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MEMORANDUM FOR SENIOR PENTAGON LEADERSHIP COMMANDERS OF THE COMBATANT COMMANDS DEFENSE AGENCY AND DOD FIELD ACTIVITY DIRECTORS

SUBJECT: Department of Defense Warfighter Brain Health Initiative – Strategy and Action Plan

As a Department, we are committed to protecting the health and well-being of our people in order to maximize our ability to defend the Nation. Brain health has historically been defined in terms of human performance optimization. The most accepted and familiar aspect of human performance has been physical performance (e.g., agility, endurance, strength) of the warfighter. Cognition also plays a key functional role in a warfighter's overall performance capabilities. Thus, to successfully defend our Nation, we must optimize physical *and* cognitive performance to enhance and maintain force readiness.

There has been great work and many successes in brain health efforts, but these efforts have been disjointed across the Department. The Department's senior leaders recognize the need to synchronize and prioritize efforts into a single and unifying brain health approach to produce more efficient and effective results. The Warfighter Brain Health (WBH) Initiative is a joint effort between the operational and medical communities. The attached WBH Initiative: Strategy and Action Plan outlines the Department's direction to better address the brain health needs of our Service members, their families, line leaders, commanders, and their communities at large. The strategy and action plan addresses brain exposures, to include blast exposures, traumatic brain injury (TBI) and long term or late effects of TBI, with the goal of optimizing brain health and countering TBI.

Success in this endeavor will require a unified effort and support from across the Department, and it is critical we implement this strategy immediately. I look forward to your assistance with this critical effort to protect the health of our people today, tomorrow, and in the future.

Lather H. Him

Attachment: As stated







Department of Defense Warfighter Brain Health Initiative



STRATEGY AND ACTION PLAN 2021



Foreword

As a Department, we are committed to protecting the health and well-being of our people in order to maximize our ability to defend the Nation. The Department's mission to efficiently defend our Nation hinges on our warfighters' ability to make expedient and effective decisions on the battlefield. For a warfighter to perform at the highest level, cognitive and physical capabilities must be optimized by addressing brain health, potentially hazardous brain exposures, traumatic brain injury (TBI), and long-term or late effects of TBI. Our goal must be to ensure our warfighters are performing at optimized capacity and if exposed or injured by a known or emerging hazard, we return our warfighters to full health to include their brain health to maximize each individual's quality of life.

To accomplish this goal, the Warfighter Brain Health (WBH) Initiative was established. Prior to this initiative there has been great work and successes in brain health efforts (i.e. treatments, research, education) but, these efforts have been disjointed across the Department. We needed to synchronize and prioritize efforts into a unifying brain health approach to produce more efficient and effective results. This initiative is a coordinated effort between operational and medical communities with the singular focus of optimizing the brain health of the warfighter.

The Department's comprehensive approach to warfighter brain health results is this WBH Strategy and Action Plan which consists of 5 lines of effort, 18 objectives, and 53 associated activities for the deliberate, prioritized, and rapid development of end-to-end solutions. This Strategy and Action Plan outlines the Department's direction to better address the brain health needs of our Service members, their families, line leaders/commanders and their communities at large. Success in this endeavor will require a unified effort and support from across the Department of Defense and it is critical we implement this strategy immediately. We look forward to the progress we will make to protect the brain health of our people today, tomorrow and in the future.

Kathleen H. Hicks Deputy Secretary of Defense

Christopher W. Grady Vice Chairman of the Joint Chiefs of Staff



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Introduction

Brain health has historically been defined in terms of human performance optimization. The most accepted and familiar aspect of human performance in the military has been the physical performance (e.g., agility, endurance, strength within the context of carrying a 50 pound rucksack as parameters) of the warfighter. Cognition plays a key functional role in a warfighter's overall performance capabilities. Thus, to successfully defend our Nation, we must optimize physical and cognitive performance to enhance and maintain force readiness.

