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Before the

Subcommittee on Personnel

COMMITTEE ON  
ARMED SERVICES

**UNITED STATES SENATE**

TO RECEIVE TESTIMONY ON TRAUMATIC BRAIN INJURY  
AND BLAST EXPOSURE CARE

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1 TO RECEIVE TESTIMONY ON TRAUMATIC BRAIN INJURY  
2 AND BLAST EXPOSURE CARE

3  
4 Wednesday February 28, 2024

5  
6 U.S. Senate  
7 Subcommittee on Personnel,  
8 Committee on Armed Services,  
9 Washington, D.C.

10  
11 The subcommittee met, pursuant to notice, at 2:59  
12 p.m., in Room 222, Russell Senate Office Building, Hon.  
13 Elizabeth Warren, chairman of the subcommittee, presiding.

14 Subcommittee Members Present: Senators Warren  
15 [presiding], Blumenthal, Hirono, Kaine, Ernst, Sullivan,  
16 Scott, and Budd.

1           OPENING STATEMENT OF HON. ELIZABETH WARREN, U.S.  
2 SENATOR FROM MASSACHUSETTS

3           Senator Warren: [Technical problems.] This hearing  
4 will come to order. I am pleased to welcome you all to  
5 today's hearing to receive testimony on the Department of  
6 Defense's efforts to protect servicemembers from blast  
7 overpressure.

8           Servicemembers put their lives and their health on the  
9 line when they are -- [technical problems]. In return, we  
10 have a profound responsibility to make sure the nation is  
11 doing all we can to keep them safe, to prevent battlefield  
12 and training casualties -- oops, thank you.

13           [Technical problems.]

14           Senator Warren: That could be trouble. All right.  
15 Good. Did we get the other on the record? Just so, I got  
16 started here. Servicemembers put their lives and their  
17 health on the line when they put on their uniforms.

18           And in return, we have a profound responsibility to  
19 make sure that the nation is doing all that it can to keep  
20 them safe, to prevent battlefield and training casualties,  
21 and to provide the best possible care for those who are  
22 injured. We are holding this hearing --

23           [Technical problems.]

24           Senator Warren: We are there? Good. We are holding  
25 this hearing because DOD is not meeting its

1 responsibilities when it comes to traumatic brain injuries  
2 and other injuries that result from firing weapons.

3 Injuries from blast overpressure, the pressure that is  
4 caused by a shock wave that exceeds normal atmospheric  
5 values, have been the signature wounds of the wars in Iraq  
6 and Afghanistan.

7 But there are also injuries incurred in training here  
8 at home. They are invisible, but they affect thousands of  
9 servicemembers, causing headaches, seizures,  
10 hallucinations, and ultimately significantly increased  
11 risks of depression and suicide.

12 Over the course of just three months in 2023, DOD  
13 provided TBI treatment to servicemembers nearly 50,000  
14 times. The more we learn, the more we come to understand  
15 that blast exposure is an ongoing threat to the health of  
16 individual servicemembers, and to the well-being, the  
17 morale, and the readiness of our entire force.

18 I appreciate the support I have had on this issue from  
19 Ranking Member Scott, from Senator Ernst, from Senator  
20 Tillis, and from other members of this committee. I  
21 secured a long term study of blast overpressure injuries in  
22 the 2018 National Defense Authorization Act, and I have  
23 worked with Senator Ernst to introduce legislation on blast  
24 overpressure and to secure additional requirements to track  
25 blast overpressure injuries in the Fiscal Year 2020 NDAA.

1 DOD is working to implement this legislation, but we  
2 still have significant problems. Last year, The New York  
3 Times reported on heightened brain injury risks for U.S.  
4 troops in Syria fighting ISIS. Four artillery batteries  
5 assigned to the region fired more weapons than any military  
6 American artillery since the Vietnam War.

7 The result was that each of these units had members  
8 with serious blast overpressure injuries, and each had at  
9 least one member that committed suicide. These deaths are  
10 a tragedy. Ryan, a Navy SEAL deployed to Iraq and  
11 Afghanistan, was subject to significant blasts from his own  
12 weapons over the course of his career and later died by  
13 suicide.

14 His father, Mr. Frank Larkin, is here today to discuss  
15 the harm that blast overpressure has caused to  
16 servicemembers and to their families. The Times also  
17 revealed that even when DOD had made policy changes to  
18 address risks, those changes were not evident on the  
19 ground. Weapons known to deliver shock waves well above  
20 safety thresholds were still widely used. Training did not  
21 involve basic safety measures, and special operations  
22 forces were not issued blast exposure gauges, the gauges  
23 that are needed to track the threats they faced.

24 So, DOD and Congress both have a lot to do. Here is  
25 my agenda to address this problem. First, we need to

1 establish mitigation strategies specific to the service  
2 member roles that are most at risk for blast overpressure.

3 Second, we must require DOD to create blast exposure  
4 and traumatic brain injury logs for all servicemembers and  
5 to integrate these logs into their VA and DOD health care  
6 records. Third, the Department of Defense should partner  
7 with innovative, evidence based programs like Home Base to  
8 help servicemembers get the care they need. And I am going  
9 to have to brag here for just a minute.

10 Home Base is a nonprofit organization founded by  
11 Massachusetts General Hospital and the Boston Red Sox to  
12 take care of the invisible wounds of veterans,  
13 servicemembers, military families, and families of the  
14 fallen. Home Base has clinics in Massachusetts and in  
15 Florida, Ranking Member Scott's State.

16 Home Base has a comprehensive brain health and trauma  
17 program specifically designed for special operations  
18 veterans and servicemembers, where it has been leading  
19 innovative treatments for veterans with co-occurring  
20 substance abuse and mental health conditions.

21 As we work through this year's NDAA, I want to support  
22 this program's work, and I appreciate Dr. Zafonte from Home  
23 Base joining us today. One more item.

24 We need to make sure that DOD sets a threshold on the  
25 maximum number of rounds that is safe -- that

1 servicemembers can safely fire, and that this includes  
2 consideration of exposure limits over an extended period of  
3 time. DOD must do its part and Congress must do our part.

4 So, to our witnesses, welcome and thank you for  
5 appearing. We are going to have two panels today. The  
6 first panel will consist of outside witnesses to provide  
7 their perspective on where DOD and the services are falling  
8 short on protecting servicemembers from blast overpressure.

9 Dr. Samantha McBirney Professor of Policy Analysis at  
10 the Pardee RAND Graduate School, Dr. Ross Zafonte, Chief of  
11 Traumatic Brain Injury and Health and Wellness Programs at  
12 Home Base, and Frank Larkin, Chief Operating Officer of  
13 Troops First Foundation and lead of the National Warrior  
14 Call Day Initiative.

15 The second panel will consist of officials from the  
16 Department of Defense and Walter Reed to hear how DOD is  
17 tackling this issue. We will have Dr. Lester Martinez  
18 Lopez, Assistant Secretary of Defense for Health Affairs,  
19 Kathy Lee, Director of Warfighter Brain Health Policy at  
20 DOD, and Captain Carlos Williams, Director of the National  
21 Intrepid Center of Excellence at Walter Reed National  
22 Military Medical Center.

23 I will now turn to ranking Member Scott for his  
24 comments to open this hearing.

25

1 STATEMENT OF HON. RICK SCOTT, U.S. SENATOR FROM  
2 FLORIDA

3 Senator Scott: First, I want to thank Senator Warren,  
4 the chairwoman of this committee and -- our subcommittee  
5 and thank her for caring about this issue and for taking  
6 this job so seriously. Chairwoman Warren, I want to thank  
7 you for holding this hearing on such an important topic.

8 Traumatic brain injury, or TBI, is one of the most  
9 common injuries sustained by American servicemembers. In  
10 2022, more than 20,000 military personnel were diagnosed  
11 with TBI. Stop and think about that for a second. Just in  
12 2022, there are more than 20,000, 20,000 members of  
13 military that were diagnosed with a traumatic brain injury.

14 That is pretty bad. The vast majority, over 84  
15 percent, were classified as mild, which is more commonly  
16 known as a concussion. But if any of us have -- when you  
17 have raised kids and they have a concussion, it scares the  
18 living daylights out of you.

