

United States Senate

WASHINGTON, DC 20510

January 18, 2024

The Honorable Lloyd J. Austin III
Secretary of Defense
U.S Department of Defense
1000 Defense Pentagon
Washington, DC 20301-1000

Dear Secretary Austin:

We write to learn more about the Department of Defense's current efforts to protect service members' brain health, particularly in ensuring that military operations do not result in blast overpressure that can lead to depression, crippling headaches, hallucinations, and suicide.

Traumatic Brain Injury (TBI) was the "signature wound" of our wars in Iraq and Afghanistan.¹ While many of these injuries were a result of improvised explosive devices (IEDS),² even repeated common or routine training unrelated to combat "may also have impacts on [central nervous system] structure, function, and development, as well as on the broader health of military service members."³ DoD studies found "some servicemembers experience cognitive deficits in delayed verbal memory, visual-spatial memory, and executive function after firing heavy weapons, even within allowable limits"⁴ and "that those who were in career fields with more blast exposure had an increased risk of developing anxiety disorders, depression, migraines, substance abuse problems, dementia and a number of psychiatric disorders including schizophrenia."⁵ Another recent DoD study estimated "up to 22% of troops from recent conflicts suffered from mild traumatic brain injury, or mTBI, and the most prevalent cause was long-term exposure to explosive weapons."⁶

¹ Center for a New American Security, "Protecting Warfighters from Blast Injury," Lauren Fish and Paul Scharre, April 29, 2018, <https://www.cnas.org/publications/reports/protecting-warfighters-from-blast-injury>; National Library of Medicine, "Traumatic Brain Injury in Iraq and Afghanistan Veterans: New Results from a National Random Sample Study," Lisa Lindquist, Holly Love, and Eric Elbogen, Summer 2017, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5501743/>.

² *Id.*

³ RAND Corporation, "Neurological Effects of Repeated Exposure to Military Occupational Levels of Blast," 2020, Back Cover, https://www.rand.org/content/dam/rand/pubs/research_reports/RR2300/RR2350/RAND_RR2350.pdf.

⁴ Center for a New American Security, "Protecting Warfighters from Blast Injury," Lauren Fish and Paul Scharre, April 29, 2018, <https://www.cnas.org/publications/reports/protecting-warfighters-from-blast-injury>.

⁵ New York Times, "U.S. Troops Still Train on Weapons with Known Risk of Brain Injury," Dave Philipps, November 28, 2023, <https://www.nytimes.com/2023/11/26/us/military-brain-injury-rocket-launcher.html>.

⁶ Task and Purpose, "Blast exposure history could soon be part of US troops' medical records," Hope Seck, January 10, 2023, <https://taskandpurpose.com/news/military-blast-exposure-medical-records/>; Military Medical Research, "Military traumatic brain injury: a challenge straddling neurology and psychiatry," Ling-Zhuo Kong, Rui-Li Zhang, Shao-Hua Hu, and Jian-Bo Lai, January 6, 2022, <https://doi.org/10.1186/s40779-021-00363-y>.

Brain injury risks were also elevated for troops in Syria combating the Islamic State of Iraq and Syria (ISIS) during 2016 and 2017.⁷ A recent *New York Times (Times)* investigation found that efforts to limit the number of active duty troops in Syria meant that those who did serve in the region fired “far more rounds per crew member... than any American artillery battery had fired at least since the Vietnam War.”⁸ All four of the artillery batteries the *Times* investigated had at least one suicide, with some batteries having several.⁹ An Army-funded study also found that exposure to blasts also puts service members at a higher risk for developing Alzheimer’s disease, even if they did not have a TBI. The findings “explain those many blast-exposed individuals returning from war zones with no detectable brain injury, but who still suffer from persistent neurological symptoms, including depression, headaches, irritability and memory problems.”¹⁰ In addition to risks to brain health, the *Times* investigation found TBI damage “can cause communication with other organs to malfunction.”¹¹ Dozens of young veterans complained of “elevated, irregular heartbeats and persistent, painful problems with their digestion.”¹²

A Marine Corps review of one unit confirmed that after firing “an unusually high number of artillery rounds” in 2017 that Marines “suffered a higher rate of Traumatic Brain Injuries (TBI) than the rest of the artillery community”¹³ and that “this operational tempo could result in the artillery community suffering injuries faster than combat replacements can be trained to replace them.”¹⁴ The review also found knowledge of ways to mitigate blast overpressure and recognition of symptoms of blast overpressure, was “extremely limited”¹⁵ and that the long-term impacts “are seemingly ignored.”¹⁶

A Defense Health Agency study¹⁷ found that “in the days after firing rockets, they [troops] had worse memories and reaction times, worse coordination, lower cognitive and executive function, and elevated levels of proteins in their blood that are markers of brain injury.”¹⁸ These findings are particularly troubling since it could impact combat operations.¹⁹ Additionally, researchers

⁷ New York Times, “A Secret War, Strange New Wounds, and Silence from the Pentagon,” Dave Philipps, November 5, 2023, <https://www.nytimes.com/2023/11/05/us/us-army-marines-artillery-isis-pentagon.html>.

