



Traumatic Brain Injury Center of Excellence

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Disclaimer

The views expressed in this presentation are those of the authors and do not necessarily represent the official policy or position of the Defense Health Agency, Department of Defense (DoD), or any other U.S. government agency. Oral presentation at the Brain Health Summit, September 2024.

For more information, please contact dha.TBICOEinfo@health.mil.

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Disclosure

- Neither I nor my spouse/partner has a relevant financial relationship with a commercial interest to disclose.

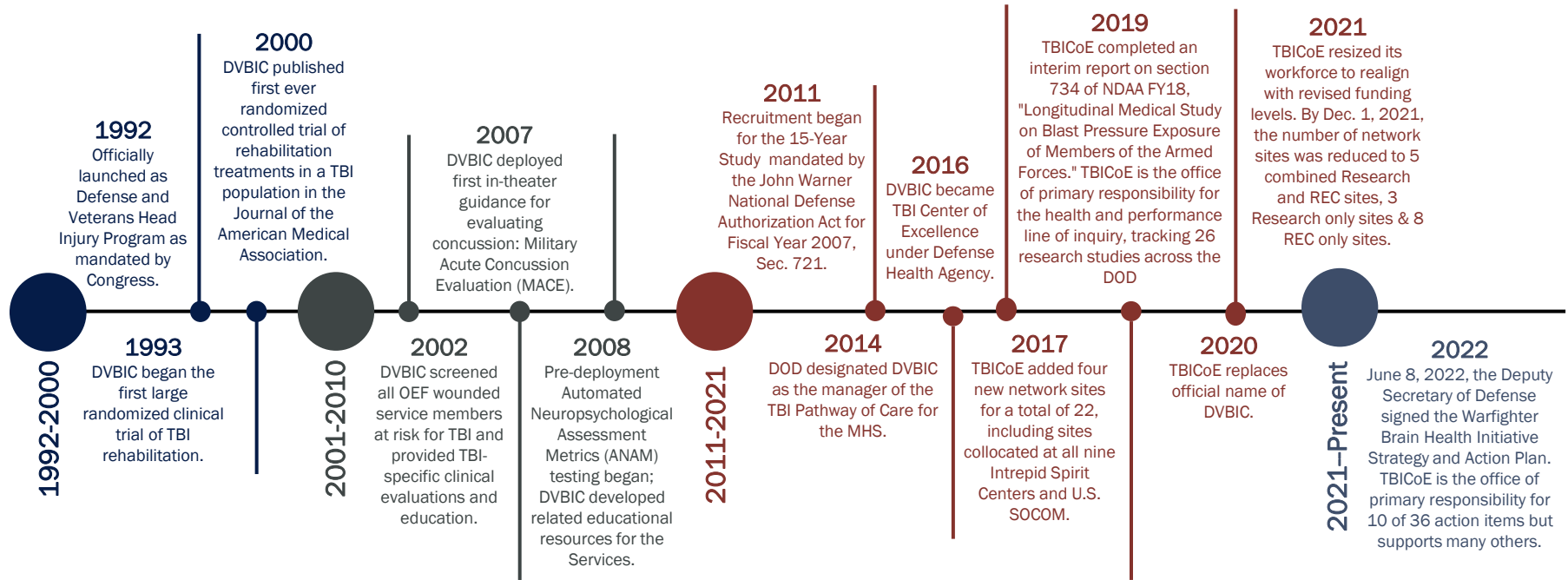


About TBICoE

- Congress established TBICoE in 1992 after the first Gulf War in response to the need to treat service members with TBI.
- TBICoE unifies a system of TBI health care, *reliably* advancing the science for the warfighter and *ready* to meet future brain health challenges.
- TBICoE assists the DoD and Department of Veterans Affairs (VA) in optimizing care of service members and veterans who have sustained a TBI, in deployed and non-deployed settings, through TBICoE's three sections: Research, Clinical Affairs and Dissemination.



