

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

**H. TBI, Disability, and Veterans Health Services**

from LIMBIC-CENC Knowledge Translation Center (LIMBICTM)

April 17, 2024, Richmond, VA

**H. TBI, Disability, and Veterans Health Services**

**Key Findings**

1. **TBI and Service-connected Disability Ratings**. Service-connected disability ratings1 and medical service use2 are highest for Veterans with blast-related mTBI, followed by blunt mTBI, and are lowest for Veterans without TBI. 1, 2 High prevalence of TBI service connected disability was found in Veterans who identified as Pacific Islanders and Native Americans.2
2. **TBI, Race, Ethnicity and Outcomes**. Dementia risk in Veterans with TBI differ by race with White Veterans having 3 times higher risk, and Black and Hispanic Veterans having 2 times higher risk compared to Veterans by racial group without TBI.3 Racial/ethnic disparities and service connected disability disparities are related to TBI mechanism of injury and differentiate those referred to a Level 1 Trauma Center.4 Veterans with TBI were twice as likely to progress faster to RF than those without TBI.5 Black Veterans and Veterans in U.S. Territories progressed faster to RF relative to non-Hispanic Whites and those in urban mainland areas.5 Black and Hispanic/Latino Veterans on average received $5,000 fewer annual total VA resources; Veterans in U.S. Territories on average received about $4,000 less.5
3. **TBI, Dementia, and Veterans Health Economics**.6 Veterans with TBI had higher annual total costs relative to Veterans without TBI or with dementia. Veterans <65 with comorbid TBI and dementia had 2 times the annual total costs of Veterans ≥65 without TBI or dementia. Veterans <65 with TBI and dementia showed a shift from V.A. to non-VA inpatient facility placements. Annual VA and non-VA facility inpatient costs are higher than for Veterans without TBI or dementia. Veterans with TBI resulting from assault or gunshot have higher long-term VA costs compared to Veterans with other TBI mechanisms of injury.6 The benefits of MRI in diagnosing and managing TBI may be cost-effective despite its per unit costs.6

**Clinical Impact**

* **Better Access of Greater Need for TBI Service Utilization**. Veterans with mTBI, especially those with blast-related mTBI, are receiving more VHA health care services than those without TBI, which may be an indicator that the VA’s TBI care mission. Prospective research is needed to better understand how clinical service type and other treatment factors contribute to disability after mTBI.
* **Novel Racial Findings in TBI, Dementia Risk and Disability Rating**. Racial differences in dementia risk are novel and may be due to differences in dementia risk, dementia diagnosis rates, or potentially an interaction between race, APOE, and neurotrauma. Our results on socio-determinants of mechanism of injury in a Level 1 Trauma Center may have implications for prevention of assault and gunshot related TBI. The high prevalence of TBI service-connected disability in Pacific Islanders and Native Americans led us to acknowledge that the VA did not yet have a special geographic designation for Native American/Tribal Lands/ Reservations. We worked with the US Department of Labor to obtain zip codes for Tribal Elders and Leaders to incorporate into VA databases.
* **TBI and Dementia Placements and Costs**. Future LIMBIC-CENC research will compare the quality of care and outcomes between VA and non-VA facilities, and the impact of shifting placements on VA costs. Our results on the cost-effectiveness of MRI may have implications for its increased use in the diagnosis and management of mTBI.
* **Brain Health and Wellness Tool**. LIMBIC-CENC findings on preventable behavioral health risk factors after TBI, synthesized with the current research literature, led to the development, testing, and release of the LIMBIC-CENC a brain health and wellness survey that generates personalized recommendations to support Service Members and Veterans efforts to identify and self-manage their health-related risk factors after TBI. The LIMBIC-CENC’s Brain Health and Wellness Video Series complements the survey tool and provides a series of 4-minute primers on how to identify, prevent or self-manage TBI and co-morbid risk factors that can decrease dementia risk.

**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.
* 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.

**TBI and Veterans Health Services References**

1. Dismuke-Greer CE, Nolen TL, Nowak K, Hirsch S, Pogoda TK, Agyemang AA, Carlson KF, Belanger HG, Kenney K, Troyanskaya M, Walker WC: Understanding the impact of mild traumatic brain injury on veteran service-connected disability: results from Chronic Effects of Neurotrauma Consortium. Brain Inj 2018;32(10):1178-1187. doi: 10.1080/02699052.2018.1482428. PMID: 29889561.
2. Dismuke-Greer C, Hirsch S, Carlson K, Pogoda T, Nakase-Richardson R, Bhatnagar S, Eapen B, Troyanskaya M, Miles S, Nolen T, Walker WC. Health Services Utilization, Health Care Costs, and Diagnoses by Mild Traumatic Brain Injury Exposure: A Chronic Effects of Neurotrauma Consortium Study. Arch Phys Med Rehabil. 2020;101(10):1720-1730. doi: 10.1016/j.apmr.2020.06.008. PMID: 32653582.
3. Kornblith E, Peltz CB, Xia F, Plassman B, Novakovic-Apopain T, Yaffe K. Sex, Race, and Risk of Dementia Diagnosis after Traumatic Brain Injury among Older Veterans. *Neurology,* 2020, 95(13).
4. Dismuke-Greer, CE, SM Fakhry, MD Horner, TK Pogoda, MJ Pugh, M Gebregziabher, CL Hall, D Taber, and DA Spain. Ethnicity/race and service-connected disability disparities in civilian traumatic brain injury mechanism of injury and VHA health services costs in military veterans: evidence from a level 1 trauma center and VA medical center. Trauma 2020;8(3):237-265. doi:10.1177/1460408620914436.
5. Dismuke-Greer CE, Esmaeili A, Karmarkar AM, Davis B, Garcia C, Pugh MJ, Yaffe K. Economic impact of comorbid TBI-dementia on VA facility and non-VA facility costs, 2000-2020. Brain Injury 2022;36(5):673-682.
6. Dismuke-Greer C, Esmaeili A, Ozieh MN, Gujral K, Garcia C, Del Negro A, Davis B, Egede L. Racial/Ethnic and Geographic Disparities in Comorbid Traumatic Brain Injury-Renal Failure in US Veterans and Associated Veterans Affairs Resource Costs, 2000-2020. J Racial Ethn Health Disparities. 2024 Apr;11(2):652-668. doi: 10.1007/s40615-023-01550-4. Epub 2023 Mar 2. PMID: 36864369; PMCID: PMC10474245.

*LIMBIC-CENC research and its KT products were supported financially by the Department of Defense, Chronic Effects of Neurotrauma Consortium (CENC) Award W81XWH-13-2-0095 and Department of Veterans Affairs CENC Award I01 CX001135. Any opinions, findings, conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Government or the U.S. Department of Veterans Affairs, and no official endorsement should be inferred.*