



PERSONNEL AND
READINESS

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

DEC 13 2022

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

Dear Mr. Chairman:

The Department's response to section 717 of the National Defense Authorization Act for Fiscal Year 2020 (Public Law 116-92), "Inclusion of Blast Exposure History in Medical Records of Members of the Armed Forces," is enclosed.

The Department continues with its ongoing efforts to establish a surveillance and exposure monitoring and documentation process to collect blast overpressure exposure data and other associated exposures that include brain exposure information from the training and contingency environments. Blast exposure history information has not been placed into a Service member's medical record, but considerable progress has been made to integrate the monitoring and documenting of historical blast overpressure exposures of Service members into our existing surveillance and medical records systems.

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,

A handwritten signature in black ink, appearing to read "Gilbert R. Cisneros, Jr.", written in a cursive style.

Gilbert R. Cisneros, Jr.

Enclosure:
As stated

cc:
The Honorable James M. Inhofe
Ranking Member



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

PERSONNEL AND
READINESS

DEC 13 2022

The Honorable Adam Smith
Chairman
Committee on Armed Services
U.S. House of Representatives
Washington, DC 20515

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Enclosure:
As stated

cc:
The Honorable Mike D. Rogers
Ranking Member

**REPORT TO THE COMMITTEES ON ARMED
SERVICES OF THE SENATE AND THE HOUSE
OF REPRESENTATIVES**



**Inclusion of Blast Exposure History in Medical
Records of Members of the Armed Forces**

December 2022

The estimated cost of this report or study
for the Department of Defense (DoD) is
approximately
\$581,000 in Fiscal Year 2021. This
includes \$150,000 in expenses and
\$431,000 in DoD labor.
Generated on 17 Nov
2021 RefID: I-6035533

BACKGROUND

This report is in response to section 717 of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2020 (Public Law 116–92), “Inclusion of Blast Exposure History in Medical Records of Members of the Armed Forces,” which requests the Secretary of Defense, in coordination with the Secretaries of the Military Departments, to ensure blast pressure exposure history is documented in the medical records of members of the Armed Forces when a covered incident occurs. This will be used to assist in determining whether a future illness or injury of the member is service-connected and inform future blast exposure risk mitigation efforts of the Department of Defense (DoD).

According to current DoD policy¹, monitoring and recording Service member exposures within 50 meters of a blast event and other covered incidents are followed by mandatory medical screenings and follow-on medical care, which remain a critical entry point into the DoD pathway of health care for members with probable traumatic brain injuries, in alignment with the section 717 requirement. However, as this policy has established event-driven treatment protocols for screening, medical care and documentation while deployed, comparable protocols and documentation processes had yet to be fully developed for all Service members involved in a covered incident within the garrison or non-deployed environment. Additionally, the evaluation, monitoring and documentation of blast events had not routinely included a measure of blast pressure, nor does it involve tracking blast exposure history within a Service member’s medical record. Conversely, in a continued effort to improve the occupational health and safety of our Service members, the Department has aggressively worked to broaden the operational protections to the Force and increase the medical understanding of blast effects, both acutely and cumulatively over time, in training and during contingency operations and is executing a comprehensive plan to close the existing documentation capability gap by expanding our blast monitoring and documentation abilities to include single and repeated blast exposure events.

In keeping with other legal requirements² the Department has collected blast overpressure exposure data and other associated exposures that include brain exposure information from the training and contingency environments that may impact health outcomes throughout a military career and help inform any future service-connected injury or illness. At present, environmental hazard information like blast pressure exposure is monitored and documented by non-medical personnel such as the safety community, training cadre, and military unit personnel. Additionally, there has not been any surveillance or documentation of brain exposure to blast overpressure due to limitations in the ability to measure and characterize the hazard of such exposures. This disparity, however, is being rectified by the Department as significant progress has been made to integrate the environmental surveillance and documentation of historical blast pressure exposure data of our Service members with clinical provider access for entry into medical records. This final report describes the Department’s continued progress to collect information during training and have the data readily available for provider use in evaluating for illness or injury based on exposure to possible hazardous blast events and inform the necessary risk mitigation efforts to protect all members in training and contingency operations. Consequently, the Department has met the requirements of section 717 and continues to improve our ability to measure and document blast pressure experienced.