Organizational History

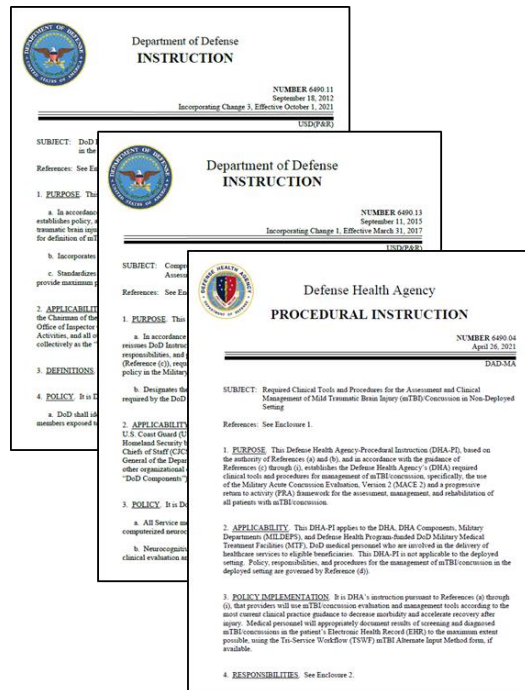


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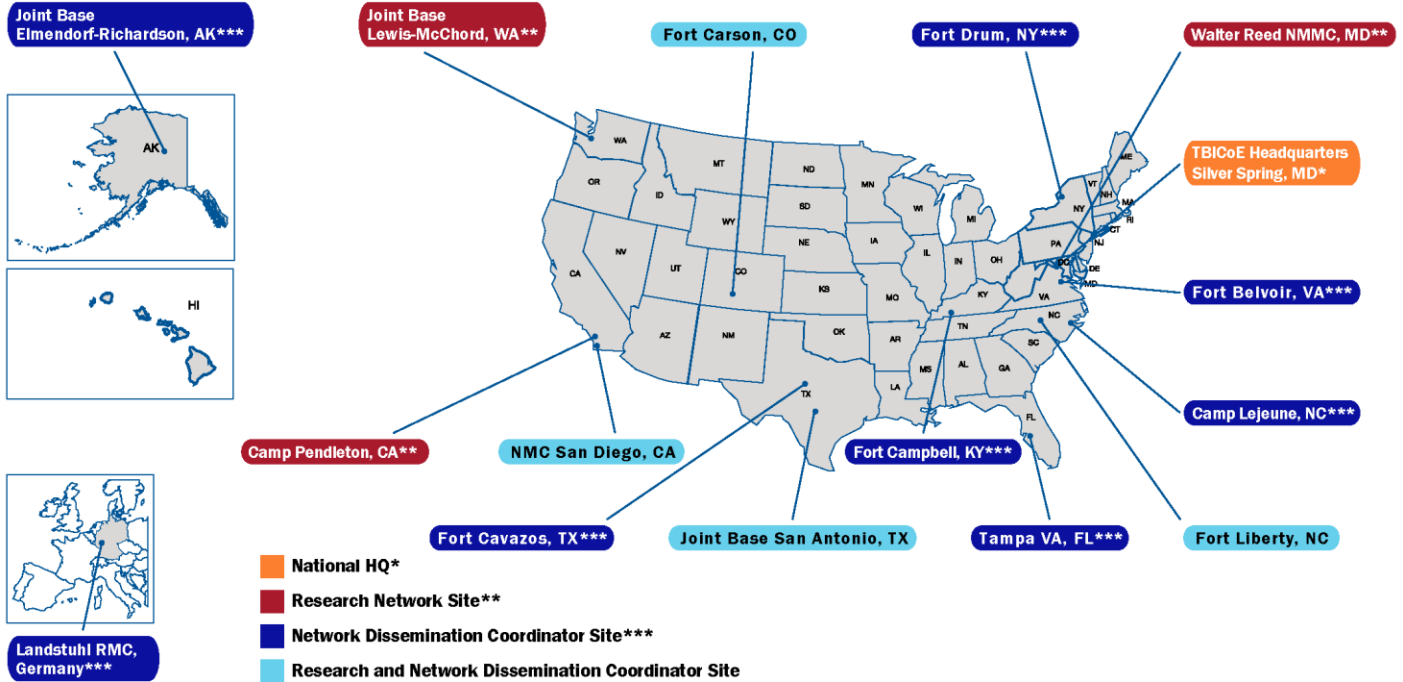


TBI-Related Instructions

- **DoDI 6490.11:** DoD Policy Guidance for Management of Mild Traumatic Brain Injury/Concussion in the Deployed Setting
- **DoDI 6490.13:** Comprehensive Policy on Traumatic Brain Injury-Related Neurocognitive Assessments by the Military Services
- **DHA-AI 6490.XX:** Currently being revised Required Clinical Tools and Procedures for the Assessment and Clinical Management of Mild Traumatic Brain Injury (mTBI)/Concussion



TBICoE Network Sites



To find a point of contact in your Defense Health Network, please email dha.TBICoEinfo@health.mil.

