposure levels developed to protect the public from accidental explosives mishaps in munitions storage and transport that consider mishap probability as detailed in Defense Explosives Safety Regulation 6055.09, "Defense Explosives Safety," January 13, 2019. Additional details regarding the derivation of 4 psi are available in "Interim Recommendation for Blast Overpressure Exposure Safety for Brain Health," located at: https://denix.osd.mil/auth/soh/programs/bop/

OSD005281-24/CMD007440-24

Ensure all new Active and Reserve Component accessions undergo cognitive assessments as part of the entry process by December 31, 2024. In addition, accelerate already mandated requirements to execute baseline cognitive assessments for currently serving high-risk Active-Duty Service members by the end of FY 2025, and address the remaining Active and Reserve Component Service members, with the exception of the Individual Ready Reserve (IRR), as soon as possible.

Establish procedures to ensure personnel recognize BOP symptoms, report exposures to their command, and seek an evaluation from their medical provider if experiencing symptoms.

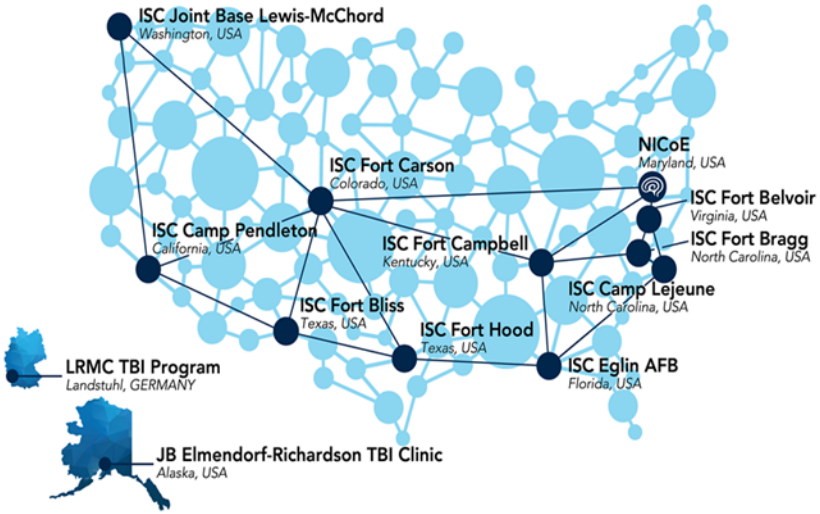
# DOD WBHI: Prevent, Recognize and Minimize the Effects of TBI (LOE 3)

- Pathway of Care System
- Innovations in TBI Care
- Clinical Tools and Recommendations
- Data
- Education and Training
- Policy

# DOD TBI Pathway of Care: System

Defense Intrepid Network for TBI and Brain Health

- In 2008 National Defense Authorization Act (NDAA) directed the DOD to establish a comprehensive plan for programs to prevent, diagnosis, treat, and rehabilitate service members with TBI, PTSD, and other mental health conditions to the fullest extent possible to include the translation of research to better understand various aspects of TBI
- Since the inception of the National Intrepid Center of Excellence (NICoE) / Defense in Intrepid Network for TBI and Brain Health, the collection of patient reported outcomes (PROs) has been a top priority




**Defense Intrepid Network Composition**:

1. National Intrepid Center of WRNMMC
2. Joint Base Lewis-McChord
3. Eglin Air Force Base
4. Camp Lejeune
5. Camp Pendleton
6. Fort Belvoir
7. Fort Bliss
8. Fort Liberty
9. Fort Campbell
10. Fort Carson
11. Fort Cavazos

# DOD WBHI: Novel Therapeutics

- Biofeedback
- Acupuncture
- Therapeutic Arts: art, music, writing, dance/movement
- Transcranial Magnetic Stimulation
- Mindfulness
- Animal engagement: canine and equine therapy
- Non-invasive, portable, point of care medical devices to aid in diagnosis and treatment of TBI