⁸ *Id.*

⁹ *Id.*

¹⁰ U.S. Army, “Study identifies potential link between Soldiers exposed to blasts, Alzheimer’s,” U.S. Army DEVCOM Army Research Laboratory Public Affairs, February 25, 2021, https://www.army.mil/article/243681/study_identifies_potential_link_between_soldiers_exposed_to_blasts_alzheimer.

¹¹ New York Times, “A Secret War, Strange New Wounds, and Silence from the Pentagon,” Dave Philipps, November 5, 2023, <https://www.nytimes.com/2023/11/05/us/us-army-marines-artillery-isis-pentagon.html>.

¹² *Id.*

¹³ Marine Corps Directorate of Analytics & Performance Organization, “Blast Overpressure Effects,” March 2019, p. 2, https://www.hqmc.marines.mil/Portals/61/Users/019/71/4371/Overpressure%20Study%20Report%2020191025.pdf?ver=Nta6RKsuKvaHCTG_HrY1MQ%3D%3D.

¹⁴ *Id.*, p. 2.

¹⁵ *Id.*, p. 18.

¹⁶ *Id.*, p. 18.

¹⁷ Uniformed Services University News, “INVICTA: A Look Into Sub-Concussive Brain Injury,” Zachary Willis, March 18, 2020, <https://news.usuhs.edu/2020/03/invicta-look-into-sub-concussive-brain.html>.

¹⁸ New York Times, “U.S. Troops Still Train on Weapons with Known Risk of Brain Injury,” Dave Philipps, November 28, 2023, <https://www.nytimes.com/2023/11/26/us/military-brain-injury-rocket-launcher.html>.

¹⁹ *Id.*

measuring blast pressure from roadside bombs in Afghanistan have also found that “75 percent of the troops’ [blast] exposure was coming from their own weapons.”²⁰

Senator Warren secured a provision in the fiscal year 2018 *National Defense Authorization Act* (NDAA) to require a longitudinal study on the impact of blast overpressure, including a review of safety precautions to protect service members.²¹ In 2018, Senator Warren and Senator Ernst introduced the *Blast Exposure and Brain Injury Prevention Act of 2018* to improve research on traumatic brain injury, speed the development of therapies to treat TBI, and enable the DoD to better track and prevent blast pressure exposure.²² At the time Senators Warren and Ernst introduced that bill, DoD estimated more than 370,000 service members had received a first time diagnosis of TBI since 2000;²³ the incidence of TBI is now approaching nearly half a million.²⁴ Ongoing challenges with diagnosing these injuries indicates that the real numbers may even be higher.²⁵

Senator Warren also secured a provision in the fiscal year 2020 NDAA requiring documentation of exposure in service members’ records.²⁶ We understand the Department is close to implementing this requirement more than three years later,²⁷ but the *Times* investigation revealing that “[t]roops say they see little being done to limit or track blast exposure” further underscores the urgency of this matter.²⁸

To assess the effectiveness of current policy and identify opportunities to support the DoD in its efforts to address causes and effects of TBI, please answer the following questions no later than February 27, 2024:

²⁰ *Id.*

²¹ Office of Senator Elizabeth Warren, “NDAA Signed Into Law, Includes Key Warren Provisions,” December 12, 2017, <https://www.warren.senate.gov/newsroom/press-releases/ndaa-signed-into-law-includes-key-warren-provisions>; “National Defense Authorization Act for Fiscal Year 2018,” Public Law 115-91, Section 734, <https://www.congress.gov/115/plaws/publ91/PLAW-115publ91.pdf>.

²² Office of Senator Elizabeth Warren, “Warren and Ernst Introduce Bipartisan Bill to Improve Servicemember Blast Exposure Injury Prevention,” May 18, 2018, <https://www.warren.senate.gov/newsroom/press-releases/warren-and-ernst-introduce-bipartisan-bill-to-improve-servicemember-blast-exposure-injury-prevention->

²³ Office of Senator Elizabeth Warren, “The Blast Exposure and Brain Injury Prevention Act of 2018,” One Pager, <https://www.warren.senate.gov/imo/media/doc/Blast%20Exposure%20and%20Brain%20Injury%20Prevention%20Act%20-%20One%20Pager.pdf>.

²⁴ Health.mil, “DoD TBI Worldwide Numbers,” May 9, 2023, <https://www.health.mil/Military-Health-Topics/Centers-of-Excellence/Traumatic-Brain-Injury-Center-of-Excellence/DOD-TBI-Worldwide-Numbers>.

²⁵ Department of Veterans Affairs, “Traumatic Brain Injury: A Guide for Patients,” CogSMART Program of VA San Diego Healthcare System, p. 2, <https://www.mentalhealth.va.gov/docs/tbi.pdf>.