This map reflects TBICoE support services across the MHS as of 28 MAY 2024



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TBICoE Capabilities

Capability	Description
Research	TBICoE guides military focused, gaps-driven TBI clinical research that enhances research capacity, builds communities of collaboration, delivers cutting edge findings and addresses knowledge gaps within the DoD. Main objective is to Advance WBH Science.
Clinical Support	TBICoE advances TBI care by translating research into DoD relevant point of injury triage/diagnostic tools, return to activity algorithms, rehabilitation guidance and consensus clinical recommendations that standardize care, establish RTD guidelines and demonstrate quality documentation. Focus on optimizing all source readiness.
Surveillance	TBICoE conducts DoD wide TBI surveillance, evaluates full spectrum prevalence, analyzes outcomes, conducts assessments, and informs reporting to DoD policy and decision makers. Aim is to identify trends, monitor the force, and deliver timely high-quality data.
Dissemination	TBICoE translates evidence-based knowledge about TBI through dissemination of key findings to stakeholder groups across the DoD. The strategy is to Prevent, Recognize and Minimize the impact of all source TBI on service members and their families.
Mission Support	TBICoE provides administrative and operational support to advance TBICoE's priorities.



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Research Section

TBICoE Research Branch works to advance TBI knowledge and state of the science through military-relevant, **gap-driven, clinically translatable research** to increase patient satisfaction, optimize health care outcomes, and support force readiness and resilience.

- Conduct Research across HQ and network
- Evidence Synthesis (Research Reviews, Information and White Papers, EXSUMS)
- TBI Surveillance
- Health and TBI-related Outcomes
- Health Services Population Research
- Health Studies
- Priorities & Gap Analysis
- Respond to Congressional Taskings- Sec 721 including 15-year studies, and Sec 734
- Partnerships





Affords direct view of the Pathway of Care

- Researchers embedded in clinical settings allow direct view of clinical care and gaps in TBI diagnosis (e.g., lack of intake capture of blast exposure history in TBI Clinics) to develop research to support gap closure
- Collaborations with clinicians supports faster translation and validation of TBI clinical tools such as the MACE 2, Progressive Return to Activity Guidance



Develops and Maintains Agile Research Portfolio

- Development of a list of DOD/MHS TBI Gaps & Priorities every 2 years to ensure TBICoE research remains relevant and responsive
- Ability to stand up new studies (e.g., evaluation of Banyan BTI and iSTAT Alinity with USAMMDA at Fort Bragg) and pivot to new priorities (e.g., War Fighter Brain projects) more quickly than organizations not situated within a military hospital or clinic



Ensures Research with Greater Military Relevance

- Direct access to military subjects/participants
- Integration with Emergency Departments, and TBI Clinics to engage in the spectrum of TBI severity and time since injury
- Engagement in longitudinal (6 mon–15+ yrs.) military studies with VA and civilian partners to understand long-term health care needs and services for service members and family members/caregivers



Fosters Partnerships and Collaborations with other Federal agencies, academic partners and businesses

- Work with all Services (e.g., 15 Year Natural History Study recruitment across Services) to enhance military relevance and generalizability of findings
- Leveraging the infrastructure of ongoing efforts (e.g., TBI Model Systems for DOD Congressionally mandated IMAP study) allows for expedited initiation of research

Benefits of TBICoE Research Network Infrastructure

Clinical Affairs Section – Current Highlights

- Surveillance
 - Quarterly Reports – Worldwide TBI Numbers, Medical Encounters
 - Special Projects – Mech of Injury, Comorbidities, Unspecified injury
 - Recommendations regarding data flow, coding, blast monitoring
- Clinical Practice and Clinical Recommendations (CPCR)
 - Mobile Application – outreach, usability, and feedback
 - Updating MACE2 and PRA tools – Tactical versions
 - Joint Profiling Standard Language
 - Low Level Blast Provider Fact Sheet and coding guidance
- Outcomes
 - Acute Concussion Metrics
 - Analysis of patient ed & documentation in acute clinical care
 - Electronic Health Record input to improve Data Capture
 - Carepoint site build to foster cross branch and division communication



Low Level Blast Exposure Fact Sheets

These fact sheets include information on:

- What low-level blast exposure is
- Who is most susceptible to its effects
- What symptoms may result from exposure
- How to manage persistent symptoms
- How to reduce risk of exposure
- How to report and document low-level blast exposure

<https://www.health.mil/Military-Health-Topics/Centers-of-Excellence/Traumatic-Brain-Injury-Center-of-Excellence/Low-Level-Blast-Exposure>

DOD Provider Fact Sheet | July 2023
Information on Low-Level Blast Exposure
Traumatic Brain Injury Center of Excellence

What is Low-Level Blast?
Blast generated from firing heavy weapon systems or explosives in combat or training environments. Exposure to low-level blast does not typically result in a clinically diagnosable concussion/mild traumatic brain injury.