19 Missing from this data are servicemembers who are  
20 frequently exposed to low level blasts that do not  
21 typically result in a clinically diagnosable concussion.  
22 This is concerning because repeated exposure to low level  
23 blast may cause similar symptoms as more severe cases of  
24 TBI.

25 We know that low level blast exposure from fire and



1 heavy weapons systems or explosives may cause a variety of  
2 symptoms including concentration, memory problems,  
3 irritability, headaches, and decreased hand-eye  
4 coordination. Each of these issues alone can be very  
5 serious and disrupt somebody's life.

6 Unfortunately, there remains a great deal about  
7 exposure to these blasts that we yet do not know. More  
8 research and better data are required so that military and  
9 health care providers can mitigate the frequency of blast  
10 exposure where possible and treat those exposed to blast  
11 where necessary.

12 We have actually taken action to do that. In the 2018  
13 National Defense Authorization Act, Congress required the  
14 Department of Defense to conduct a medical study on blast  
15 pressure exposure.

16 Two months ago, the committee received the  
17 Department's final report on this study. This hearing  
18 presents an opportunity to assess the quality of the  
19 Department's work. The legislation required the study,  
20 which followed specific individuals over an extended period  
21 of time, to include three specific elements.

22 First, the Department was to "monitor, record, and  
23 analyze data on blast pressure exposure" for any service  
24 member "likely to be exposed to a blast in training or  
25 combat." Second, the study was to assess the feasibility

1 and advisability of including blast exposure history into a  
2 servicemember's medical record.

3 Last, the Department was to review the safety  
4 precautions of heavy weapons training in light of emerging  
5 research on blast exposure. In reviewing the final report  
6 submitted this past December, it is clear the Department  
7 still has more work to do, particularly in its ability to  
8 monitor and record blast exposures for military personnel.

9 Only a few hundred soldiers and Marines were fitted  
10 with wearable devices that unfortunately seem to suffer  
11 from quality control issues. And while the Department's  
12 report does say that it may be feasible to record blast  
13 exposure information in a servicemember's medical record, a  
14 business case analysis is required to determine the way  
15 forward in this area. In this hearing, I would like to  
16 learn more about how the Department plans to conduct this  
17 business case analysis.

18 This is an important issue. I believe the Department  
19 is committed to getting this right and I believe the TBI  
20 Center of Excellence and Warfighter Brain Health  
21 Initiatives are excellent initiatives that I hope will  
22 provide the military with the information needed to better  
23 understand the effects of repetitive blast exposure.

24 We all must remember the exposure to low level blast  
25 will continue to be a necessary risk for many of our

1 frontline combat troops. But if we can do better -- if we  
2 can better quantify the type and number of blasts that have  
3 the potential to cause significant, perhaps permanent  
4 injuries, then we can use that information to make better  
5 decisions about how best to accomplish a particular  
6 mission.

7 I would like to hear from the witnesses what Congress  
8 can do to ensure the Department of Defense has the  
9 resources it needs to conduct its planned work and where we  
10 can help. Only this is about the well-being of the  
11 individuals that are willing to put on the uniform, who are  
12 closest to the front line of combat, and every  
13 servicemember that is diagnosed with TBI.

14 We owe it to them to ensure -- and their families to  
15 ensure that when they go into harm's way, they are well-  
16 trained, have the right protective equipment, and are  
17 utilized in a manner that achieves the objective with an  
18 understanding of the risk involved.

19 I want to thank you to all the witnesses for being  
20 here today. I look forward to your testimony. And again,  
21 I want to thank Senator Warren for putting this together.

22 Senator Warren: Thank you.

23 [Technical problems.]

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1 STATEMENT OF SAMANTHA MCBIRNEY, PROFESSOR OF POLICY  
2 ANALYSIS, PARDEE RAND GRADUATE SCHOOL

3 Dr. McBirney: Chairwoman Warren, Ranking Member  
4 Scott, and members of the committee, good afternoon, and  
5 thank you for the opportunity to testify today. My name is  
6 Dr. Samantha McBirney, and I am a Biomedical Engineer at  
7 the nonprofit, nonpartisan RAND Corporation.

8 My research for the last 15 years, not only at RAND,  
9 but also at the University of California, Berkeley and the  
10 University of Southern California, has focused on traumatic  
11 brain injury, or TBI, both as the result of blunt impact  
12 and blast overpressure.

13 Today, I would like to speak with you about repeated  
14 exposure to low level military occupational blasts, which  
15 are low level blast exposures experienced while fulfilling  
16 military occupational duties.

17 Evidence suggests that servicemembers are exposed to  
18 these blasts in the form of blast overpressure, or the  
19 pressure wave that emanates from the source of an  
20 explosion. This pressure wave can cause sub-concussive  
21 injuries which are not immediately detectable and would not  
22 qualify as a TBI.

23 Exposure to blast overpressure can occur both in  
24 combat and in training, as has already been mentioned.  
25 During training, exposure can be due to breaching exercises

1 and the firing of increasingly powerful weapon systems,  
2 such as the Carl Gustaf recoilless rifle and the AT4.

3 To provide some perspective on the level of exposure  
4 some servicemembers have, one study found that up to 32  
5 percent of blasts experienced by breaching instructors  
6 exceeded the recommended exposure limit.

7 Studies have shown that the cumulative effect of  
8 repeated low level blast exposure can cause symptoms  
9 similar to TBI. While a variety of effects have been  
10 linked to low level blast exposure, as Senator Warren and  
11 Senator Scott have already mentioned, there remains a lack  
12 of scientific evidence linking repeated exposure to injury.  
13 One reason for this is the difficulty of diagnosis.

14 The very nature of low level blast exposure, and the  
15 fact that it is not one single event that causes an issue,  
16 but rather the cumulative effect of repeated exposure over  
17 time complicates injury recognition.

18 Symptoms typically do not manifest immediately, which  
19 makes it unlikely that repeated exposure to low level blast  
20 is identified as the cause. Additionally, injury is vastly  
21 underreported among servicemembers, only obfuscating the  
22 issue of proper diagnosis further.

23 There is also a lack of research about the military  
24 occupational specialties at greatest risk of exposure to  
25 low level blast. While there is no doubt that certain

1 occupational specialties are more frequently exposed than  
2 others, there is little research to support these  
3 hypotheses.

4 So, there remains a lack of understanding of the  
5 direct impact that repeated exposure to low level blast has  
6 on the health of servicemembers in different occupational  
7 specialties. If the preventive intervention is perfectly  
8 effective but cannot be delivered in time, it is not  
9 useful.

10 This quote from a 2019 RAND report perfectly describes  
11 the current state and the reason many of us are here today,  
12 "as a research community, we clearly see that additional  
13 research needs to be done. However, there are steps the  
14 DOD can take now to better protect servicemembers against  
15 blast induced injury."

16 I highlight four recommendations in my written  
17 testimony, and I would like to bring your attention to one  
18 of them here, the creation and maintenance of blast  
19 exposure records. These records should include number of  
20 exposures, the context of each exposure, and any physical,  
21 mental, or emotional effects resulting from that exposure.

22 This would allow the DOD to better track exposure  
23 frequency, assess the occurrence among high risk  
24 occupational specialties, determine the connection between  
25 exposure and health outcomes, and develop strategies to

1 mitigate exposure in training environments.

2           Ultimately, these records could be used to develop an  
3 index score to gauge an individual's combat readiness and  
4 potential health risks. As our weapon systems continue to  
5 become more advanced and increasingly powerful, low level  
6 military occupational blasts will remain an enduring  
7 challenge for servicemembers.

8           Addressing the issue of repeated exposure to these  
9 blasts necessitates action and collaboration between the  
10 DOD and the research community. By implementing the  
11 recommendations as outlined in my written testimony,  
12 alongside continued research efforts to close substantial  
13 knowledge gaps, the DOD can take significant strides  
14 towards better protecting the health and well-being of our  
15 servicemembers.

16           Thank you, and I look forward to your questions.

17           [The prepared statement of Dr. McBirney follows:]

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1 Senator Warren: Thank you.