There is emerging evidence to suggest exposure to repetitive blast overpressure in training and in the deployed setting may have an effect on warfighters' physical and cognitive performance. Currently weapons and weapon systems are evaluated for auditory and/or lung effects because air-filled organs such as ears and lungs are susceptible to overpressure waves. The Department

does not have procedures or protocols established to conduct health hazard assessments to evaluate the brain for blast effects; namely blast overpressure effects on physical or cognitive performance. Section 734 of the National Defense Authorization Act (NDAA) for Fiscal Year 2018, "Longitudinal medical study on blast pressure exposure of members of the Armed Forces," directed the Secretary to conduct a longitudinal medical study on blast pressure exposure for Service members (SM), to include members who train with any high overpressure weapon system.



Concerns for brain health and repetitive blast exposures prompted a memorandum by the Deputy Secretary of Defense on October 1, 2018, which directed the Under Secretary of Defense for Personnel and Readiness (USD(P&R)) to develop a Department-wide comprehensive strategy and plan to optimize brain health and counter traumatic brain injury (TBI). The US Special Operations Command (USSOCOM) led with its policy, "Comprehensive Strategy for Special Operations Forces Warfighter Brain Health," February 14, 2019, aligning operational and medical components to address this issue.

Prior to these policies, there have been successful but disparate brain health efforts within the Department. The Warfighter Brain Health (WBH) Initiative is a joint effort between operational and medical communities with the focus to optimize warfighter brain health, immediately detect brain injury when it occurs and combat its effects on warfighters, their families, line leaders/commanders, and their communities at large.

Priorities and Concerns

Prior to the development of the WBH Initiative Strategy and Action Plan, warfighter feedback was solicited to better understand their priorities and concerns regarding brain health. Several common themes emerged from a diverse group of warfighters, with varying military experiences and combat occupational specialties, such as artillery and infantry. Figure 1 outlines the priorities and concerns of warfighters as it pertains to their brain health.

The "Warrior Mindset"

• Complete Mission regardless of injury or illness

• Discredit own concerns when compared to others in worse condition

Reductions in Training

•Focus on blast and brain health could dilute training opportunities

• Difficult to maintain deployment readiness and combat effectiveness

Disconnect Between Operational and Medical

• Conflict between preparing for combat (operational) and translating brain health information (medical) to inform training and safety standards

Limited Information (Health Hazards, Adverse Effects)

•Know risks from exposures to the brain

•Exposures tracked, monitored and documented especially when no longer active duty

Need for Additional Resources (Specific to Brain Health)

• Desire for more clinical tools, protocols, and research solutions when notice changes in functional abilities, especially for those who have been in the military for a longer period of time

Infrequent Periodic Brain Health Evaluations

•More frequent and periodic general physical and brain health assessments across career lifecycle

Figure 1. Brain health priorities and concerns.

Each of the warfighters considered it very important to document health hazards and exposures in medical or service records for follow-up health care by the Department of Veteran's Affairs (VA). Based on warfighter inputs, the strategic approach to the WBH Initiative emerged.

Purpose

The Department's senior leaders recognized the need to synchronize and prioritize efforts into a single brain health approach to produce more efficient and effective results. The WBH Initiative is a coordinated Department-wide approach to address warfighter brain health. The WBH Strategy and Action Plan addresses brain health and brain exposures, to include blast exposures, TBI and long-term or late effects of TBI, with the goal of optimizing brain health and countering TBI. The Department's pursuit of superior lethality, per the National Defense Strategy (2018), hinges on the speed of decisions (neurocognitive) and detection of brain injury when it occurs. This strategy and action plan creates a framework for deliberate, prioritized, and rapid development of end-to-end solutions for WBH. For the purposes of this initiative, WBH is defined as the physical, psychological, and cognitive status that affect a warfighter's capacity to function adaptively in any environment, and impacts readiness, operational capability, mission effectiveness, and the goal to achieve overmatch or superior lethality.¹

Authorities

As directed by Deputy Secretary of Defense Memorandum, "Comprehensive Strategy and Action Plan for Warfighter Brain Health," October 1, 2018, the Department developed this comprehensive strategy and plan of action focused on promoting WBH and countering TBI. This strategy and action plan concentrated on optimizing, identifying, preventing, reducing, and advancing critical actions to address the brain health needs of our people.