# DOD TBI Pathway of Care: Tools and Clinical Recommendations

| Department of Defense Tools and Clinical Recommendations for Traumatic Brain Injury | |
|---|---|
| 1. | Military acute concussion evaluation (MACE)2 tool |
| 2. | Concussion management tool (CMT) |
| 3. | **Cognitive rehabilitation** for service members and veterans after mild to moderate traumatic brain injury |
| 4. | Management of **headache** after concussion/ mild traumatic brain injury: guidance for primary care management in deployed and non-deployed settings |
| 5. | Indications and conditions for in-theatre post-injury **neurocognitive assessment** tool (NCAT) testing |
| 6. | **Neuroendocrine dysfunction** screening after mild traumatic brain injury |
| 7. | Assessment and management of **dizziness** associated with mild traumatic brain injury |
| 8. | Assessment and management of **visual dysfunction** associated with mild traumatic brain injury |
| 9. | **Neuroimaging** after mild traumatic brain injury in the non-deployed setting |
| 10. | **Progressive return to activity** after acute concussion/ mild traumatic brain injury: guidance for the primary care manager in deployed and non-deployed settings |
| 11. | **Progressive return to activity** after acute concussion/ mild traumatic brain injury: guidance for the rehabilitation provider in deployed and non-deployed settings |
| 12. | Management of **sleep disturbances** after concussion/ mild traumatic brain injury: guidance for primary care management in deployed and non-deployed settings |

*Source: Department of Defense Traumatic Brain Injury Center of Excellence*



(health.mil, 2024)

# DOD Mild Traumatic Brain Injury: Screening for Concussion

(gettyimages.com, 2017)

Concussion screening should determine:

- If emergent care should be provided to the Service member
- If the Service Member meets DOD concussion criteria

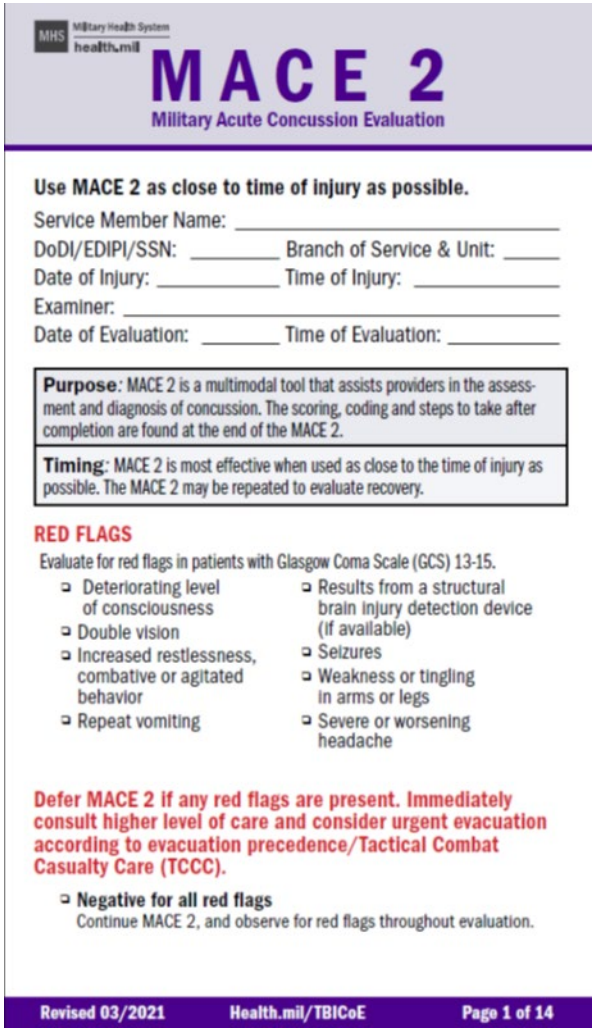
# Military Exposure to Low Level Blast (LLB)


*Military Occupational Specialty terminology may vary by service

(health.mil, 2024)

# DOD Mild Traumatic Brain Injury: Screening for Concussion

- An acute assessment tool for all medically trained personnel who treat Service members involved in a potentially concussive event
- Multimodal tool that captures assessment information from many health care areas such as balance, eye movements, cognition, report of symptoms and key past medical history that can prolong the recovery from a concussion



MHS Military Health System health.mil

**MACE 2**

**Military Acute Concussion Evaluation**

**Use MACE 2 as close to time of injury as possible.**

Service Member Name: _____

DoDI/EDIPI/SSN: _____ Branch of Service & Unit: _____

Date of Injury: _____ Time of Injury: _____

Examiner: _____

Date of Evaluation: _____ Time of Evaluation: _____

**Purpose**: MACE 2 is a multimodal tool that assists providers in the assessment and diagnosis of concussion. The scoring, coding and steps to take after completion are found at the end of the MACE 2.