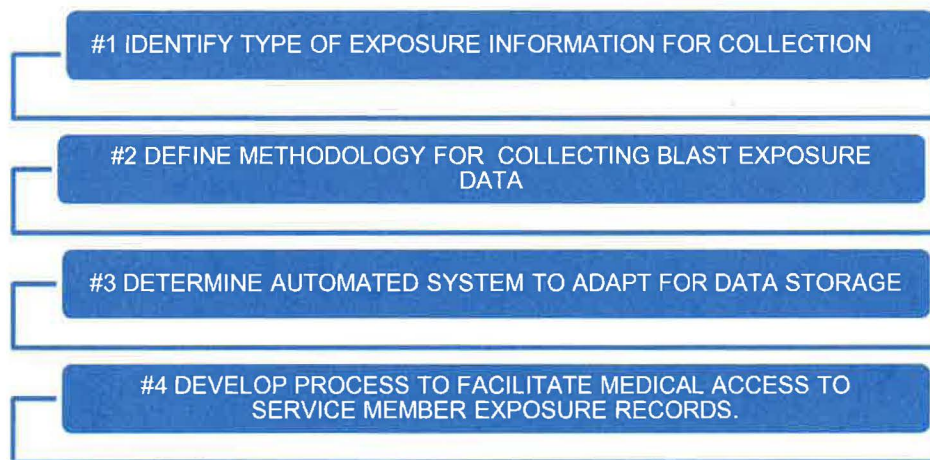
¹ DoD Instruction 6490.11, “DoD Policy Guidance for Management of Mild Traumatic Brain Injury/Concussion in the Deployed Setting,” September 18, 2012, as amended.

² Section 734 of the NDAA for FY 2018, “Longitudinal Medical Study on Blast Pressure Exposure of Members of the Armed Forces.”

SCOPE

Four elements were identified and evaluated to assess potential options for collecting blast overpressure exposure history and including this information in a Service member's electronic medical record. These elements are delineated in Figure 1.

Figure 1. Assessment Elements Examining the Feasibility Collecting Blast Overpressure Exposure History



CURRENT STATUS

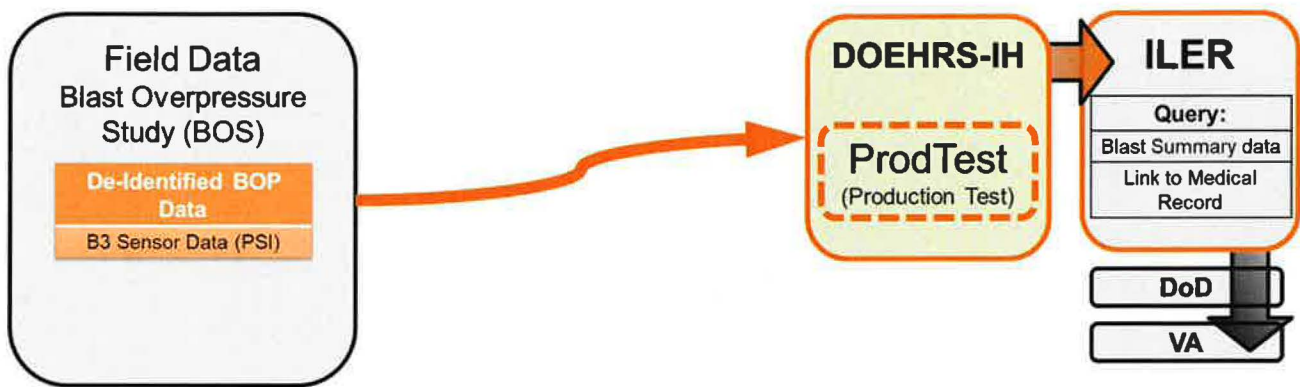
To achieve the goal to establish surveillance and exposure monitoring and documentation process, the Department executed the following strategic actions:

- Development of capabilities to house blast exposure-related variables within the Defense Occupational and Environmental Health Readiness System-Industrial Hygiene System (DOEHRS-IH) and later extract relevant data through the Individual Longitudinal Exposure Record (ILER).
- Conducted a live-fire, Blast Overpressure (BOP) Surveillance Pilot project involving data collection from both Army and Marine units during Tier I heavy weapons training to:
 - Determine feasibility, limitations, and technical requirements of BOP monitoring.
 - Use Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facilities-Policy analysis to inform organizational capabilities.
 - Provide discrete, real-time exposure information to optimize data management within our current systems with linkages to the DOEHRS-IH and ILER systems.
- Automating translatable, unit-level BOP exposure reports for operational leadership to aid in force health protection decision making during training.