Vision

Optimize warfighter brain health and performance to maximize Joint Force superiority and lethality in all operating environments

Mission

Act rapidly to provide products, practices, and policies to directly impact warfighter brain health and performance

Scope

The Department of Defense remains constantly vigilant for threats to warfighter readiness, health and performance to minimize potential negative impacts to the Department's operations and mission effectiveness. The capacity for early identification and mitigation of potential hazardous exposures to brain health, especially for the risk of TBI, should lead to the reduction of injury and long-term and late effects in a warfighter's life. The WBH Strategy and Action Plan consists of 5 lines of effort (LOE), 18 objectives, and 53 associated activities for the deliberate, prioritized and rapid development of end-to-end solutions for WBH.

¹ Source: Deputy Secretary of Defense Memorandum, "Comprehensive Strategy and Action Plan for Warfighter Brain Health", October 1, 2018 and National Defense Strategy, January 2018.

Lines of Effort

To accomplish the vision and mission of the WBH Initiative, there are five LOE with supporting objectives and implementation activities (actions).



LOE 1: Optimize Cognitive and Physical Performance

LOE 1 lays the foundation for this strategy and action plan. The fundamental aspect of the brain health strategy is the ability to monitor a warfighter's cognition and determine if there is a need to either enhance or restore it, especially if there has been a decrement through a hazardous brain exposure. The initial implementation and success of this strategy and action plan is dependent on a unified approach to cognitive surveillance monitoring. A cognitive surveillance monitoring program supports both the warfighter's ability to make expedient, effective decisions on the battlefield, and the Department's pursuit of superior lethality. Without a cognitive surveillance monitoring program, the Department lacks the ability to monitor and optimize cognitive performance in order to maximize operational readiness. Identifying a decrease in cognitive performance over time supports warfighter-level intervention to improve operational readiness.

Objective 1a. Establish cognitive and physical performance baselines to identify performance changes

- i. Establish a cognitive surveillance program by leveraging the Department's current predeployment neurocognitive assessment program.²
- ii. Develop a lethality metric that measures cognitive and physical performance.

² Required pursuant to section 1673 of the NDAA for FY 2008 "Deployment Assessments of Cognitive Function," section 722 of the NDAA for FY 2011 "Comprehensive policy on consistent neurological cognitive assessments of members of the Armed Forces before and after deployment," and DoDI 6490.13, "Comprehensive Policy on Traumatic Brain Injury-Related Neurocognitive Assessments by the Military Services," dated September 11, 2017.

iii. Determine the index/factor/modality to measure baseline and evaluate cognitive and physical performance (e.g., balance, oculomotor, magnetic resonance imaging (MRI).

Objective 1b. Enhance current cognitive and physical performance to achieve superior lethality and readiness

- i. Develop or refine training and sustainment programs that maximize cognitive and physical performance.
- ii. Monitor industry and academia cognitive and physical performance concepts for applicability.
- iii. Identify evidence-based solutions that develop or enhance cognitive and physical performance.

Objective 1c. Restore cognitive and physical performance after brain exposures or injury

- i. Identify evidence-based cognitive and physical performance restoration treatments.
- ii. Expand access to and use of programs that leverage these restoration strategies.
- iii. Discover new evidence-based cognitive and physical performance restoration strategies.

Objective 1d. Raise awareness and convey best practices that maximize cognitive and physical performance

- i. Develop and implement operationally-focused strategic communication plans to raise awareness and emphasize the importance of cognitive performance.
- ii. Establish a centralized, accessible repository to share identified best practices on WBH at the speed of relevance.

The Department must understand an individual's cognition prior to, and after, a potential exposure to a brain hazard to optimize the cognitive and physical performance of warfighters. Cognitive surveillance monitoring is only part of the solution. Better understanding of known and emerging hazardous exposures and their effects on the brain is critical to ensure warfighter cognitive and physical performance are at optimal levels.