**Timing**: MACE 2 is most effective when used as close to the time of injury as possible. The MACE 2 may be repeated to evaluate recovery.

**RED FLAGS**

Evaluate for red flags in patients with Glasgow Coma Scale (GCS) 13-15.

- ▫ Deteriorating level of consciousness
- ▫ Double vision
- ▫ Increased restlessness, combative or agitated behavior
- ▫ Repeat vomiting
- ▫ Results from a structural brain injury detection device (if available)
- ▫ Seizures
- ▫ Weakness or tingling in arms or legs
- ▫ Severe or worsening headache

**Defer MACE 2 if any red flags are present. Immediately consult higher level of care and consider urgent evacuation according to evacuation precedence/Tactical Combat Casualty Care (TCCC).**

- ▫ **Negative for all red flags**
  Continue MACE 2, and observe for red flags throughout evaluation.

**Revised 03/2021** **Health.mil/TBICoE** **Page 1 of 14**



(health.mil, 2020)

# DOD Mild TBI: Symptom Clusters and Management

**J. Symptom-Guided Management:**

- The following table provides recommendations and resources for how to treat the most common symptoms associated with concussion.

| Symptom Cluster | Signs and Symptoms | Evaluation | Primary Care Management |
|---|---|---|---|
| **Anxiety/ Mood** | ▪ Depression/feeling sad<br>▪ Irritability<br>▪ Low tolerance to frustration<br>▪ Mood changes/lability<br>▪ Nightmares | ▪ GAD-7 ≥ 10<br>▪ NSI questions 17–22<br>▪ PHQ-9 ≥ 10 | ▪ Refer immediately to Behavioral Health for any concerns about harm to self or others<br>▪ Consider acute intervention in cases of acute stress reaction: education, reassurance of safety, normalization, acute symptom management, social support<br>▪ Non-pharmacologic: mindfulness, deep breathing and relaxation, pleasurable activities, exercise (if appropriate)<br>▪ Depression Resources<br>▪ Primary Care Behavioral Health Clinical Pathways<br>▪ VA/DoD PTSD and ASD CPG |
| **Cervical** | ▪ Dizziness (cervicogenic)<br>▪ Headache<br>▪ Neck pain<br>▪ Numbness | ▪ Physical exam | ▪ Non-pharmacologic: Traditional Chinese or Medical Acupuncture<br>▪ Pharmacologic: acetaminophen every 6 hours for up to 48 hours post-concussion followed by NSAIDs as needed; avoid tramadol, acetaminophen/caffeine/butalbital, and opioids<br>▪ Dizziness and Visual Disturbances Following mTBI Clinical Recommendation<br>▪ Headache Following mTBI Clinical Recommendation |