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1           STATEMENT OF ROSS D. ZAFONTE, CHIEF OF TRAUMATIC  
2 BRAIN INJURY AND HEALTH & WELLNESS PROGRAMS, HOME BASE  
3           [Technical problems.]

4           Dr. Zafonte: Good afternoon, Chairwoman Warren,  
5 Ranking Member Scott, members of the subcommittee. My name  
6 is Dr. Ross Zafonte. I am honored to provide testimony  
7 today on traumatic brain injury care and blast exposure.  
8 My career is centered around improving the lives of people  
9 with traumatic brain injury.

10           I currently serve as President of Spalding, Chair of  
11 the Physical Medicine Rehabilitation Department at Harvard  
12 Medical School, Chief of the Department of Physical  
13 Medicine Rehabilitation at Mass General Hospital and  
14 Brigham and Women's Hospital, and for the past 15 years, I  
15 have served at the Home Base Program, directing its Brain  
16 Injury Program. I actually see the patients, as well as do  
17 the research.

18           Blast overpressure, as we just heard, is a sudden  
19 onset of a pressure wave from explosions occurring with  
20 shoulder carried artillery in training or deployment, in  
21 breaching buildings, and from improvised explosive devices.  
22 Generally, the bigger the explosion, the more damaging the  
23 pressure width.

24           TBI can have a wide range of physical and physiologic  
25 effects. Some signs appear immediately, others take days

1 or weeks to occur, and they may result in physical,  
2 sensory, cognitive, behavioral, or mental impacts.

3 According to the Department of Defense, since 2000,  
4 over 400,000 U.S. servicemembers experienced at least one  
5 brain injury and 40 percent of those later screened  
6 positive for co-morbid psychological health conditions.

7 Our own research has noted an elevated ten year risk  
8 of hypertension, cardiac disease, endocrine or hormonal  
9 dysfunction, and behavioral concerns such as depression  
10 even among the youngest of patients.

11 Home Base is located in Charlestown, Massachusetts,  
12 with, I am proud to say, as a native Floridian, satellite  
13 locations in Florida and Arizona, and operates one of the  
14 oldest and most impactful private sector programs in the  
15 nation.

16 For 15 years, we have served as an incubator for  
17 innovative clinical care models and research, and the  
18 program is nested within Mass General Hospital, allowing us  
19 to leverage the faculty in Mass General Brigham Health  
20 System. Home Base bridges the gap between research and  
21 clinical care.

22 Now, in 2018, Home Base was approached by the Navy  
23 Special Warfare with a complex set of problems facing Navy  
24 SEALs. We quickly developed a comprehensive brain injury  
25 and polytrauma program. This program is named COMBAT, or

1 the Comprehensive Brain Health and Treatment Program.

2 It is modeled after existing programs that we  
3 developed for elite athletes and provides integrated,  
4 multi-disciplinary, specialist treatments, evaluation and  
5 care coordination for veteran and active duty operators.  
6 Home Base has treated nearly 1,000 special operators  
7 through our intensive programs.

8 71.9 percent of combat participants are active duty  
9 and the overwhelming majority return to duty, so we are  
10 keeping the fighting force active. We currently have 178  
11 active duty special operators waiting to be screened and  
12 scheduled for COMBAT Program, and COMBAT has cared for  
13 operators in 47 States, the District of Columbia, Guam,  
14 Puerto Rico, including 53 patients from Massachusetts, 60  
15 from Florida, 6 from Connecticut, 22 from Hawaii, 278 from  
16 Virginia, 4 from Illinois, 1 from Alaska, and 54 from North  
17 Carolina.

18 The COMBAT program is highly efficient, agile, and  
19 compressed into a five day model of care. Patients see a  
20 minimum of nine providers, and this may expand grossly  
21 related to pertinent diagnostic imaging or other studies.

22 So, in summary, we are very grateful for the support  
23 of Congress, especially Chairwoman Warren, has shown this  
24 program, and for the partnership and financial support  
25 provided by SOCOM.

1           The program is successful and the demand for care is  
2 growing at a steady pace. Based on my experience in this  
3 field and treating patients at Home Base, I would recommend  
4 the Department of Defense consider the following options.  
5 Invest in and develop tools to measure --

6           [Technical problems.]

7           Dr. Zafonte: Increase funding for partnerships with  
8 academic medical centers. Ensure all servicemembers with  
9 traumatic brain injury can easily access care. And as has  
10 been said, that data needs to be linked to blast exposure.

11           Develop novel methods to define and understand the  
12 impacts of declining health spans and develop treatment  
13 interventions. I also recommend that DOD partner with Home  
14 Base to develop a long term, longitudinal health span study  
15 on the multi-system injury of blast and traumatic brain  
16 injury.

17           And invest in research that evaluates and treats the  
18 long term sequelae of repeated brain injuries of blast  
19 exposure. Thank you for the opportunity to testify on this  
20 very important topic, and for your commitment to supporting  
21 members of the military. I am happy to answer questions  
22 the committee may have.

23           [The prepared statement of Dr. Zafonte follows:]

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1           Senator Warren: Thank you, Dr. Zafonte. Mr. Larkin,  
2 would you like to make an opening statement?

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1 STATEMENT OF FRANK J. LARKIN, CHIEF OPERATING  
2 OFFICER, TROOPS FIRST FOUNDATION, LEAD OF NATIONAL WARRIOR  
3 CALL DAY INITIATIVE

4 Mr. Larkin: Thank you to the committee for the  
5 opportunity to speak. My formal testimony is submitted for  
6 the record.

7 As a former Navy SEAL, I am here today to be a voice  
8 for all those that have worn our nation's uniform and are  
9 currently struggling everyday with both visible and  
10 invisible wounds. Wounds that transcend mental, physical,  
11 and spiritual domains. Wounds that transcend -- I am  
12 sorry, wounds that have influenced an epidemic level of  
13 suicides amongst our active-duty force and veteran  
14 populations.

15 My intent today is not to pounce on the Department of  
16 Defense or the Veterans Administration, but to help them  
17 succeed. I would not be here if it was not for my son  
18 Ryan, U.S. Navy SEAL Special Operator 1st Class Ryan F.  
19 Larkin. My son would be 36 years old today if he had not  
20 taken his life on the morning of April 23rd, 2017.

21 He had been suffering from what we have come to  
22 characterize as invisible wounds, a complex rubric of post-  
23 traumatic stress disorder, moral injury, and substance use  
24 disorder that was complicated by undiagnosed traumatic  
25 brain injury from blast exposure, the signature injury of

1 the past 20 plus years fighting the global War on Terror.

2 Ryan was a highly decorated and accomplished Navy  
3 SEAL, trained as a special operations medic, sniper, and  
4 explosives breacher. He loved being a SEAL, furthered by  
5 the love and loyalty for his teammates that was cemented on  
6 the battlefield.

7 Following four heavy combat tours in Iraq and  
8 Afghanistan, Ryan, like many others who have worn the  
9 uniform of our nation in combat, began experiencing  
10 uncharacteristic changes that manifested in difficulty  
11 sleeping, nightmares, anxiety, hypervigilance, loss of  
12 memory and declining cognitive functions. He stopped  
13 smiling. He sought help, but the help that was offered was  
14 not aligned with what he needed.

15 When his condition became more complicated, and their  
16 proposed solutions didn't work, the system weaponized his  
17 pleas for help against him and pushed him out of the SEAL  
18 team and out of the Navy.

19 This abrupt separation created another deep weeping  
20 wound. He felt that he had let his teammates down,  
21 abandoning them. The system he trusted hung labels on him  
22 to justify their assessments and their actions. A year  
23 after he honorably separated from the Navy, Ryan ended his  
24 life. Ryan repeatedly said, something is wrong with my  
25 head, nobody is listening, they keep telling me I'm crazy.

1           This was reinforced by the endless stream of  
2 medications prescribed by both defense health and VA  
3 clinicians to address his behavioral symptoms, not the root  
4 cause of his challenges. Everything defaulted to  
5 psychiatric and mental health illness, with very little  
6 mention of TBI, despite his operational profile and  
7 repeated exposures to blast overpressures from our weapons  
8 systems and enemy IEDs.

