



PERSONNEL AND  
READINESS

**UNDER SECRETARY OF DEFENSE**  
4000 DEFENSE PENTAGON  
WASHINGTON, D.C. 20301-4000

DEC 21 2023

The Honorable Jack Reed  
Chairman  
Committee on Armed Services  
United States Senate  
Washington, DC 20510

Dear Mr. Chairman:

The Department's response to section 742 of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2020 (Public Law 116-92), "Modification of Requirements for Longitudinal Medical Study on Blast Pressure Exposure of Members of the Armed Forces and Collection of Exposure Information," is enclosed. Section 742 requests an annual status report on the longitudinal medical study on blast pressure exposure (section 734 of the NDAA for FY 2018 (Public Law 115-91)).

The Department completed its work on the series of studies being conducted in response to Public Law 115-91. This status report provides highlights from the section 734 final report. The overarching goal of the section 734 studies, also referred to as the Blast Overpressure Study, was to improve the Department's understanding of the impact of blast pressure exposure from weapon systems on the Service members' brain health and better inform policy for risk mitigation, unit readiness, and health care decisions.

Thank you for your continued strong support for the health and well-being of our Service members. I am sending a similar letter to the House Armed Services Committee.

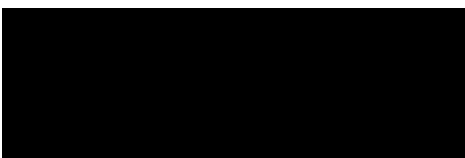
Sincerely,



Ashish S. Vazirani  
Acting

Enclosure:  
As stated

cc:  
The Honorable Roger F. Wicker  
Ranking Member





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**UNDER SECRETARY OF DEFENSE**

4000 DEFENSE PENTAGON  
WASHINGTON, D.C. 20301-4000

DEC 21 2023

The Honorable Mike D. Rogers  
Chairman  
Committee on Armed Services  
U.S. House of Representatives  
Washington, DC 20515

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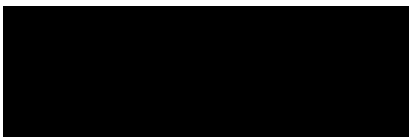
Sincerely,



Ashish S. Vazirani  
Acting

Enclosure:  
As stated

cc:  
The Honorable Adam Smith  
Ranking Member



# **Report to the Committees on Armed Services of the Senate and the House of Representatives**



## **Modification of Requirements for Longitudinal Medical Study on Blast Pressure Exposure of Members of the Armed Forces and Collection of Exposure Information**

### **Annual Status Update**

**December 2023**

The estimated cost of this report or study for the Department of Defense is approximately \$1,000 for Fiscal Year 2022-2023. This includes \$800 in expenses and \$200 in DoD labor.  
Generated on 31 October 2023  
RefID: 7-CDDE456