| **Cognitive** | ▪ Confusion/foggy thinking<br>▪ Delayed response<br>▪ Diff culty concentrating<br>▪ Diff culty with memory/forgetfulness | ▪ MACE 2 cognitive score ≤ 25<br>▪ NSI questions 13–16 | ▪ If there are any concerns about cognition, conf rm patient report of symptoms and performance with third party when possible<br>▪ Physical and sleep-related symptoms may impact cognitive function- identify and treat contributing conditions<br>▪ Cognitive Rehabilitation Following mTBI Clinical Recommendation |
| **Headache** | ▪ Auras<br>▪ Neck pain<br>▪ Numbness, tingling, weakness<br>▪ Phonosensitivity<br>▪ Photosensitivity | ▪ HIT-6 ≥ 50<br>▪ NSI questions 4–7, 9, 11 | ▪ Non-pharmacologic: Traditional Chinese or Medical Acupuncture<br>▪ Pharmacologic: acetaminophen every 6 hours for up to 48 hours post-concussion followed by NSAIDs as needed; avoid tramadol, acetaminophen/caffeine/butalbital, and opioids<br>▪ Headache Following mTBI Clinical Recommendation |
| **Oculomotor** | ▪ Blurry vision<br>▪ Decreased attention for visual tasks<br>▪ Diff culty reading (paper or screen)<br>▪ Double vision<br>▪ Eye strain<br>▪ Headache<br>▪ Photosensitivity | ▪ NSI questions 4, 6, 7<br>▪ VOMS Abnormal Smooth Pursuits, Saccades, or Convergence testing | ▪ Oculomotor symptoms often spontaneously resolve within a few weeks after injury<br>▪ Dizziness and Visual Disturbances Following mTBI Clinical Recommendation<br>▪ VOMS Visual Guide |
| **Sleep** | ▪ Diff culty falling/staying asleep<br>▪ Excessive daytime sleepiness<br>▪ Fatigue<br>▪ Nightmares<br>▪ Sleeping too much or too little | ▪ ESS > 10<br>▪ ISI > 11<br>▪ NSI questions 17, 18 | ▪ Sleep disruption can exacerbate other symptom clusters and may prolong recovery<br>▪ Sleep Disturbances Following mTBI Clinical Recommendation |
| **Vestibular** | ▪ Decreased coordination<br>▪ Dizziness/vertigo<br>▪ Loss of balance<br>▪ Motion sensitivity<br>▪ Nausea<br>▪ Nystagmus | ▪ NSI questions 1–3, 8<br>▪ VOMS Abnormal Vestibular/Ocular Ref ex or Visual Motion Sensitivity testing | ▪ If appropriate, evaluate and treat benign paroxysmal positional vertigo<br>▪ Dizziness and Visual Disturbances Following mTBI Clinical Recommendation<br>▪ VOMS Visual Guide |