9           Over the course of two years between defense health  
10 and the VA, he was prescribed over 40 different  
11 medications, everything from potions, lotions, and creams  
12 to high end psychotropic and mood stabilizing drugs. He  
13 never received a clinical diagnosis. He was a walking  
14 experiment.

15           One night prior to his death, he said that he wasn't  
16 going to live very long, that he was broken up inside. He  
17 made me promise that if anything ever happened to him, that  
18 he wanted his body donated for TBI-Breacher's Syndrome  
19 research. Then he turned to me and said, you know dad, it  
20 is going to take guys killing themselves before the system  
21 wakes up to the fact that it has a problem.

22           The guys are hurt. Ryan's brain was donated to a DOD  
23 research effort at Walter Reed National Military Medical  
24 Center. Two months later, we learned that Ryan had a  
25 severe case of undiagnosed microscopic brain injury



1 uniquely related to repeated blast exposure. Ryan was  
2 hurt, not crazy.

3 He was right all along. Unfortunately, our medical  
4 enterprises could not and still cannot see this level of  
5 microscopic injury in a living warfighter or veteran. My  
6 son died from his injuries suffered both in training for  
7 combat and combat operations.

8 He just didn't die right away. These warriors with  
9 invisible wounds, they are hurt. They are not broken.  
10 They break when they are cut away from their teammates,  
11 their tribes, and are betrayed by the institutions where  
12 they have given their all. It has been 23 years since  
13 9/11. DOD has spent almost \$3 billion in mental -- on  
14 mental health, substance abuse, suicide prevention, PTSD,  
15 TBI, and other warfighter assistance programs.

16 I give them a D plus, C minus at best, for the lack of  
17 measurable impact for those who need answers. Those are  
18 the deck plate, dirt level warfighters we promised to take  
19 care of and not leave behind.

20 Blast exposure is a key threat to warrior brain health  
21 and potentially represents a significant national security  
22 threat to our force, readiness, and resiliency. However,  
23 whatever solutions we come up with, it can't impact our  
24 operational effectiveness or lethality on the battlefield.

25 We need to do this smarter and by down the risk on the

1 front end. Thank you for the opportunity to be the voice  
2 for others like Ryan. Subject to your questions.

3 [The prepared statement of Mr. Larkin follows:]

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1           Senator Warren: Thank you, Mr. Larkin. I appreciate  
2 your being here and sharing this story. I am sorry for  
3 your loss, and I am sorry for the treatment your son Ryan  
4 received. I think you said it right, traumatic brain  
5 injuries are considered "the signature wound" of our wars  
6 in Iraq and Afghanistan.

7           While improvised explosive devices, IEDs, may have  
8 caused some of these medical injuries, a military medical  
9 research study found that for troops with mild traumatic  
10 brain injury, "the most important cause of brain injury was  
11 the long term exposure to explosive weapons."

12           In 2011, the Defense Advanced Research Projects Agency  
13 determined that 75 percent of the troops' blast exposure in  
14 Afghanistan was coming from their own weapons. The effects  
15 of blast overpressure are terrible, including memory loss,  
16 increased risk of dementia, and substance abuse problems.

17           But despite the severity of these impacts on  
18 servicemembers' health, when these problems are diagnosed,  
19 blast exposure is rarely identified as a potential cause.  
20 Dr. McBirney, you have studied this issue for 15 years now.  
21 Why is it so difficult to detect when blast overpressure is  
22 causing the types of symptoms that we are talking about  
23 here in our servicemembers?

24           Dr. McBirney: That is a great question, Senator  
25 Warren, and a question that so many people within the

1 research community are committed to answering. It really  
2 comes back to the nature of the injury itself.

3 We are not looking at an injury that is caused by one  
4 isolated event. The fact that it is caused by repeated  
5 exposure to very low level blasts that perhaps might happen  
6 throughout the course of an entire military career really  
7 complicates injury recognition.

8 Add to that the fact that symptoms typically don't  
9 manifest immediately, as was mentioned, and it becomes  
10 increasingly difficult to link symptoms to repeated  
11 exposure.

12 Senator Warren: So, yes, I just want to say, I want  
13 to pick up on this, because I think this is a really  
14 important point about the challenge in trying to diagnose  
15 because of the very nature of what the injury looks like.  
16 It is not a single moment in time where this happens. And  
17 so, I just want to pick up and let's see if we can take  
18 this forward.

19 We need to know how often, I take it from your  
20 testimony -- we need to know how often a servicemember has  
21 been exposed to blast overpressure, to give medical  
22 personnel the information that they need to identify and  
23 treat the underlying cause of their symptoms. Now, so far,  
24 the DOD only has blast exposure data for a total of 500  
25 servicemembers.

1           We are missing data, obviously, for a whole lot more.  
2   Tracking this information through blast exposure and  
3   traumatic brain injury logs for all servicemembers would be  
4   a good start, but we also need to pay special attention to  
5   servicemembers that are at especially high risk for blast  
6   exposure.

7           Some military occupational specialties, MOSs, such as  
8   training instructors, are significantly more likely to be  
9   exposed to blast during training or operations. The Marine  
10   Corps found that the artillery community is also at  
11   particularly high risk and that high rates of exposure  
12   could lead them, "to suffering injuries faster than combat  
13   replacements can be trained to replace them."

14           So, Dr. McBirney, I wanted to give you another chance  
15   in this is we are trying to push this forward, does DOD  
16   currently have the strategies it needs to mitigate the  
17   risks from blast overpressure that are specific to each of  
18   the military occupational specialties that are most likely  
19   to be exposed?

20           Dr. McBirney: I can't say I am aware of any of those  
21   strategies. And in addition to that, a lot of the folks  
22   with whom I interact on a very regular basis with boots on  
23   the ground in these communities that are at risk of  
24   significant exposure are additionally unaware of such  
25   strategies.

1           Senator Warren: Okay. So, anything more do you want  
2 to say about what DOD should be doing in this space? I  
3 want to make sure I have given you a chance here.

4           Dr. McBirney: No. Thank you, Senator. I think  
5 really Mr. Larkin and I were discussing prior to this. I  
6 think if my -- if I could choose the key takeaway for  
7 today, it would be to not let perfection interfere with  
8 progress. I think everyone here is looking for the right  
9 solution. And what we really want to be sure of is that we  
10 don't wait too long to implement what we think is a perfect  
11 solution.

12           There is a lot of research that still needs to be  
13 done. Coming from the research community, I am always a  
14 supporter of more research. That being said, we can also  
15 be looking to implement solutions, study said solutions,  
16 while they are being implemented at the same time.

17           Senator Warren: So, let's focus on that for just a  
18 second, just a little bit more, about the idea of  
19 collecting the data as we go along, so at least it is a  
20 first step in getting the information that we need.

21           I understand this is a gap that DOD needs to fill, and  
22 I understand that it is more challenging to limit  
23 servicemember blast exposure during combat, but there is no  
24 excuse for DOD to continue to expose servicemembers to  
25 unnecessary levels of blast overpressure during training.

1 This is obviously an area where we could make change, and  
2 it is clear that there is a lot we need to do to protect  
3 our servicemembers from blast exposure.

4 But DOD, it goes to your point Dr. McBirney, DOD  
5 constantly says we need more research, we need more  
6 research. And I am a data nerd. I always want more  
7 research, but I am very concerned about the idea that we  
8 are going to put off treatment.

9 So, let me put the question more specifically to you,  
10 and that is, do you think we know enough now about the  
11 risks of blast overpressure to servicemembers' health to  
12 start taking action now?

13 Dr. McBirney: In short, absolutely. Yes.

14 Senator Warren: All right. So, we do know enough.  
15 So, there are number of steps DOD could take to help us get  
16 more data so that we can understand this over time, but  
17 more importantly, a number of steps they could take right  
18 now in terms of treatment.

19 And I have talked long enough so I will come back to  
20 you later on this, Dr. Zafonte and Mr. Larkin. Senator  
21 Scott.

22 Senator Scott: Yes. Well, first, Mr. Larkin, I can't  
23 imagine -- having kids and grandkids, I can't imagine lose  
24 one. So, thank you for your service, your son service and  
25 just hope as a result, you know, something good happens out

1 of it. Somebody -- it prevents something else from  
2 happening.