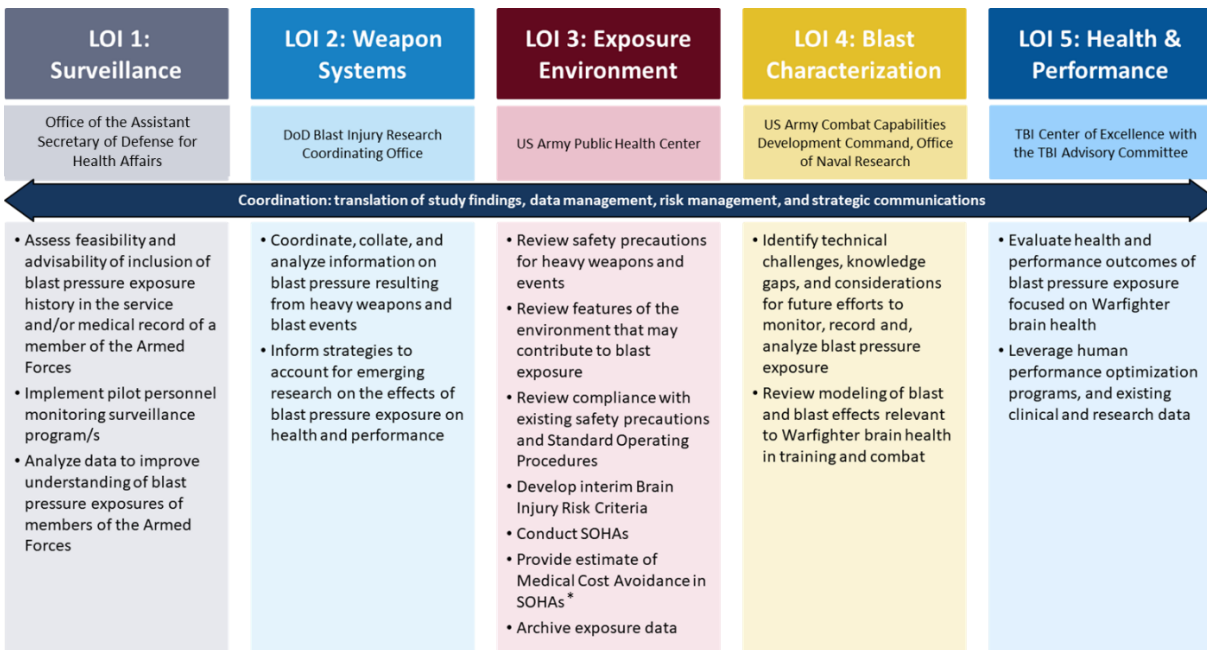
# INTRODUCTION

This report is the final response to section 742 of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2020 (Public Law 116–92), “Modification of Requirements for Longitudinal Medical Study on Blast Pressure Exposure of Members of the Armed Forces and Collection of Exposure Information,” which requires an annual status report on the longitudinal medical study on blast pressure exposure (section 734 of the NDAA for FY 2018 (Public Law 115–91)). The most recent annual status update was submitted on February 27, 2023.

The goal of section 734, also referred to as the Blast Overpressure Studies (BOS), was to improve the Department’s understanding of the impact of blast pressure exposure from weapon systems on the brain health of Service members and better inform policy for risk mitigation, unit readiness, and health care decisions. The scope of section 734 includes a series of studies and assessments to achieve the goal rather than a single longitudinal study. The multiple study methodology was used to capture answers to several inter-related research questions that would prove challenging to accomplish with one large and unwieldy study, thereby presenting more opportunities for success.

The section 734/BOS had an established program structure, which included the following five lines of inquiry (LOIs): Surveillance (LOI 1), Weapons Systems (LOI 2), Exposure Environment (LOI 3), Blast Characterization (LOI 4), and Health and Performance (LOI 5), to address the congressional requirements (Figure 1). Previous annual status updates provided progress across each of the LOIs; however, this final annual update provides highlights from the section 734 final report.

**Figure 1 Section 734/BOS Lines of Efforts Overview**



\* Service member Occupational Health Assessments

## **SECTION 734: HIGHLIGHTS**

### **Overview**

The foundation of the BOS pilot efforts was a three-phase pilot which examined individually identifiable blast overpressure (BOP) exposure through body-worn blast wearable sensors to collect data, perform quality control measures, and management across Department of Defense (DoD) systems to connect to medical records. To better target the objectives of section 734 legislation, the Department focused on specific weapons and munitions the Services use regularly and as a result the most important weapons to explore monitoring, documentation, and safety issues. The Department developed a list of “Tier 1” weapon systems identified by the Services which was organized based on four different categories: shoulder-mounted, 50 caliber weapons, indirect fire systems, and breaching charges.

### **Monitor, Record, and Analyze Blast Pressure Exposure**

The BOS pilot implemented personnel monitoring with over 500 Service members by using commercially available watch-sized body-worn blast wearable sensors in a three-sensor system to capture BOP exposure on the individual in a training environment. The DoD was able to monitor, record the blast wave parameters, and analyze the data. The Department was unable to demonstrate the ability to monitor, record, or analyze blast pressure exposure in combat environments. The conduct of the BOS pilot was resource intensive using blast wearable sensors and the DoD did not evaluate the resources that would be necessary to monitor, record, and analyze across a large unit. However, the Department’s ability to monitor, record, and analyze a Service member’s exposure to blast may be accomplished through other means as well such as recording shot counts, questionnaires or surveys and using military occupational specialty as a proxy. The BOS pilot effort did not evaluate these alternatives for blast exposure monitoring; however, the Department plans to conduct a business case analysis and review lessons learned from this effort to inform its way forward with blast monitoring.<sup>1</sup>

### **Assess the Feasibility and Advisability of Including Blast Exposure History**

The Department demonstrated that it is feasible in a test environment using blast wearable sensors to capture Service member blast exposure history. However, the BOS pilot did not evaluate the resources necessary to document data from blast wearable sensors on a broad scale. The BOS pilot assessed the feasibility and advisability of including BOP exposure history in the Service and/or medical record of members of the Military Services, piloted implementation of a personnel monitoring, and analyzed data to improve understanding of BOP exposures to members of the Military Services. A key consideration of tracking and surveillance of the BOS program was the inclusion of BOP exposure data within existing DoD record systems. The Department plans to conduct a business case analysis and review lessons learned from this effort to inform its way forward with the documentation of blast exposure.<sup>2</sup>

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<sup>1</sup> Section 735 of the NDAA for FY 2023 (Public Law 117–263), “Brain Health Initiative of Department of Defense.”