(health.mil, 2024)

# DOD Mild Traumatic Brain Injury: Progressive Return to Activity

**K. Specialty Referral Guidance:**

- Patients who do not respond to initial management and have symptoms persisting >15 days may benef t from referral to TBI specialty clinic, if available, or specialties listed below.

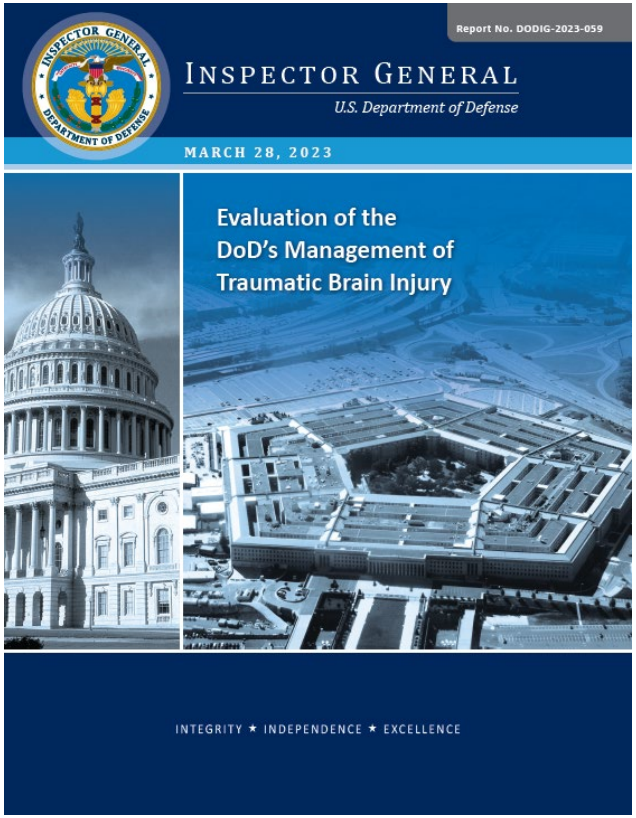
| Symptom Cluster | Specialty Referral |
|---|---|
| Anxiety/ Mood | **Behavioral Health**<br>▪ Consider early referral in cases of acute stress reaction that do not rapidly resolve with simple measures<br>▪ Evaluation of new or premorbid behavioral health conditions |
| Cervical | **Physical Medicine and Rehabilitation (PM&R)**<br>▪ Assessment of persistent neck pain with comorbid chronic pain or persistent headache secondary to musculoskeletal dysfunction<br>**Physical Therapy**<br>▪ Assessment and treatment of persistent neck pain following mTBI |
| Cognitive | **Neuropsychology**<br>▪ Formal evaluation to determine a need for work/home/school accommodations<br>**Occupational Therapy**<br>▪ Strategies for daily living, functional cognition interventions, adaptive equipment/technology, driving evaluations<br>**Speech Language Pathology**<br>▪ Cognitive rehabilitation strategies, speech disf uencies, organizational strategies |
| Headache | **Neurology**<br>▪ Assessment of persistent headaches when: (a) the diagnosis is not clear, (b) headaches do not respond to traditional treatment or prevention strategies, (c) there is a signif cant unresolved disability due to headache, (d) prolonged or persistent aura, or (e) headaches with accompanied motor weakness<br>**Neuro-Optometry**<br>▪ Evaluation of headaches secondary to visual changes or eye strain<br>**Physical Medicine and Rehabilitation (PM&R)**<br>▪ Assessment of persistent headaches with comorbid chronic pain or persistent headache secondary to musculoskeletal dysfunction |
| Oculomotor | **Neuro-Optometry**<br>▪ Assessment of visual disturbances that started or worsened after mTBI<br>**Occupational Therapy**<br>▪ Strategies for daily living, functional vision interventions, adaptive equipment/technology, driving evaluations |
| Sleep | **Behavioral Health**<br>▪ Evaluation of behavioral health conditions that may impact sleep<br>**Sleep Medicine**<br>▪ Evaluation of persistent or chronic sleep disturbance |
| Vestibular | **Vestibular Therapy**<br>▪ Specialized physical or occupational therapy to alleviate dizziness and other problems associated with vestibular disorders |

(health.mil, 2024)

# DOD IG: Evaluation of the DOD's Management of Traumatic Brain Injury

**Four Recommendations:**

1) Recommend that the Director of the Defense Health Agency (DHA) review and **update DHA Procedural Instruction (DHA-PI) 6490.04**, "Required Clinical Tools and Procedures for the Assessment and Clinical Management of Mild Traumatic Brain Injury (mTBI)/Concussion in Non-Deployed Setting.
2) Recommend the Under Secretary for Personnel & Readiness, in coordination with the Assistant Secretary of Defense (Health Affairs), the Director of the Defense Health Agency, the Service Surgeons General, and the Joint Staff Surgeon, **establish an oversight plan** for the management of traumatic brain injury (TBI) care within the Military Health System (MHS).
3) Recommend that USD(P&R), in coordination with ASD(HA); Director, DHA; Service Surgeons General; and the JSS, **establish a TBI Program of Record (POR)** for TBI care within the MHS.
4) Recommend that the USD(P&R), in coordination with ASD(HA); Director, DHA; Service Surgeons General; and the JSS, establish a process by which MHS providers can access, create, and update **Service members' profiles**, regardless of their Service Component.




IG: Inspector General
USD (P&R): Under Secretary of Defense for Personnel and Readiness
JSS: Joint Services Support