LOE 2: Identify, Monitor, and Mitigate Brain Exposures

To "optimize" cognitive performance, the focus of LOE 2 is on developing a comprehensive understanding of known and emerging brain threats³ such as blast overpressure, blunt force/impact, projectiles, directed energy, chemical and biological toxins and other environmental hazards that could affect cognitive performance. If there is a capability to monitor the brain threat, this supports the development of a surveillance system that can

³ To include: blast overpressure (include underwater and subterranean exposures); blunt force trauma; high G acceleration/ vibration/ recoil; incoming/ near missed impact (e.g. ballistic missiles); ballistic projectiles; directed energy; chemical-biological-gas toxins; and other environmental hazards.

monitor, analyze and document brain exposures to the threat. The Department will develop or adjust standards and exposure limits to mitigate deleterious brain exposures.

Objective 2a. Understand the known and emerging threats and hazards to brain health

- i. Define the relationship between the effects of brain exposures and brain injuries on brain health.
- ii. Develop a health hazard assessment procedure for the evaluation of effects on the brain.
- iii. Develop and refine outreach strategies to educate and maximize awareness on known and emerging threats and hazards to brain health.
- iv. Evaluate blast, repetitive impacts, and weapons/munitions as threats to WBH.⁴
- v. Evaluate directed energy (e.g., electromagnetic fields (EMF) and UV radiation) as threats to WBH.
- vi. Promote research of blast and repetitive impact as a priority threat to WBH.

Objective 2b. Monitor warfighters for brain exposures

- i. Evaluate warfighters during training activities to identify exposure effects and trends on brain health.
- ii. Develop a surveillance system that can monitor, analyze, and document brain exposures.⁵
- iii. Develop mechanisms to provide real time feedback and tracking capabilities about blast brain exposures and intensity.

Objective 2c. Reduce risks of brain exposures that may negatively impact brain health

- i. Develop standards for acceptable levels of exposure.
- ii. Develop exposure frequency guidelines for commonly used weapons/munitions.⁶
- iii. Develop and refine outreach strategies to educate and maximize awareness and mitigation strategies for brain exposures.
- iv. Require acquisition programs to identify and mitigate potential threats and hazards to WBH as a key performance element.

⁴ Required pursuant to section 734 of the NDAA for FY 2018, "Longitudinal medical study on blast pressure exposure of members of the Armed Forces."

⁵ Required pursuant to section 734 of the NDAA for FY 2018, "Longitudinal medical study on blast pressure exposure of members of the Armed Forces."

⁶ Required pursuant to section 734 of the NDAA for FY 2018, "Longitudinal medical study on blast pressure exposure of members of the Armed Forces."

A warfighter is exposed to various hazards depending on the environment (training or operational) but the Department does not have a full understanding of the effects these hazards may have on the brain. The ability to determine hazardous exposure effects on a SM's brain will also assist with protection and mitigation in an effort to minimize injury.

LOE 3: Prevent, Recognize, and Minimize the Effects of Traumatic Brain Injury

For LOEs 1 and 2, the focus is on understanding the physical and cognitive state of the warfighter and brain exposures in the environment prior to injury. However, since TBIs are less visible and a poorly understood consequence of war and stateside training, the WBH Strategy and Action Plan must include prevention and education activities. LOE 3 efforts are aimed at prevention and education strategies to minimize risk for brain exposures and injuries. Medical care must continue to focus on early detection and documentation to support effective diagnosis, treatment, and rehabilitation. Therefore, there needs to be established systematic capture of patient outcomes to support quality assurance activities to maximize brain health following TBI.

Objective 3a. Reduce risks of TBI that may negatively impact brain health

- i. Provide information, education, training, and protective measures that mitigate the risk of sustaining TBIs while maintaining combat performance and maximizing brain health.
- ii. Develop preventative strategies to minimize risk for repetitive brain exposures and injuries.

Objective 3b. Educate stakeholders regarding the signs and symptoms of TBI and a means to report it

- i. Provide consistent messaging, relevant information, and training to key stakeholders, including family members, leaders, and service providers, on how to recognize TBI signs and symptoms, what resources are available for assistance, and how to report potential TBI incidents.
- ii. Develop and refine tools that non-medical and medical personnel can use to identify warfighters with suspected or actual TBIs.

Objective 3c. Reduce the effects of TBI on brain health and performance

- i. Develop evidence-based cognitive and physical performance restoration strategies for warfighters with TBIs.
- ii. Develop countermeasures that alleviate the effects of TBI and allow the warfighter to maintain combat effectiveness.

iii. Promote early detection and documentation for suspected or actual TBIs for effective diagnosis, treatment and rehabilitation.