LLB Exposure May Cause

- Concentration problems
- Irritability
- Memory problems
- Slowed thinking/slow reaction time
- Decreased hand-eye coordination
- Difficulty hearing
- Headaches
- Tinnitus

What Should Medical Providers Do?

Ask

When taking a patient's history, ask about LLB exposures and assignment to high-risk military occupations(s).

Document

Document in the medical record:

- Military occupation(s)
- Estimate of total LLB exposures (e.g., weapon systems, duration of exposure, number of blasts)
- Experience as a military training instructor
- Years in high-risk occupation/unit (e.g., MOS/NEC/AFSC)

Research is still emerging on the full exposure on brain health and performance.

DOD Service Member Fact Sheet | July 2023
Information on Low-Level Blast Exposure
Traumatic Brain Injury Center of Excellence

What is Low-Level Blast?
Blast generated from firing heavy weapon systems or explosives in combat or training environments. LLB exposure is not the same as a concussion/mild traumatic brain injury.

LLB Exposure May Cause

- Concentration problems
- Irritability
- Memory problems
- Slowed thinking/slow reaction time
- Decreased hand-eye coordination
- Difficulty hearing
- Headaches
- Tinnitus (ringing in the ears)

What Should Service Members Do?

Recognize

- There are specific military occupations at high risk for exposure.
- Certain heavy weapon systems have been identified as generating the most LLB exposure.
- There are ammunition firing limits for the weapon systems that you use.
- LLB exposure can vary depending upon your firing position and other environmental conditions.

Limit

Limit exposure to as low as reasonably achievable by:

- Keeping an appropriate distance from weapons being fired
- Turning in unused ammunition (i.e., avoid SPENDICK)
- Wearing appropriate protective equipment (e.g., helmet, hearing protection)
- Adhering to weapon system firing limits

Report

- Symptoms from LLB exposure typically resolve with time.
- If your symptoms persist and impact your daily function, inform your command and medical provider.
- Report to medical provider should include:
 - Duration of exposure
 - Number of blasts
 - Years in high-risk occupation/unit (e.g., MOS/NEC/AFSC)
 - Symptom details and duration
- Refer to [health.mil/TBIfactsheets](https://www.health.mil/TBIfactsheets) for additional resources



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Acute Concussion Evaluation and Management

Identification of 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: _____

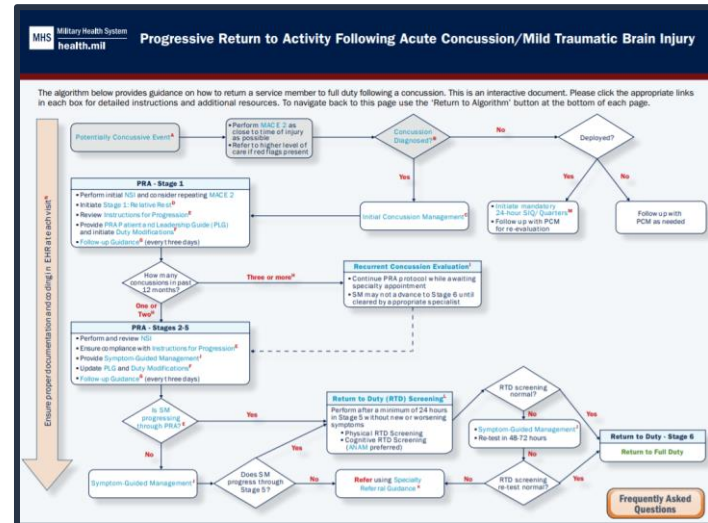
Examiner: _____

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.

