

**LIMBIC-CENC Clinical Care Monograph Version 2**

**G. TBI and Military Service**

from LIMBIC-CENC Knowledge Translation Center (LIMBICTM)

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**Key Findings**

1. **Deployment Status and TBI Risk**. LIMBIC-CENC researchers found that deployed Service Members were 7 times more likely than non-deployed Service Members to screen positive for any level of TBI severity. Deployed Service Members were 5.5 times more likely to have a mTBI and 3 times more likely to have a moderate-severe TBI. Deployed Service Members were 3 times more likely to sustain spinal injury.1 In the long-term, Veterans who were deployed are more likely than non-deployed Veterans to use alcohol and other substances (cocaine, amphetamine, opioid, and cannabis) and have diagnoses consistent with cognitive dysfunction (memory loss, mild cognitive impairment, and dementia).1-3
2. **Deployment Status, TBI, and Mental Health Risk**. Deployed Service Members were more likely than non-deployed Service Members to have TBI, PTSD, depression, anxiety, pain interference and impaired sleep (hypersomnia, insomnia, and obstructive sleep apnea) based on self-report and ICD diagnoses.4 Deployed Service Members were also more likely than non-deployed SMs to have suicidal ideation and attempts and overdoses.4
3. **Deployment Status, TBI, and Cognitive Functioning**. Veterans who sustained deployment mTBI had small but significantly lower performance on objective tests of working memory, processing speed and trail making (A and B). Six neuropsychological profiles of deployment-related mTBI were identified based on high, moderate and low self-reported functioning levels and high or low cognitive performance.5 Service Members andVeterans with deployment-related mTBI and meeting criteria for PTSD were more likely to be grouped within poorer outcome profiles.5
4. **TBI Due to Blasts**. Multiple LIMBIC-CENC studies found little to no direct differences in outcomes between blast-related and non-blast-related mTBI, when adjusting for other factors such as PTSD, pain, depression, sleep.6-10 There was little evidence that self-reported blast-exposure history impacted cognitive functioning.4, 6 However, blast-related mTBI has a significant impact on VA health services utilization and costs relative to non-blast mTBI and no mTBI.10 Further, blast exposures in both combat and training settings are predictors of Service Connected Disability; number of controlled detonations in training may be much more impactful.9

**Clinical Impact**

* **Advancing the TBI, Deployment and Outcomes Literature**. Identifying the association between combat deployment and increased risk of TBI, traumatic injuries, mental health disorders and substance use further elucidates the magnitude of both the physical and mental health impacts of deployment and TBI. These findings provides evidentiary support for DOD and VA healthcare policies on screening for TBI and follow-up comprehensive evaluation of positive TBI screens, particularly for Veterans with a deployment history.
* **Controlled Detonations, TBI and Morbidity.** LIMBIC-CENC researchers have begun to lay an evidence base on the impact of controlled detonations on service connected disability and by extension mTBI, comorbidities and outcomes. These findings may have more immediate implications for DOD training approaches. There remains significant heterogeneity in outcomes between Service Members and Veterans with varying histories of lifetime mTBI and repetitive low-level blast exposures.
* **Untangling Evidence on the Effects of Blast and non-Blast TBI**. LIMBIC-CENC symptom research has found little to no evidence that blast-related TBI directly impacts outcomes, when adjusting for other comorbidities such as PTSD, pain, depression, and sleep. Increasing the LIMBIC-CENC PLS cohort and its robust longitudinal follow-up will allow for analyses of sub-group effects and interactions between risk factors related to both blast injuries and controlled detonations. More nuanced prognostic models can then be created to identify individualized, modifiable behavioral and biomarker-based risk factors (mTBI blast phenotypes) and better inform personalized treatments (precision medicine).

**Primary Knowledge Translation Products**

* LIMBIC-CENC provides a repository of information on [TBI and Epidemiology](https://www.limbic-cenc.org/for-tbi-researchers/epidemiology-of-military-tbi-researchers/) in the For TBI Researchers section. We also provide a repository on [TBI and Polytrauma for Service Members, Veterans, and Families](https://www.limbic-cenc.org/for-service-members-and-veterans-with-tbi/) and [TBI and Polytrauma for Clinicians](https://www.limbic-cenc.org/for-tbi-clinicians/polytrauma-and-tbi-clinicians/).
* The [Abstract Veterans TBI Health and Outcomes Podcasts](https://www.limbic-cenc.org/for-service-members-and-veterans-with-tbi/the-abstract-veterans-tbi-health-and-outcomes-podcasts/) provides evidence-informed and real world patient, family and clinician perspectives on accessing and best leveraging DOD and VA health care services and resources.

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