

ASSESSING RISK OF ADVERSE HEALTH OUTCOMES DUE TO BLAST OVERPRESSURE EXPOSURES

Olivia Helen Webster¹

¹*Defense Centers for Public Health- Aberdeen, 8977 Sibert Road, Aberdeen Proving Ground, Maryland 21010, United States of America.*

Key words: risk, criterion, occupational, health, Warfighter

Abstract:

Current methods to predict and assess the hazard severity (HS) and hazard probability (HP) associated with Warfighters' exposure to blast overpressure (BOP) from heavy weapons are focused primarily on the lung and other air-containing organs as the most vulnerable to injury. However, ongoing research and the observation of cognitive performance decrements in military personnel post-BOP exposure have led to the need for a method to assess BOP effects to the brain. Currently, there is no widely accepted occupational exposure limit or risk assessment process for BOP exposures to the brain.

The Defense Centers for Public Health-Aberdeen (DCPH-A) performs BOP Health Hazard Assessments (HHAs) to determine the allowable number of rounds (ANORs) that will produce a less than one percent incidence of any lung injury within a 24-hour period. These ANORS, along with the associated HS, HP, and Risk Level are generated by the BOP-HHA software, which uses pressure-time data collected with Blast Test Devices (BTDs) placed in crewmember positions during weapons testing at Army test centers. Recent efforts have focused on developing a process to assign risk of adverse brain health outcomes due to BOP exposure based on data collected by wearable gauges/dosimeters during live military training exercises. This type of data is collected as part of the DCPH-A Joint Service member Occupational Health Assessment (JSOHA) process.

The DCPH-A serves as the Line of Inquiry 3: Exposure Environment lead within the Congressionally mandated FY18 National Defense Authorization Act, Section 734 WorkGroup. In line with this effort, DCPH-A is developing a Blast-related Brain Injury Interim Health Protection Criterion (HPC) and associated risk assessment process for use in HHAs and JSOHAs, in accordance with Military Standard 882E. This process will outline how to assign the HS and HP of a potential brain injury or cognitive performance decrement due to BOP exposure from weapon systems and provide risk mitigation recommendations, including ANORs for various risk levels.

This presentation will cover the current and proposed methods to assess the health hazard of BOP and detail the associated DCPH-A HHA and JSOHA processes. It will discuss the Blast-related Brain Injury Interim HPC, which is set to be completed by October 2023. Ultimately this presentation will show the importance of maintaining and sustaining the robust assessment capability based on risk of lung injury due to BOP, while continuing the development of a novel approach to assess risk of brain injury due to BOP.