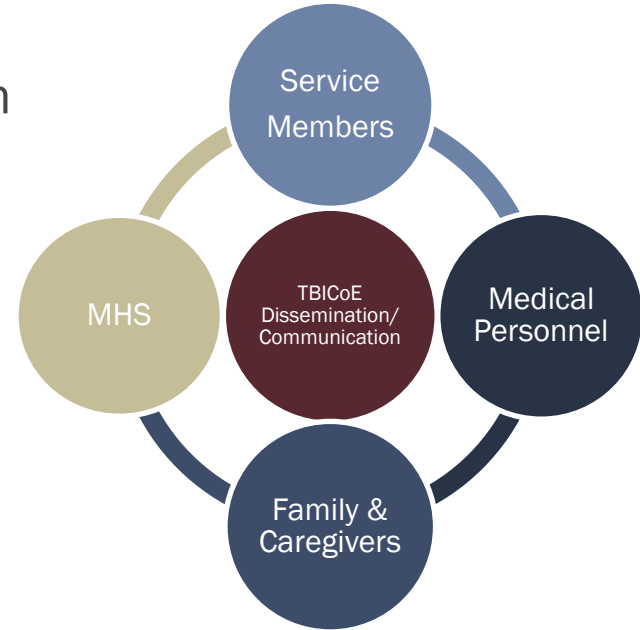
Progressive Return to Activity



Dissemination & Communications Office

Mission:

Increase patient satisfaction, optimize health care outcomes, and support force readiness and resilience by producing and propagating state of the science knowledge products through various communication efforts, outreach, education and training of medical personnel, service members, and their families and caregivers.



Dissemination Support

- TBICoE Network Dissemination Coordinators
 - SMEs on TBICoE products who disseminate service members, leaders, and providers while promoting TBI education and outreach
 - Coordinate dissemination initiatives to support acute concussion care pathway
 - Provide virtual or in-person training on TBICoE-developed clinical tools and resources



TBICoE Resources

- Leader Policy Guidance for Management of Mild Traumatic Brain Injury/Concussion in the Deployed Setting
- HEADS Flyer
- Low Level Blast Fact Sheets
- Military Acute Concussion Evaluation 2
- Progressive Return to Activity Clinical Recommendation
- Recurrent Concussion Evaluation Card

Download all resources here:
www.health.mil/TBIProviders

MACE 2
Military Acute Concussion Evaluation

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

Service Member Name: _____
 Duty Station: _____ Branch: _____
 Date of Injury: _____ Time: _____
 Examiner: _____
 Date of Evaluation: _____ Time: _____

When to Use MACE 2: Use MACE 2 when there is a suspected mild traumatic brain injury (MTBI) or concussion. It is used to determine if there is a concussion and to provide recommendations for management. It is used to determine if there is a concussion and to provide recommendations for management.

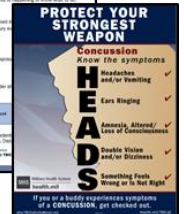
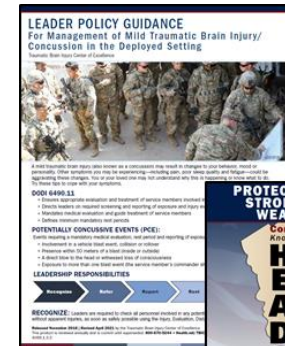
Progressive Return to Activity Following MACE 2

1. Concussion
 2. No concussion
 3. No concussion
 4. No concussion
 5. No concussion

RECURRENT CONCUSSION EVALUATION

THREE OR MORE DOCUMENTED IN 12-MONTH SPAN

1. Comprehensive neurological evaluation by neurologist or otherwise qualified provider
 - Review of prior concussion history with focus on timing or resolution of symptoms
 - Assessment of symptoms (State to be determined by provider)
2. Neuroimaging per provider judgment
3. Neuropsychological assessment by psychologist
 - Evaluate attention, memory, processing speed and executive function
 - Perform a psychosocial and behavioral assessment
 - Include resolution of officer
 - Consider NCIJ per TRICOM clinical recommendation
4. Functional assessment* completed by occupational therapist/physical therapy
5. Neurologist or qualified provider addresses RTD status



Patient and Leadership Guide (PLG)

- Overview of PRA protocol
- Answers common questions about concussion
- Communicates duty status, schedule of appointments and any required duty modifications
- Summarizes activities SMs should and should not perform
- Download PLG at:

www.health.mil/ProviderResources

Patient and Leadership Guide (PLG)
Progressive Return to Activity Following Concussion/ mTBI Patient and Leadership Guide (PLG)

NAME: _____ TO: _____ DATE: _____
BANK/NAME/UNIT: _____ Shift for: _____
SIGNATURE: Concussion/mTBI Signature: _____

DUTY STATUS: Concussion/mTBI
Quarantined 24 hours 48 hours 72 hours N/A
Light Duty Profile (per stages chart) for _____ days
Follow up Dates/Times: _____
NOTE: _____

Follow-up:
The above service member (SM) has been diagnosed with a concussion, or mild traumatic brain injury (MTBI), and is being treated. The purpose of this PLG is to provide the SM and their unit with information on how to manage the SM's return to duty. This process includes a return to duty protocol (RTD) and a return to full duty protocol (RTFD). The SM should return to full duty as soon as possible and follow the RTD and RTFD protocols. The SM should return to full duty as soon as possible and follow the RTD and RTFD protocols.