Objective 3d. Optimize medical care to return warfighters to full duty following TBI

- i. Identify, develop, and deploy evidence-based assessment, diagnostic, treatment, and rehabilitation strategies for TBIs.
- ii. Standardize documentation of TBI incidents and treatment data.
- iii. Advance mechanisms that capture patient outcomes and support quality assurance activities to maximize brain health following TBI.
- iv. Educate medical personnel, appropriate to their specialty, on evidence-based treatment strategies for TBIs that will return the warfighter to full duty.

We must continue to refine our approaches toward protection from, and mitigation of, TBIs including concussion. As the Department better understands brain exposures and injuries, we will begin to reduce the long-term and late effects.

LOE 4: Reduce or Eliminate Long-Term and Late Effects

With the implementation of activities under LOEs 1-3, the Department strives to reduce or eliminate long-term and late effects of brain exposures and injuries. To accomplish this, LOE 4 is focused on better defining and understanding multiple aspects that contribute to long-term and late effects. The development of medical countermeasures to reduce long-term and late effects will be tied to predictive models to forecast outcomes in order to focus treatment strategies and follow-up clinical activities. Additionally, it will take a community of interagency federal partners and the private sector to adequately address long-term and late effects following brain exposures and injuries.

Objective 4a. Understand the characteristics and causes of the long-term consequences of known and emerging brain exposures and/or TBI

- i. Define the long-term and late effects following brain exposures and TBI.
- ii. Develop a comprehensive understanding of:
 - 1) the etiology and mechanisms of long-term and late effects of brain exposures and TBI
 - 2) the contributions of co-occurring conditions that influence functional outcomes, including performance
 - the dose-response rate of brain exposures and/or TBIs needed to induce longterm or late effects
 - 4) the long-term and/or late effects that prevent warfighters from returning to optimal brain health

iii. Support the DoD's Uniformed Services University of the Health Sciences brain tissue repository collection of post-mortem specimens through outreach and other activities.

Objective 4b. Mitigate long-term and late effects of TBI through effective treatment and rehabilitation

- i. Identify, develop, and deploy evidence-based treatment and rehabilitation strategies for TBIs that will return warfighters to optimal health and performance.
- ii. Develop models to forecast the long-term and/or late effects of brain exposures, TBI, and co-occurring conditions in order to improve functional outcomes.
- iii. Develop medical countermeasures to reduce or eliminate long-term and/or late effects following TBI.

Objective 4c. Collaborate with the VA and other government agencies to provide a seamless transition of care for those with long- term and/or late effects

- i. Delineate pathways of care for warfighters within the DoD, VA, and private sector to provide care that produces maximal and measurable functional outcomes.
- ii. Integrate exposure and medical records between DoD and VA to ensure WBH-related information is accessible to health care providers.

The Department strives to move toward an ideal state where TBIs are no longer a threat to our warfighters. This will be accomplished with continued support for the advancement of the science focused on warfighter brain health.

LOE 5: Advance Warfighter Brain Health Science

In support of all of the LOEs, LOE 5 activities are based on the need to advance WBH science, through a unity of effort, by developing a brain health research strategy that is based on validated warfighter operational requirements. The process of conducting WBH research is maximized through partnerships with other governmental agencies, industry, and academia through data sharing and analysis activities. It is crucial that research findings are translated rapidly through an accepted and nimble process to the field for the betterment of WBH.

Objective 5a. Align brain health research and acquisition to current and emerging threats and operational requirements

- i. Develop a research strategy for brain health based on warfighter operational requirements.
- ii. Establish a process across the brain health enterprise to identify, validate, and streamline requirements/requests for WBH-related research and acquisition activities.
- iii. Establish a unity of effort for coordination of brain health research to improve efficiencies and collaboration, minimize redundancies, and guide future funding decisions.