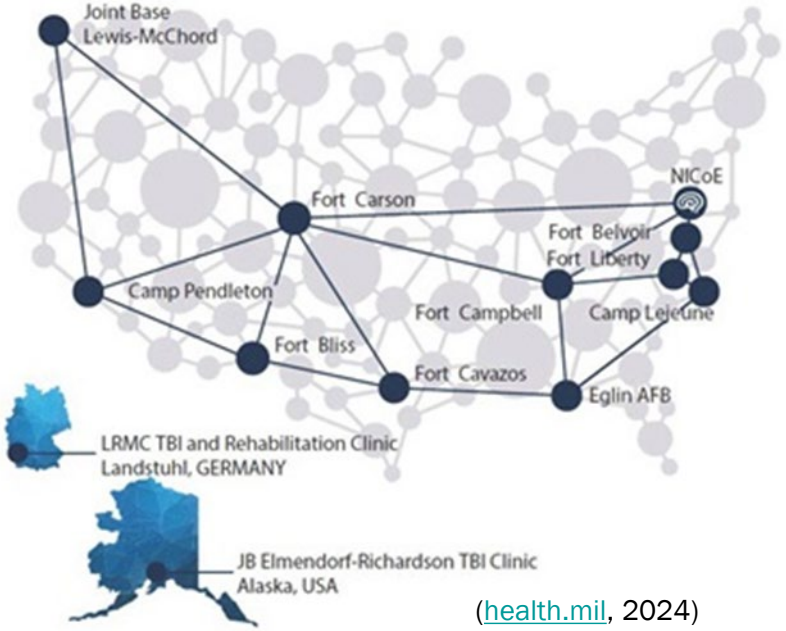
# DOD WBHI: Reduce or Eliminate Long-Term and Late Effects (LOE 4)

- Long term effects vs. late effects
- Continued use of brain tissue repository
- Collaboration with other Government Agencies, industry and academia important in this area

(media.defense.gov, 2022)

# DOD WBHI: Reduce or Eliminate Long-Term and Late Effects (LOE 4)

- Long-Term Effects: Defense Intrepid Network (DIN)
  - Multi-disciplinary clinical teams
  - Delivery of innovative TBI therapeutics throughout DIN
- Late Effects: DOD/USU Brain Tissue Repository
  - Opened in 2012
  - As of 2023, 360 brains donated from Service member families

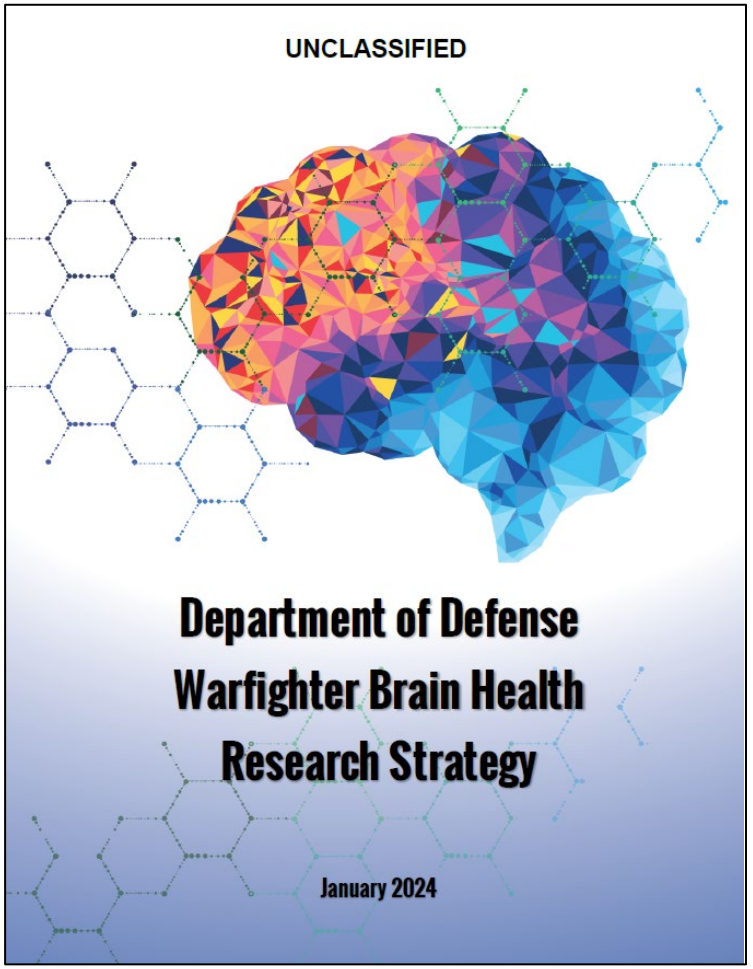



(health.mil, 2024)

USU: Uniformed Services University

# DOD WBHI: Advance Warfighter Brain Health Science (LOE 5)

- Department transitioning from injury only to brain optimization
- Medical and non-medical research
- Developed a WBH research strategy with seven (7) key areas
- Knowledge translation critical