3 Dr. Zafonte, can you explain what the -- the blast,  
4 what does it do to the brain like this? Like let's say,  
5 you know, I go shoot a shotgun or doing this stuff, what  
6 does it do -- each one of them, how does it impact my  
7 brain?

8 Dr. Zafonte: Well, I think, to my colleagues' good  
9 point, perfection is the enemy of the good. And you can  
10 criticize all of the models, but we know that these sub-  
11 concussive injuries do a number of different things.

12 They probably disproportionately impact areas of the  
13 brain at gray matter, white matter interfaces. They  
14 probably have a vascular effect. More likely long term,  
15 there is possibly a premature aging effect to the brain  
16 itself with multiple repetitive blast exposures or  
17 certainly with traumatic brain injury.

18 So, lifelong exposure, getting that quantification  
19 that Senator Warren talked about is critically important  
20 because we need to know one thing. We need to know in who,  
21 how much, what were they doing, and then what was the  
22 actual phenotype or what actually happened to the symptoms  
23 of the person, and track that very carefully.

24 Senator Scott: So, right now, you can get a glucose  
25 monitor and put all your data in there, and pretty fast you



1 can get a correlation, right? So have you had any  
2 opportunity to take -- because we know, if you joined the  
3 service, we know what blast you are going to have in boot  
4 camp if you are enlisting -- you know, enlisted. And so,  
5 is there anybody that is doing anything to just say that  
6 when you just put all this data on something and then just  
7 look at the model over a period of time?

8 Dr. Zafonte: I think there are a number of groups,  
9 including our own, looking at blood based biomarkers for  
10 people, neuroimaging. And all of those are critical as we  
11 understand the exposure and the diagnosis.

12 But we also want to know how those things and specific  
13 lifelong exposures impact the symptoms of the person.  
14 Because there is not a 1 to 1 relationship. There's a  
15 relative relationship.

16 Senator Scott: So, if you had -- if every service  
17 member, if you had the data of -- you know, just start  
18 today. Just anybody new that joins boot camp and starts  
19 going through infantry training. And you know, if you just  
20 have the data and you had that in front of you, then over  
21 time you could do predictive analysis of, you know, where  
22 the problems are, right?

23 Dr. Zafonte: Right. And I think that -- but to the  
24 point that was just raised, I think there are action steps  
25 now and that we have -- we are compelled very much so to

1 make this a living learning environment and continue to  
2 collect data and perhaps change policy, change programs,  
3 change how we treat people as we understand more over time.

4 Senator Scott: So, you don't have enough information  
5 today exactly what happens as all these blasts happen.  
6 What you have is, you know, you see the result. You see  
7 over a period of time that this is what happens. That is  
8 what you have so far, right?

9 Dr. Zafonte: I think that is right. I think,  
10 Senator, what we have, and thank you for the excellent  
11 question, is a series of smaller studies that show changes  
12 in your imaging, changes in blood based biomarkers,  
13 representative of injury of the brain. But how it is going  
14 to behave in a large population of people is one thing.  
15 How it is going to behave in Bobby or Sue is a very  
16 different thing.

17 Senator Scott: Right. Okay. And how -- so, Dr.  
18 McBirney, how hard it would be to just put up a program?  
19 It wouldn't be that hard, would it?

20 Dr. McBirney: That is a great question.  
21 Unfortunately, one that I find myself unqualified to  
22 answer.

23 Senator Scott: But we do it in a whole bunch of other  
24 stuff. We do it like with glucose monitors, right. And if  
25 you gave servicemembers just -- you know, just say, here

1 -- they all have cell phones, right? You just had an app  
2 that said, okay, so every time you have exposure okay, you  
3 put this in. You put in exactly what you did and what you  
4 shot.

5 And some people are not going to do it well, just like  
6 no one follows their health -- you know, they didn't take  
7 their medicine. But that wouldn't be that hard to do,  
8 right? I mean, we have all this stuff from sugar levels.

9 Why don't we do -- I mean, why don't we -- why  
10 wouldn't that be the simplest thing to start doing and then  
11 you could start seeing that, like -- if you could -- if you  
12 had all that data, you could pretty quickly do a predictive  
13 analysis of even short term problems. Not, you know, it  
14 take a long time to say what is my 20 year problem, right.

15 Dr. Zafonte: Yes, I think following people over  
16 decade will be valuable. I think we will see certain  
17 markers and certain things change early on, but we have to  
18 remember that it is not an uncomplicated story.

19 Even the blood based biomarkers or other entities such  
20 as imaging have a lot of variation within. You know, the  
21 brain, I think my colleagues would support me, is an  
22 incredible structure, but it is also a bit of a black box  
23 still within science, and understanding how different  
24 networks relationships, how these nodes connect, and an  
25 injury in one space affects an injury another, that is a

1 challenge.

2 Senator Scott: But you would actually know the  
3 result. I mean, you even though you don't know exactly  
4 why, you could over time predict what is going to happen.

5 Dr. Zafonte: If you are looking for symptomatic,  
6 senator, prediction I think with a large enough data set,  
7 you certainly could draw some strong relationships.

8 Senator Scott: Right. And then very quickly come  
9 back and say, okay, we know this. We know that if you have  
10 this much, you know -- the, you know, the odds are like you  
11 can go get a blood test for cancer now and it is very  
12 predictive of whether you are going to end up with cancer.  
13 Is it perfect? No. I mean it depends on the cancer. So,  
14 it seems like this would be pretty easy to do and it  
15 shouldn't be that hard.

16 Dr. Zafonte: So, Senator, I would agree with you, but  
17 I would bring up the issue that we are all individual and  
18 different people, and these types of injuries affect  
19 individuals in a different way.

20 So, a series of years' worth of exposure is affected  
21 by who you were beforehand, the kinds of exposures, and  
22 then the treatment you had afterwards. And that produces  
23 this result, and the fact that it is not so easy to put in  
24 a box.

25 Senator Scott: Right. Okay. Senator Hirono.

1 [Technical problems.]

2 Senator Hirono: I call myself for five minutes  
3 -- [technical problems]. There are a lot of our  
4 servicemembers who were exposed to IEDs during the tenure  
5 in Afghanistan and Iraq. So, are you tracking these  
6 servicemembers? Most of them probably are in veteran  
7 status. Are you tracking them for exposure to blasts and  
8 what is happening to them? Anybody?

9 Mr. Larkin: So, I used to be a senior leader within  
10 the Department of Defense running the Joint IED Field  
11 Organization, JIEDO. And I can tell you that it was a  
12 concern as far back as 2008, 2009, that these blast  
13 exposures were creating a unique health risk to our  
14 warriors.

15 We had gotten to the point where we had up armored and  
16 created new armored vehicles that were surviving the blast,  
17 but what got in that vehicle and what came out of that  
18 vehicle were two different states, and it alerted us to the  
19 fact that there were things -- that blast effect was having  
20 an effect on the human body that needed to be studied and  
21 researched.

22 So, as far as you know, having a handle on -- unless  
23 there was a catastrophic injury and usually one that was  
24 visible, at the time, if they -- a lot of these folks came  
25 out of these vehicles, and they looked fairly normal.

1 Senator Hirono: Yes.

2 Mr. Larkin: And it wasn't until time evolved that we  
3 started to see the behavioral changes, cognitive  
4 dysfunction, and so forth. I have no knowledge of whether  
5 anybody attempted to formally collect on that data and do  
6 anything with it.

7 Senator Hirono: I think that is an important kind of  
8 follow up as we try to understand what the impact of these  
9 blasts are long term. Also, I would think that -- I mean,  
10 it is bad enough that there is traumatic brain injury that  
11 needs to be followed up on, but I would think that a lot of  
12 them may develop conditions such as ringing in the ears.  
13 Yes, so, Dr. Zafonte.

14 Mr. Larkin: Thank you very much, Senator, for the  
15 excellent point. I think we have long term sequelae for  
16 people such as tinnitus or ringing in the ear, chronic  
17 headaches.