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Objective 5b. Maximize WBH research opportunities for partnerships with other government agencies, industry, and academia

- i. Establish a mechanism to identify research priorities in brain health within the DoD as well as those within other federal agencies.
- ii. Identify and maintain awareness of ongoing efforts related to WBH in order to maximize efficiency, reduce duplication of effort, and maximize opportunities for knowledge translation.
- iii. Explore novel funding mechanisms that support unique partnerships, product development, and longitudinal studies.

Objective 5c. Enable researchers to have access to valid data regarding brain exposures and injuries and related brain health effects

- i. Improve the interoperability and interchangeability of data across systems that include brain exposure data.⁷
- ii. Define the common data elements needed across systems that include brain exposure data and related brain health effects.

Objective 5d. Translate research findings into knowledge and materiel products, practices, and policies to maintain and optimize WBH

- i. Ensure key organizations within the brain health community establish knowledge translation into practice activities as a critical mission set.
- ii. Use a system of internal process reviews to facilitate knowledge translation.

To be effective, the research and development (R&D) efforts must be focused on outcomes, which includes the translation of research findings into action. The Department's continued investment in R&D areas are essential to address the entire spectrum of WBH, to include brain exposures, prevention and treatment of injury, and understanding the long-term and late effects.

Managing the Strategy and Action Plan

To successfully implement the WBH Initiative Strategy and Action Plan, Department-wide participation and support is needed at all levels from senior leadership to commanders to warfighters.

Department-Wide Support

The USD(P&R) established an executive oversight committee comprised of key senior leaders to facilitate support of the initial activities associated with the WBH Initiative and its

⁷ E.g., Defense Occupational and Environmental Health Readiness System (DOEHRS), Military Health System GENESIS (MHS GENESIS), Individual Longitudinal Exposure Record (ILER).

implementation. The purpose of the WBH Executive Committee (EXCOM) was to provide direction and oversight necessary to ensure the WBH Strategy and Action Plan addresses the needs of warfighters, commanders, and families. During the kickoff, the EXCOM endorsed a strategic approach to address WBH.

To comply with the Deputy Secretary of Defense (DSD) directive, it was important to finalize this strategy and action plan in a timely manner to move forward with implementation. The decision was made to leverage the existing senior DoD governance infrastructure for approval through the DSD Workforce Council (DWC), which is chaired by the DSD and the Vice Chairman of the Joint Chiefs of Staff. The DWC endorsed this strategy and action plan on May 18, 2021. In addition, the DWC endorsed a unified approach to cognitive surveillance monitoring which tests the cognitive function of accessioning and current SM, including deployers, resulting in the Total Force obtaining a baseline test by the end of five years. This data aims to proactively sustain and extend the lifecycle of the force by providing an opportunity to enhance or restore SM cognitive performance based on baseline testing.

Warfighter Brain Health Capabilities-Based Assessment

In synchronization with the development of this strategy and action plan, a WBH Capabilities-Based Assessment (CBA) was completed. The objective of the WBH CBA was twofold: 1) identify requirements and gaps in the Department's ability to optimize, monitor, mitigate threats to, and support WBH; and 2) recommend suitable, feasible, and acceptable materiel and non-materiel solution approaches to address identified gaps. These gaps identified shortfalls in the DoD's ability to optimize, monitor, mitigate threats to, and support brain health across the warfighter's lifecycle. The solution approaches, as a result of the WBH CBA, include change recommendations across the Doctrine, Organization, Training, Materiel, Leadership & Education, Personnel, Facilities, and Policy (DOTMLPF-P) spectrum. The CBA leveraged existing strategic guidance, concepts, policies, and other Joint Capabilities Integration and Development System (JCIDS) approved documentation. The CBA complements the WBH Strategy and Action Plan and will assist with its implementation.

Conclusion

The Department must remain attentive to threats to our warfighters' readiness, health, and performance in order to maintain operations and mission effectiveness. Our understanding of deleterious brain exposures (both known and unknown) is a crucial piece in taking care of warfighters' brain health. Traumatic brain injuries are the signature injuries from recent combat operations. These injuries can have short-term or delayed effects on warfighter physical and cognitive performance and health that can lead to degraded readiness, loss of operational capability, lost duty days, and decrease in quality of life. With the implementation of this strategy and action plan, the Department will better address the brain health needs of our warfighters, their families, line leaders/commanders and their communities at large.