Element #1: Identify Type of Exposure Information for Collection:

A de-identified data management (test) phase (conducted January through September 2020), as part of the Blast Overpressure Study-De-identified surveillance feasibility work, used partially masked data and metadata created from the data repository of existing blast monitoring studies (Combat and training Queryable exposure/Event Repository and the Army’s Environmental Sensors in Training (ESiT)) were used to help establish the necessary data fields in DOEHRS-IH and to define the mechanism for the ILER to query this information. The proposed scheme for the system development within DOEHRS-IH and ILER using de-identified (non-Personally Identifiable Information) BOP data is presented at Figure 2. This phase informed the data collection for the next phases (surveillance and longitudinal data collections).

Figure 2. Proposed Scheme for Test Phase System Development



Element #2: Define the Methodology for Blast Exposure Data Collection:

The blast exposure data collection process is ongoing and occurring in two concurrent pilot project phases (surveillance and longitudinal). For the blast overpressure data collection, the blast gauges are worn by Service members on the back of the head, chest, and left shoulder. The BOP waveform data is collected through three wearable Black Box Biometrics blast gauges (7th generation). We are monitoring the thresholds for full overpressure events with the gauges set to one pound per square inch to trigger the gauge to record. Data collected includes information on full overpressure or gauge-triggering event pressure to include waveform; peak overpressure, impulse pressure; and overpressure event time.

The surveillance phase is a pilot, live-collection of personally-identifiable BOP exposure information and contextual data elements (weapon system, body/crew position, environmental factors). This is in progressive contrast to the de-identified data used in field tests. The data is collected during a unit-level training of Tier 1³ heavy weapon systems. Blast overpressure

³ In coordination with the Military Services, a set of frequently used, high-powered weapons and weapon systems was identified. The plan for all the weapons (39 weapons and weapons systems) is to study each of the weapons over time. The set of weapons were divided into three “tiers” based on usage frequency across the Services and those most commonly used were assessed a “Tier 1” designation. The Tier 1 set of weapons includes, but is not limited to, shoulder-mounted, 50-caliber weapons, indirect fire systems, and explosive breaching charges. Refer to interim report submitted March 2, 2021, for weapons list.

exposure data and related metadata are collected in a cross-sectional manner from up to 100 Soldiers (Fort Campbell, KY) and 100 Marines (Camp Lejeune, NC) attending specific training events using high-powered weapons. To date, monitoring and documentation has been completed at Fort Campbell on 88 subjects across four separate training events and is considered “operationally complete” for the purposes of the live-data collection pilot. Identification of specific units to engage in the pilot at Camp Lejeune for both surveillance and longitudinal efforts is in progress. As the two, live-collection pilot sites have modest numbers for data entry, the Department reserves the option to increase the number of sites for additional data collection.

The longitudinal phase is similar to the surveillance phase with blast overpressure exposure data, and related metadata are collected but will be collected over a specified time period engaging up to 250 Soldiers (Fort Campbell, KY) and up to 250 Marines (Camp Lejeune, NC) attending training events over a 4-month period. To date, longitudinal monitoring is ongoing involving 246 subjects across various units at Fort Campbell. At Camp Lejeune, infantry unit identification is in progress and awaiting command clearances.

As the data collection phases continue, the study teams have outlined some key lessons learned thus far and will address these lessons in the data collection phases continued over the next few months.

- Adequate communication with the operations at the battalion and unit levels is imperative for effective and timely surveillance engagement.
- Flexible scheduling is necessary to support unit operational requirements.
- Study teams must familiarize with weapon-system specific data prior to unit engagement.
- Increased understanding of weapon system-specific firing teams.
- Increased understanding on costs of operations to maximize effectiveness of study teams.

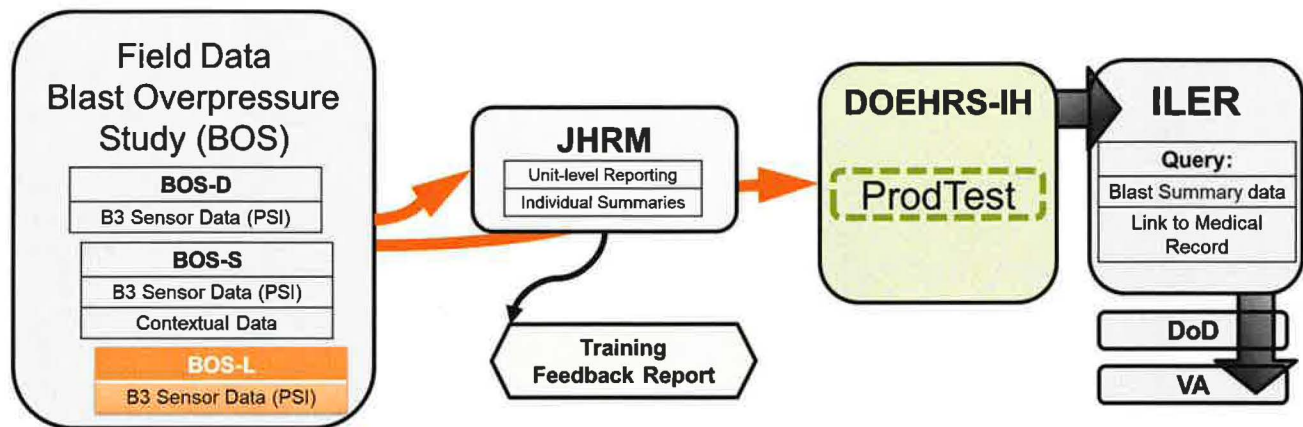
Element #3: Determine Automated System to Adapt to Store Data:

The DOEHRS-IH is the prevailing DoD enterprise approach used to identify and document occupational and environmental health exposure hazards and was designated to document and store relevant blast exposure information such as, environmental characteristics, weapons-specific contextual data, and blast overpressure information for individual Service members. DOEHRS-IH allows the DoD to manage occupational and environmental health risk data and actively track biological, chemical, and physical health hazards. Additionally, leveraging DOEHRS-IH will permit use of the ILER system and facilitate access to individual exposure information for medical health care providers.

Element #4: Develop a Process to Transfer Exposure Information to Service Member's Medical Record:

As discussed above, the surveillance and longitudinal data collection phases are ongoing. Figure 3 depicts a notional overview of the process to transfer exposure information to a Service member's medical record to include an automated unit-level training feedback report once ILER is engaged in the blast summary data extraction process.

Figure 3. Proposed Process to Transfer Exposure Information to Service Members' Medical Record



At the time this report was written, technical developers continue to work on refining the data extraction of the relevant exposure information. This includes validating the data elements captured from the gauges which includes determining the value of the waveform data and the best ways to present the data in DOEHRs-IH. In addition, DoD is validating storage requirements for the amount of blast data and modifying data mapping and data exchange protocols to ensure visibility from DoD to the Department of Veterans Affairs (VA).

CHALLENGES

The Department faces two major challenges in attempting to complete the target goals for this ongoing work. The first is the time, costs, and schedule involved with modifying existing exposure surveillance systems to make them interoperable across both the DoD and the VA, as well as the sustainment of such systems to capture and store large amounts of data. The surveillance and longitudinal data collections are only a small fraction of the potential amount of data to be captured across training and operational settings.

The second challenge rests with the field researchers' ability to collect blast exposure history data in a combat or contingency environment. To help address this challenge, the study teams were to collaborate with the ESiT researchers as they participated in an International Joint Warfighter Assessment exercise in July of 2021 to collect data in a realistic combat training exercise. Unfortunately, the exercise had to be restructured by the Service organizers based on mission shifts, exercise delays, and coronavirus disease 2019 requirements and priorities and did not lend itself to the appropriate field study as planned. The Department continues to explore

optional plans for simulating the operational environment, but large scale training exercises are limited at the time of this reporting.

CONCLUSION

The DoD continues to monitor, screen, and document the blast exposure events of Service members on DoD missions in accordance with applicable law and DoD policy, but the Department is not routinely monitoring blast overpressure exposures, nor is blast overpressure exposure history information placed into a Service member's medical record at this time. However, we are aggressively pursuing efforts to broaden the health protection of operational forces and increase the medical understanding of blast overpressure effects on our Service members in the training environments and during contingency operations. We anticipate the results from the Department's longitudinal medical examination across multiple lines of inquiry involving BOP exposure and the use of heavy weapons systems to inform future policy and military training doctrine.

The Department completed the critical first step in the success of these efforts with the ability to adjust an existing surveillance and monitoring system, such as DOEHRS-IH to augment our ability to document blast pressure exposures, including exposures to the brain, over the career lifecycle of a Service member and leverage an emerging data curation capability, specifically the ILER, which will capture longitudinal exposure information from our surveillance systems and interface inter-operably with our electronic health record for both the DoD and the VA. It is here that medical providers will have visibility of blast exposure data for retrieval and placement into medical records including those members in garrison training environments. The Department is on target to complete all necessary data collection and system enhancements to complete the legislative requirements enacted through the NDAA for FY 2020 and will continue building on the new capabilities to expand them across the enterprise to better inform safety standards and force health protection policy.