18 Senator Hirono: Yes.

19 Dr. Zafonte: Pain is a big driver that drives not  
20 only a headache or one's immediate perception, but it also  
21 invades behavior. People who are in pain don't behave the  
22 same way, and they don't cognitively perform the same way.

23 So, what I am saying is that blast has a multi-system  
24 effect. Of course, the brain is our principal and driving  
25 concern, but it has effects in things that are linked to

1 the brain, linked to the behavior that we need to know more  
2 about.

3 Senator Hirono: Well, for example, tinnitus -- that  
4 doesn't cause pain, but it is severely annoying. It can be  
5 debilitating. And I don't know whether you are -- it  
6 sounds as though you are also tracking the incidence of  
7 these kinds of issues, and it is something I am very  
8 familiar with, and there seems to be no cure for these  
9 conditions.

10 And so, I am very interested to know what kind of  
11 breakthroughs there are in treatment -- I know that  
12 tinnitus is the disease, and tinnitus is a ringing that's  
13 not related to any problem with the ears. So, is that  
14 something that you all are also studying, tracking?

15 Mr. Larkin: Senator, all I can tell you is that I  
16 have it from the use of explosives and weapons.

17 Senator Hirono: You have it?

18 Mr. Larkin: It doesn't go away.

19 Senator Hirono: I know.

20 Mr. Larkin: It is just -- I have to live with it.

21 Senator Hirono: Me too. It is very annoying. And  
22 sometimes it is so loud that it interferes with sleeping.  
23 So that is -- I think that there are a lot more of our  
24 servicemembers who have endured or are enduring those  
25 conditions that we have to pay attention to. One more

1 question.

2 A 2023 RAND report noted that there is a critical gap  
3 in effective PPE in that most models represent the average  
4 human male. So is that -- and this is for Dr. McBirney.  
5 It is certainly important that we protect -- provide  
6 protective equipment to all of our servicemembers.

7 So how can we make sure that this kind of protective  
8 equipment is also -- is appropriate for women. Is that  
9 happening?

10 Dr. McBirney: And that is a great question, a very  
11 important topic, and it is happening. So those findings  
12 were from the last state of the science meeting that we had  
13 on blast induced injury, and we were happy to learn that  
14 there is quite a bit of research being done in the  
15 community to make sure that the average male, and  
16 specifically in many instances the average Caucasian male,  
17 is not the only subject that is being used to test  
18 equipment.

19 Senator Hirono: Yes. That is very important. Thank  
20 you. Thank you, Madam Chair.

21 Senator Warren: Thank you. Senator Ernst.

22 Senator Ernst: Thank you very much, and good  
23 afternoon. And I would like to thank you, Chairwoman, for  
24 the invitation to participate in this subcommittee today.  
25 It is a very important discussion that we are having about



1 the impact on our servicemembers and their families.

2 And traumatic brain injuries can arise not only from  
3 the combat deployments, but also from those routine  
4 training exercises that our men and women go through every  
5 single day. Even when they are adhering to safety  
6 standards and established safety guidelines, the act of  
7 firing heavy weapons, just as you stated, Mr. Larkin, can  
8 create those long term effects.

9 Other types of training sessions in preparation for  
10 combat deployments, many of these things can potentially  
11 lead to cognitive impairments affecting our function. And,  
12 Mr. Larkin, I understand that you shared the story about  
13 your son, Ryan.

14 And I want to thank you so much for your service as a  
15 Navy SEAL and your son's service as a Navy SEAL. It was  
16 through Mr. Larkin, through Frank sharing his son's story  
17 with me many years ago that I finally understood the need  
18 to be involved with traumatic brain injuries.

19 So, thank you so much for sharing what is a very  
20 difficult story to tell, but one that is incredibly  
21 important for every young man and woman that puts on the  
22 uniform of our nation. So, thank you for that. And Mr.  
23 Larkin, did you share with the subcommittee then how it was  
24 discovered that your son Ryan had traumatic brain injury?

25 Mr. Larkin: Thank you for the question, Senator, and

1 thank you for your comments. Ryan had expressed his desire  
2 that if anything ever happened to him, he wanted his body  
3 and his brain donated for traumatic brain injury breacher  
4 syndrome research.

5 That subsequently was done, and his brain was donated  
6 to an activity at Bethesda, Walter Reed that postmortem  
7 analysis revealed that he had an undiagnosed microscopic  
8 level of brain injury that was uniquely aligned with blast  
9 exposure. They only see this pattern of injury with blast  
10 exposure.

11 And if we had not gotten that finding, the narrative  
12 that the Navy had built around Ryan and his struggle, and  
13 his subsequent passing would have continued on -- would  
14 continue to have damaged his reputation. But this finding  
15 was indisputable that he was injured. He was not, in his  
16 terms, crazy.

17 Senator Ernst: Exactly, Mr. Larkin. And I just want  
18 everyone to understand that so many of these injuries go  
19 undetected through CAT scans, through MRI's, PET scans.

20 And as a follow up to that then, and I am very  
21 grateful that Ryan had chosen to do that because you would  
22 not have known about those injuries otherwise, but then for  
23 you, and Dr. Zafonte -- is that right?

24 I want to make sure I get it correct, Dr. Zafonte, is  
25 the automated neuropsychological assessment metrics, the

1 ANAM test that is used by the DOD, an accurate method of  
2 detecting those changes in cognition that can lead to a TBI  
3 diagnosis?

4 Dr. Zafonte: Senator, thank you for the excellent  
5 question. I think we are searching for a gold standard. A  
6 number of these measures, including the ANAM, have  
7 significant flaws in them.

8 Everything from the way they are administered, to  
9 challenges on their consistency and internal behavior  
10 within an individual and external to other individuals.  
11 So, while it is an interesting screening tool, it is far  
12 from perfect.

13 Senator Ernst: Yes. And that is why I hope we  
14 continue to work towards alternatives or ways that we find  
15 that gold standard. That is something that this  
16 subcommittee is working on. You have spoken a little bit  
17 about wearable devices as well that might be able to  
18 diagnose a TBI or blast exposure.

19 All of these things require research, development,  
20 recommendations. Are you confident that we can get to a  
21 point where you are able to make recommendations to  
22 Congress, to DOD, that will provide us a path forward in  
23 protecting these men and women. Any thoughts -- yes, Dr.  
24 Zafonte.

25 Dr. Zafonte: Thank you, Senator, for your excellent

1 question. I would say, and I think my good colleague said  
2 this before, perfection is the enemy of the good. There  
3 are things we know to do now, and as we learn more, we  
4 should do better.

5 And I think if we act and think our responsibilities  
6 to make this a dynamic, learning, positive environment for  
7 our servicemembers, we can do things now while evaluating  
8 data and really making positive change in the future.

9 I think we are going to learn that there is a lot more  
10 of that microscopic injury than we had ever believed, and  
11 then in certain people, that is going to have some  
12 significant sequelae over time.

13 Senator Ernst: Thank you, Dr. Zafonte. And I believe  
14 you are absolutely correct. I think there are a lot more  
15 servicemembers out there that have sustained various micro  
16 tears or injuries to their brain. And I was reminded of  
17 this quote not too long ago. And it's an old one, so  
18 forgive me, but if the human brain were so simple, we could  
19 understand it, we would be so simple we couldn't.

20 And just let that sink in, because I think we are  
21 always going to be striving to find the answer that we need  
22 when it comes to traumatic brain injury. We may never  
23 reach that 100 percent solution just because of the  
24 dynamics of this incredible organ, but it doesn't mean we  
25 should just let it go. There are absolute, disruptions to

1 families, just as we have heard from Mr. Larkin.

2 And it is incredibly important that we pursue not only  
3 ways to prevent traumatic brain injury, but that we also  
4 find ways if it does occur and we won't be able to prevent  
5 it in 100 percent of cases, but if it is to occur, we need  
6 to find ways to treat it and mitigate the impact to our  
7 families.

8 So, thank you again, Chairwoman. I really appreciate  
9 the opportunity to be here today.

10 Senator Warren: So, I just want to say a very special  
11 thank you to you. Senator Ernst, Senator Ernst is not on  
12 this subcommittee.