²⁶ Letter from Senators Elizabeth Warren and Joni Ernst and Representatives Bill Pascrell and Don Bacon to Secretary of Defense Mark Esper, February 11, 2020, <https://www.warren.senate.gov/imo/media/doc/2020.02.11%20Letter%20to%20DoD%20re%20TBIs.pdf>; Fiscal Year 2020 National Defense Authorization Act, Public Law 116-92, Section 717.

²⁷ Task and Purpose, “Blast exposure history could soon be part of US troops’ medical records,” Hope Seck, January 10, 2023, <https://taskandpurpose.com/news/military-blast-exposure-medical-records/>.

²⁸ *Id.*

1. In 2019, the Marine Corps published the Blast Overpressure Effects Report, and in 2022, the Department of Defense established the Warfighter Brain Health Initiative.²⁹ In response to these studies, have any of the services implemented changes to its training or operational practice? If so, what changes were made?
2. Have the other service branches conducted similar research on the effects of blast overpressure? If so, what has this research revealed?
 - a. Which units in each service branch has this research or other information identified as being at high-risk of blast overpressure?
3. The Marine Corps and Army stated that they “now have programs to track and limit crews’ exposure” to blasts.³⁰ Please provide information on these programs.
 - a. What information does the Marine Corps and Army provide to service members regarding these programs?
 - b. What criteria are used to limit exposure to weapons with high concussive forces, like crew-served weapons and conduct ranges that expose service members to concussive forces for blast exposure?
 - c. Have any other services developed similar programs to track and limit exposure? Please provide information on these programs and the information that is provided to service members regarding these programs.
4. When are baseline neuropsychological assessments performed using Automated Neuropsychological Assessment Metrics and other assessment method?
 - a. Are there any communities or military operational specialties that establish baseline before pre-deployment health assessment? If so, what communities and when?
5. What steps has SOCOM taken to reduce blast exposure?
 - a. How often does SOCOM use the Carl Gustaf rocket launcher, other crew-served weapons, and conduct ranges that expose service members to concussive forces, and how does it determine when there is sufficient reason to use it?
 - b. What is SOCOM doing to ensure that these safety steps to reduce blast exposure are being followed?

²⁹ Marine Corps Directorate of Analytics & Performance Organization, “Blast Overpressure Effects,” March 2019, p. 18, https://www.hqmc.marines.mil/Portals/61/Users/019/71/4371/Overpressure%20Study%20Report%2020191025.pdf?ver=Nta6RKsuKvaHCTG_HrY1MQ%3D%3D; Department of Defense, “Defense Department Taking Action with Warfighter Brain Health Initiative,” Ken Cornwall, December 20, 2023, <https://www.defense.gov/News/News-Stories/Article/Article/3622388/defense-department-taking-action-with-warfighter-brain-health-initiative/#>.

³⁰ New York Times, “A Secret War, Strange New Wounds, and Silence from the Pentagon,” Dave Philipps, November 5, 2023, <https://www.nytimes.com/2023/11/05/us/us-army-marines-artillery-isis-pentagon.html>.

6. Special Operations Command claimed in 2019 that it would provide gauges measuring blast exposure “to all of its operators, but four years later, only those taking part in research studies have them.”³¹ When will the command be able to provide gauges to all operators, and what are the challenges the command faces by not being able to provide the gauges to all operators at this time? What is the cost of providing gauges to all operators?
7. What steps are each of the service branches taking to ensure service members have gauges to measure blast exposure?
 - a. Which service members receive these gauges?
 - b. How does each service use these gauges to determine whether its service members are being exposed to unsafe levels of blast exposure?
8. What information do each of the service branches provide commanders and service members regarding the risk of blast overpressure and TBIs? Please provide a copy of the information and guidelines.
9. Given that “[m]ost of the affected gun crew members are not out of the military,”³² what steps are the service branches taking to:
 - a. inform commanders and service members about the impact of blast overpressure, especially during training, provide the supplied information and guidelines;
 - b. test and monitor for symptoms of injuries from blast overpressure both after deployment and as a result of training; and
 - c. provide adequate mental health care and other health care support to the service members?
10. When does the Department expect to complete implementation of the provision under the FY 2020 NDAA requiring documentation of exposure in service members records?³³
11. How does DoD and the Department of Veterans Affairs coordinate on addressing blast overpressure, including screening for symptoms?
12. What programs and services on blast overpressure and TBIs does the Department offer to assist service members as they transition from active service?
 - a. How does it coordinate with the Department of Veterans Affairs in providing these services?

³¹ *Id.*

³² New York Times, “A Secret War, Strange New Wounds, and Silence from the Pentagon,” Dave Philipps, November 5, 2023, <https://www.nytimes.com/2023/11/05/us/us-army-marines-artillery-isis-pentagon.html>.


³³ Fiscal Year 2020 National Defense Authorization Act, Public Law 116-92, Section 717.

We also request that you provide our offices with a briefing on the Warfighter Brain Health Initiative and the Department's latest efforts to address TBI no later than February 1, 2024.

Sincerely,



Elizabeth Warren
United States Senator



Thom Tillis
United States Senator



Joni K. Ernst
United States Senator