What is the PRA?
The PRA is a graded return to activity protocol. The earliest a SM can be returned to full duty is a grade 1 return to duty protocol has been shown to get SMs back to full duty faster.

What could happen if a SM returns to duty too soon?
Returning a SM too soon to the SM and their unit at risk. Concussion can cause long-term effects, including chronic dizziness, headaches, and depression. The SM should return to full duty as soon as possible and follow the RTD and RTFD protocols.

What are common concussion symptoms?

Thinking/Remembering	Physical	Emotional
Difficulty concentrating	Balance problems	Dizziness
Difficulty remembering the information	Fading vision	Fuzzy or blurry vision
Difficulty thinking clearly	Headache	Nausea or vomiting
Fading slowed down	Sensitivity to noise or light	Sleep

What is the average recovery time from concussion/mTBI? When can the SM fully return to work?
Recovery is different for each person, but most SMs will be able to return to work within 7-10 days. Some SMs may experience more symptoms and require a return to a T3 Clinic or specialist.

How does a SM progress through the stages of the PRA?
The SM must spend at least 24 hours in each stage. At the beginning of each day the SM will perform the same or better compared with the previous day AND they have to be in the next stage.

What does a SM do if there are new or worsening symptoms during the PRA?
Stop the activity until symptoms resolve. Then, return to the previous lowest stage for 24 hours and continue progress through the PRA. Contact the provider and

Patient and Leadership Guide (PLG)
Stages of Progressive Return to Activity

Stage	Things Service Member Should Do	Things Service Member Should Not Do
Stage 1 - Relative Rest	<ul style="list-style-type: none">Light physical activities that don't make symptoms worse (e.g. walking at easy pace)Light leisure activities that don't make symptoms worse (e.g. TV, reading)	<ul style="list-style-type: none">Communicate with friends and family members for supportEat a healthy diet and drink plenty of water
Stage 2 - Symptom-Limited Activity	<ul style="list-style-type: none">Increase your physical activity (e.g. take a walk, ride a stationary bike without resistance, do light household activities)Light reading/computer work as tolerated	<ul style="list-style-type: none">Avoid crowded areasAvoid extreme temperaturesNo group physical trainingNo resistance-weight training
Stage 3 - Light Activity	<ul style="list-style-type: none">Increase physical activities (e.g. elliptical or stationary bike without resistance, walk, yardwork, lift or carry light loads of less than 20 pounds)More technical reading and computer work, go out in more crowded areas (e.g. grocery shopping)Start military specific tasks (e.g. clean equipment, perform maintenance checks, clean weapons)	<ul style="list-style-type: none">Maintain or reduce use of caffeine, energy drinks, and nicotineTake breaks if needed
Stage 4 - Moderate Activity	<ul style="list-style-type: none">Increase physical activities (e.g. non-contact sports, hiking or running, resistance training as tolerated (e.g. pushups, sit-ups), carry weight across uneven terrain)Increase complexity of military specific tasks (e.g. orienteering, land navigation, following complex instructions, begin wearing personal protective equipment as tolerated)	<ul style="list-style-type: none">No operating heavy machineryNo riding in tactical vehiclesNo alternating shift work or shifts > 8 hours
Stage 5 - Intensive Activity	<ul style="list-style-type: none">SM to follow up with PCM for Return to Duty ScreeningGradually increase exposure to high risk (e.g. live fire, live ammunition, weapons fire or blast exposure, contact sports) in a supervised training environment based on mission requirementsResume usual exercise routine and military tasks/training (e.g. use night vision goggles, take part in simulations, navigate uneven terrain/obstacle environment with full jacket/weapon helmet) (back)	<ul style="list-style-type: none">No driving until dizziness or visual distortions have resolvedNo weapons fire or blast exposureNo alternating shift work or shifts > 8 hours
Stage 6 - Return to Full Duty	<ul style="list-style-type: none">Unrestricted activity	

AV04 4001 1.1 3/22
Revised June 2022
By the Traumatic Brain Injury Center of Excellence
This content is released through public contact and approved.
MIL-STD-1302-1 Health.mil/700002



Questions?

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