13 And, like many in the Senate, she has an absolutely  
14 packed schedule, but she has been engaged for years now on  
15 the issues around traumatic brain injury and working toward  
16 changes in the law, both for the documentation that will  
17 lead us to better diagnoses and also for the resources to  
18 begin treatment now for those who need it.

19 And she wanted to be here with us today. And I  
20 appreciate your coming and doing this. Thank you. Thank  
21 you, Senator Kaine.

22 Senator Kaine: Thank you, Chair Warren, and to the  
23 subcommittee for having this hearing. It is really  
24 important. And I am just going to ask the same question of  
25 both panels. So, I just have one question and I would love

1 to get your take, and I will ask the same question to the  
2 second panel.

3 We are not the only country that employs weapons that  
4 can have these effects on servicemembers' brain health.  
5 So, what have we learned or what can we learn from the  
6 experience of other nations and their militaries, either  
7 about strategies to prevent or strategies to treat?

8 Mr. Larkin: Senator, again, in my role as a senior  
9 leader of the Joint IED Defeat Organization at DOD, back  
10 during the height of Iraq and Afghanistan, this was not a  
11 U.S. only problem.

12 You know, we were very much in the trenches with our  
13 NATO allies, Five Eyes partners, who were all experiencing  
14 the same challenges with maneuvering on the battlefield  
15 because the IED had paralyzed our movement and the IED was  
16 the weapon system the enemy used against us that literally  
17 brought home all the casualties and fatalities of those two  
18 conflicts and Africa.

19 And, you know, if we don't bridge communications with  
20 those countries as we try to solve this problem, we are  
21 missing a big part of it. They have a great data. They  
22 are as concerned about what we are talking about as we are.

23 I think that really we need unsolicited -- we need a  
24 gyro like task force to bring together the Government,  
25 industry, academia, and our foreign partners for a unity of

1 effort to match the data, the intellectual capability, and  
2 our technology to solve this.

3 We can solve it. It is just that we have different ad  
4 hoc efforts going on right now. They are not coordinated.  
5 We are handicapped by a lack of data sharing. And like I  
6 said, we got to get everybody on -- in the same --

7 Senator Kaine: And even within our own family. I  
8 know this panel too has DOD, but not VA. I mean, I am I  
9 know in the Richmond, VA, this is a very high priority.  
10 So, sharing within our family certainly, but with our  
11 allies who have the same experience is really important.  
12 Dr. McBirney or Dr. Zafonte, do you want to add to that at  
13 all?

14 Dr. McBirney: Sure. No, thank you for the question,  
15 Senator, and it is an excellent one. One consideration  
16 that I know some of our allies are considering at this  
17 time, and it was published in a report in 2018 by the  
18 Center for a New American Security, is reviewing and  
19 updating firing limits for a lot of these weapon systems.

20 Those firing limits haven't necessarily been revisited  
21 in some time. And so, in my written testimony, there is a  
22 direct quotation from that CNS report in 2018 that details  
23 exactly what information to revisit in these weapon systems  
24 manuals, and perhaps consider updating to really get at  
25 mitigating exposure that our servicemembers experience in

1 training in particular.

2 Senator Kaine: Dr. Zafonte.

3 Dr. Zafonte: Senator, thank you for the great  
4 question, and I agree with the comments of my esteemed  
5 colleagues. I would add just one other thing, you are  
6 completely right. There is power in numbers. There is  
7 power in togetherness. There is power in the opportunity  
8 to discover and serve our allies throughout the world.

9 And so, I would advocate for common data elements,  
10 common data sets that go across our allies as we think  
11 about these kinds of exposures and the kind of long term  
12 sequelae, both immediate, what does somebody feel now, and  
13 then what do they experience years later. Those kinds of  
14 things would be incredibly important and doable in many  
15 other health systems.

16 Senator Kaine: Thank you very much. I yield back.

17 Senator Warren: Thank you. Very important. Senator  
18 Sullivan.

19 Senator Sullivan: Thank you, Madam Chair. And thank  
20 you and Senator Scott for holding this hearing. I think it  
21 is a really important one, and I want to thank the  
22 witnesses for their attention to these really important  
23 issues for our military.

24 So, I got here a little bit late, so if this has  
25 already been discussed, bear with me, but I want to dig



1 into this New York Times article from November of 2023  
2 entitled, A Secret Strange -- Secret War, Strange New  
3 Wounds, and Silence from the Pentagon. And this was about  
4 the Marines in Syria deployed in Syria in 2016 and 2017.

5 And, they returned and really struggled with PTSD  
6 issues and health issues, and it wasn't from direct combat.  
7 I mean, they were in combat, but it was primarily from  
8 there, it appears, really significant amount of firing  
9 howitzer rounds.

10 And kind of to Senator Kaine's point, we have had  
11 military members in different wars, Vietnam, Korea, WWII,  
12 of course, fire thousands and thousands of howitzer rounds.  
13 But so, we have seen this before, but these Marines seem to  
14 really have struggled. Have you -- either of you read this  
15 report or this story? Okay.

16 And then, Senators Warren, and Ernst, and Tillis on  
17 January 18th, letter to Secretary Austin asked him a lot of  
18 specific questions relating to this and other issues that  
19 relate to TBI. But this is a kind of a different TBI.

20 So, sometimes I worry, you know, I just retired from  
21 the Marine Corps myself, and I love the Marine Corps. But,  
22 you know, like all big organizations, they can be  
23 bureaucratic, and I am not sure these Marines are treated  
24 very well. And I am wondering, from your experience, maybe  
25 we will start with you, Dr. Zafonte, what is your

1 assessment of that report? Was well done reporting, in my  
2 view, from the New York Times.

3 And what do you think the next steps should be?  
4 Obviously, we will ask the Government witnesses in the next  
5 panel on this topic but would just like to get your  
6 assessment from this particular episode. A lot of my  
7 constituents in Alaska wrote -- read this article and were  
8 quite disturbed by it.

9 We don't even have a big Marine Corps presence in my  
10 State, but big Army and Air Force presence. So, can -- I  
11 would like all of you to just comment on what your thoughts  
12 were and then what we can do - you know, if the Marines  
13 haven't seen this, you can see how they could overlook it,  
14 but we -- I think this needs a much deeper dive than the  
15 military has given it.

16 And to the chairman's credit and some other senators  
17 are already pressing Secretary Austin on it. So, what are  
18 your thoughts on it?

19 Dr. Zafonte: Senator, thank you for the excellent  
20 point and question. From my perspective, I think that the  
21 piece brought up a series of issues. It really took the  
22 cover off of some things and made them more public in some  
23 ways.

24 And it talked about many of the long term sequelae,  
25 near term and long term, that are being seen clinically in

1 this population of people. Now, these are extreme  
2 individuals, many of them. They are the 1 percent of the 1  
3 percent. They are the fittest, the swiftest, and yet they  
4 are seeing clinically apparent problems. There are also,  
5 in many ways, the most resilient. They are selected many  
6 times.

7 So that raises for me some real concerns. It may be  
8 related to the density of the exposure. It may be related  
9 to the lifelong exposure. And it may be related to a  
10 global elements of the life in that kind of stress for a  
11 significant period of time.

12 So, I think we need to learn a lot more about the long  
13 term issues here and the short term ones. And I think part  
14 of the way we do that is better quantifying the exposure  
15 and the person over time.

16 Senator Sullivan: Great. Doctor McBirney, do you  
17 have a view on this?

18 Dr. McBirney: Absolutely. No, and thank you for  
19 raising this. I thought that New York Times article was  
20 very well written and well investigated and reported. I  
21 think --

22 Senator Sullivan: And by the way, just for the  
23 record, I don't believe everything at the New York Times  
24 writes.

25 [Laughter.]

1 Dr. McBirney: Certainly.

2 Senator Sullivan: And so, Senator Warren might -- no,  
3 I am just kidding. But so, I am sure the Marines had some  
4 points in there that probably weren't reported, or I am not  
5 saying it was a perfect piece, but it raised an important  
6 issue. And these young men, to Dr. Zafonte's point, these  
7 are, my view, the best of what we have in America. And we  
8 certainly, you know, we need to take care of them.