<sup>2</sup> Section 735 of the NDAA for FY 2023 (Public Law 117–263), “Brain Health Initiative of Department of Defense.”

## **Review the Safety Precautions Surrounding Heavy Weapons Training**

An important component of section 734 was to objectively evaluate the current state of knowledge of health and performance outcomes for Service members exposed to blasts in training and combat environments. Studies were reviewed that focused on humans exposed to occupational BOP. Key findings in the areas of neurocognition, symptom reporting after blast exposure, medical diagnoses and healthcare utilization helped to further understanding of health and performance effects and led to the development of policy and tools, noted below. The BOS pilot efforts included the collection of Tier 1 weapon system information and review of DoD policies, regulations, tactics, techniques, and procedures. This led to the development of tools to be used across the Services to support safe range operations. The BOS pilot reviewed current safety precautions and identified possible discrepancies and gaps. DoD established a database for Allowable Number of Rounds and Noise Hazard Contours. To improve communication on the potential impacts of BOP exposure, DoD developed a specific blast exposure medical diagnosis (ICD-10 code) to enable future medical surveillance for BOP exposure, and enhanced and evaluated the Medical Cost Avoidance Model. The BOS pilot completed Joint Service Member Occupational Health Assessment assessments for Tier 1 weapons. With the information gained from these efforts, DoD issued Assistant Secretary of Defense for Readiness Memorandum, “Interim Guidance for Managing Brain Health Risk from Blast Overpressure,” November 4, 2022. This memorandum offered numerous actions to reduce risk and exposure to blast overpressure.

## **Assess the Feasibility and Advisability of Accessibility to Data<sup>3</sup>**

In the field training environment of the BOS pilot, raw blast wearable sensor data was collected from units. At the end of the monitoring period, the data were formatted to include all relevant Service member BOP exposure information and then uploaded the files into section 734 pilot-established Defense Occupational Environmental Health Readiness System- Industrial Hygiene (DOEHRS-IH) test environment (as opposed to the production environment). As the principal data repository system of record for Service member health hazard exposures, DOEHRS-IH satisfies many requirements for managing BOP exposure monitoring records. The Individual Longitudinal Exposure Record (ILER) is a DoD and Department of Veterans Affairs web application that links exposure data to an individual’s record to support Service member health care management decisions. ILER is a federated query system that retrieves data from multiple

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<sup>3</sup> Section 742 of the NDAA for FY 2020 (Public Law 116–92), “Modification of Requirements for Longitudinal Medical Study on Blast Pressure Exposure of Members of the Armed Forces and Collection of Exposure Information.”

Additional language per section 742 relevant to section 734:

(b) Collection of Exposure Information- The Secretary of Defense shall collect blast exposure information with respect to a member of the Armed Forces in a manner-

- (1) consistent with blast exposure measurements training guidance of the Department of Defense, including any guidance developed pursuant to-
  - (A) the longitudinal medical study on blast pressure exposure required by section 734 of the National Defense Authorization Act for Fiscal Year 2018 (Public Law 115-91; 131 Stat. 1444); and
  - (B) the review of guidance on blast exposure during training required by section 253 of the John S. McCain National Defense Authorization Act of Fiscal Year 2019 (Public Law 115-232; 10 U.S.C. 2001 note prec.);
- (2) compatible with training and operational objectives of the Department; and
- (3) that is automated, to the extent practicable, to minimize the reporting burden of unit commanders.

sources to provide military service exposure information. During the BOS pilot, the DOEHRS-IH team tested transmission of information from the DOEHRS-IH test environment to ILER. As part of the interface test, ILER personnel used DOEHRS-IH BOP exposure test information to develop and tested a query facility for reporting individual's BOP exposure information in an Adobe Acrobat document format (\*.pdf).

## **CONCLUSION**

The BOS pilot was able to demonstrate that it is feasible to capture blast information from our weapon systems, store that information safely and generate exposure reports for individuals and units in a training environment. To determine the advisability of a blast monitoring effort would require the Department to evaluate costs and outcomes. The Department plans to conduct a business case analysis and review lessons learned from section 734 efforts to inform its way forward for a monitoring program that documents and analyzes blast exposures that may affect the brain health of Service members.<sup>4</sup> The Department intends to leverage the BOS pilot to continue to inform training and operational safety doctrine, protocols, and policies to best protect the Warfighter.

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<sup>4</sup> Section 735 of the NDAA for FY 2023 (Public Law 117–263), “Brain Health Initiative of Department of Defense.”