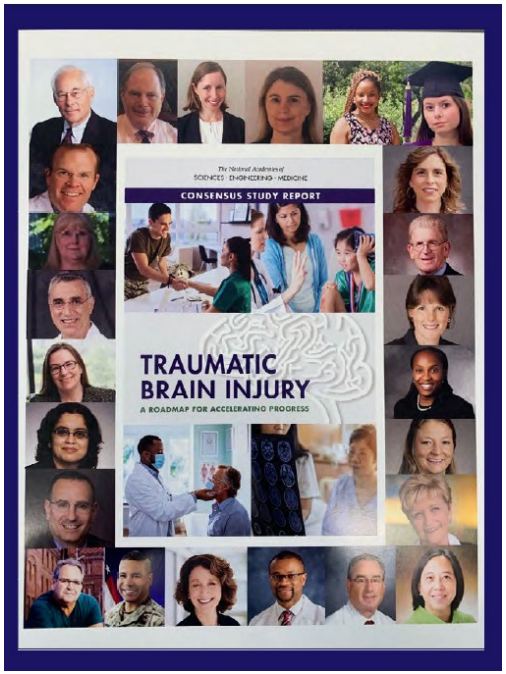


# National Academies of Sciences Engineering Medicine (NASEM) TBI Report

- Traumatic Brain Injury: A Roadmap for Accelerating Progress
  - Commissioned by Department of Defense

## RECOMMENDATIONS

1. **Create** and implement an **updated classification system** for TBI.
2. **Integrate acute** and **long-term** person- and family-centered **management** of TBI.
3. **Reduce** unwarranted **variability** and **gaps** in administrative and clinical **care guidance** to assure high quality care for TBI.
4. **Enhance awareness** and **identification of TBI** by healthcare providers and the public.
5. **Establish** and reinforce local and regional **integrated care delivery systems** for TBI.
6. **Integrate** the TBI system of **care** with TBI **research** into a **learning system.**
7. **Improve** the quality and **expand** the range of **TBI studies** and **study designs.**
8. **Create** and **promulgate** a **national framework** and **plan** for improvement of TBI care.



# NASEM Forum on TBI

- Established Forum on TBI
  - Ongoing mechanism to discuss issues
    - Current research gaps
    - Complexity of the systems involved in TBI treatment and rehabilitation
  - Convenes major TBI stakeholders
    - Federal Government: DOD, Health and Human Services (HHS), Department of Transportation (DoT) and VA
  - TBI Action Collaborative formed
- Priorities
  - Improved TBI classification
  - Role of TBI biomarkers
  - Post-acute TBI care models

# Key Takeaways

- System-wide approach
- Develop and disseminate clinical tools and recommendations
- Standardize collection and analysis of patient common data elements/ outcomes to improve care and treatment
- Implement comprehensive education and training activities to all key stakeholders
- Establish and enforce policy to ensure compliance and maintain oversight
- Translate research findings into the field

# References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# Questions

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# How to Obtain CE/CME Credits

**2024 OCT CCSS: Fostering Quality and Excellence in Military-Specific Care**

To receive CE/CME credit, you must register by 0800 ET on 18 October 2024, to qualify for the receipt of CE/CME credit or certificate of attendance. Complete the course evaluation and posttest for the session(s) you attended by 11:59 PM ET on Thursday, 31 October 2024, to receive CE/CME credit or a certificate of attendance.

1. Log in to your account.
2. Go to the main event page and select the session you want to complete under the TAKE COURSE tab.
3. On the session page, click TAKE COURSE under the TAKE COURSE tab.
4. Progress through the required course items by clicking START under the Course Progress menu tabs located on the left of the screen or by clicking Start Course at the bottom of the page.
5. Complete the evaluation and pass the posttest with a score of 80% or above to select your credits and download your certificate.

All completed courses and certificates are available in your account. Refer to your Pending Activities for sessions you have yet to complete. You must complete the required course items by Thursday, 31 October 2024, to receive credit.

**Questions?** Email DHA J7, CEPO at dha.ncr.j7.mbx.cepo-cms-support@health.mil.