9 Dr. McBirney: Absolutely, agreed. I think the one of  
10 the main takeaways for me when I read that article was the  
11 fact that there is a culture that is pervasive across the  
12 DOD, unfortunately, that really contributes to this  
13 underreporting that we see of injuries. And I think the  
14 way that these men were treated is indicative of this  
15 culture and the fear that a lot of servicemembers have when  
16 it comes to reporting injuries.

17 There have been many studies done on the  
18 underreporting of traumatic brain injury. There are a  
19 variety of reasons that servicemembers don't report  
20 injuries. But fear of negative repercussions on their  
21 military career is certainly a huge one. So, I think when  
22 I read that New York Times article in the series of  
23 articles, that is really what came to my mind, is a culture  
24 that needs changing if we hope to improve this.

25 Senator Sullivan: Yes. And, Mr. Larkin, real quick.

1 Sorry, Madam Chair. You know, there -- and I don't know if  
2 you have a view on this, but we have had many wars with  
3 many thousands and thousands of artillery rounds fired. I  
4 had an 81 millimeter mortar platoon for two years on active  
5 duty, my Marines.

6 We fired, you know, all kinds of 81 millimeter mortar.  
7 That is not as big as these howitzers, but it is a big  
8 mortar, and, you know, you feel it when you are firing  
9 those, and your ears hurt when you don't have your ear  
10 protection on because it is so loud.

11 But what is your sense on how we need to look at this,  
12 that article, but compare it to other wars where we have  
13 shot thousands and thousands and thousands of rounds.

14 Mr. Larkin: So, you know, if I am going to put my  
15 money, it is going to be on the preventative end as much as  
16 we can to by down these injuries. But I completely agree  
17 with Dr. McBirney, the issue here is about trust.

18 You know, you are not going to get in reporting unless  
19 there is trust that is built between that operator or that  
20 warrior and the system. We have collected blast data on  
21 -- in a variety of different efforts --

22 Senator Sullivan: On artillery too?

23 Mr. Larkin: Just in, you know, a variety of different  
24 settings where blast gauges and so forth have been worn by  
25 our warriors. We have no idea where that data has gone.

1 So again, it never comes back to the warfighter like a  
2 dosimeter would for radiation.

3 So, they say, well, you know, we wear these things,  
4 but we don't hear anything back. One of the things, and it  
5 might be a novel idea I offer, is, you know, when we  
6 procure and acquire weapons systems and munitions, why  
7 don't we ask those manufacturers to provide us with blast  
8 overpressure data according to strict criteria that they  
9 all have to follow, that ultimately will allow us to craft  
10 training protocols and potentially surveillance programs  
11 for the more high risk occupation.

12 But again, we have been calling this by a different  
13 name coming off the battlefield since WWI, and it all has  
14 rested in psychiatric mental health diagnosis, and we are  
15 now starting to realize this is a biological injury caused  
16 by blast overpressure.

17 Senator Sullivan: Thank you. Thank you, Madam Chair.

18 Senator Warren: Thank you. I have another round of  
19 questions that I want to do. I know Senator Scott does.  
20 If anyone else does, we are glad to do it. But I want to  
21 pick up on what Mr. Larkin was just talking about, and that  
22 is trust. That servicemembers who have been affected by  
23 blast overpressure aren't getting the help they need.

24 And the question is, why not? And I will go back to  
25 The New York Times article because it does give us some on

1 the ground anecdotes that people are experiencing. So, a  
2 Marine Corps officer who is leading an artillery unit was  
3 quoted in this story saying that he was experiencing severe  
4 headaches and small seizures but, "was worried that his  
5 injuries would not be acknowledged because there was no  
6 documentation that he was exposed to anything serious."

7 Now, we have talked some about the importance of  
8 record keeping and how that could fundamentally change what  
9 happens in this area, but I want to talk about where we are  
10 right now and the consequences of the failure to diagnose  
11 early and what that means. Mr. Larkin, you are the one who  
12 has focused on this more than anyone.

13 I think you said in your written testimony that you  
14 estimate that about 80 percent of your son's exposure  
15 occurred during training. Is that right? That is what I  
16 understood.

17 Mr. Larkin: Yes, Senator. And if you talk to other  
18 veterans that have trained for combat, been in combat, they  
19 will pretty much confirm that the majority of their  
20 exposures is in the training environment, an environment  
21 that we can control.

22 Senator Warren: So, if I can ask you, we know about  
23 what happened to Ryan because he donated his brain  
24 postmortem, and they were able to do an analysis. But can  
25 you speak to what happened when Ryan was still alive, and

1 whether you and your family got the appropriate support  
2 that Ryan needed, as he clearly demonstrated that he was in  
3 increasing trouble?

4 Mr. Larkin: So, one thing I didn't share about Ryan  
5 is that after he passed, what we found on his computer were  
6 -- he downloaded numerous studies on blast exposure and TBI  
7 and also was researching the medications that he got. So,  
8 he was locked on this. I didn't like what he did. I  
9 didn't support what he did. But I have grown to understand  
10 why he did it. It was for his teammates. He was going to  
11 prove that something was wrong. Now, when he went to get  
12 help, he did it more for his teammates than himself.

13 But again, you know, we didn't know what we didn't  
14 know. I think a lot of people were trying to do their best  
15 for him, the best that they could, but maybe all the wrong  
16 way. And because we lacked the science, we lacked the  
17 knowledge. TBI was not mentioned -- I mean, very little.  
18 It was not taken seriously because they couldn't see it.

19 We still can't see this level of injury in a living  
20 operator or living warfighter, which is -- again within the  
21 medical enterprise, if you don't have a blood marker that  
22 alerts you, you know, just like a, you know, heart attack,  
23 we look at heart, you know, enzymes and so forth, that  
24 alert us that, hey, there is muscle damage and we see an  
25 EKG that tells us that, you know, things are going wrong.



1           But then when the heart -- we don't have that right  
2 now, and it handicaps our ability to triage these folks  
3 early on in the evolution, to your point. And the  
4 opportunity here, and I don't know if my colleagues would  
5 agree with me, but the opportunity that we have here is to  
6 get it at this early, not wait till it gets to a  
7 catastrophic, you know, point, you know, this disease  
8 process, the injury process where things have gone too far.

9           Senator Warren: So let me just pick up on this. I  
10 understand that this is hard to diagnose and that it is  
11 -- we collect data that will be one way to make it easier  
12 to diagnose. I understand we would like to start as early  
13 in the process as we can. But there is another feature of  
14 this that we have some control over right now, that when  
15 someone has any concern, who is the advocate to make sure  
16 they get the help they need?

17           My sense of this is it is just a patchwork. You go  
18 here, you get sent there, then you end up someplace else,  
19 and the patient is put in the position of having to  
20 advocate for a diagnosis, that it is not the patient's  
21 responsibility or expertise to have to make. I am grateful  
22 that Ryan did what he did in order to help his teammates.  
23 But ultimately, we have a bigger responsibility here.

24           So, I just want to know if you can speak just a little  
25 bit to the notion that starting now, before we have perfect

1 information, that we need a single way for people to go  
2 into this system, to be able to raise a hand, say, I have  
3 problems like the Marine that is quoted in The New York  
4 Times piece. I have problems and know there will be one  
5 person there who will advocate and at least get them to the  
6 best possible treatment that we can. Can you speak to  
7 that, Mr. Larkin?

8 Mr. Larkin: Yes. And I think the number one word  
9 that I would pick out is listen. The system needs to  
10 listen to these folks as they step forward.

11 You know, and we need to understand this is a  
12 leadership problem, and we need to educate leadership as to  
13 what is going on here so that they can properly usher these  
14 folks down the right paths, so that we can stop their  
15 injury process and that we can start a level of treatment  
16 that one size fits one, not one size fits all, you know,  
17 which is precision medicine. And I think as the science  
18 develops, as our medical capabilities develop, we are going  
19 to get better and better at doing that.

20 But again, Ryan became disenfranchised. He became,  
21 you know, adversarial because the system turned on him, a  
22 system that he depended on, a system I depended on. This  
23 was my community, too. And so, this is why I am here  
24 today. And I realize this isn't in a perfect world, but  
25 you know, the ultimate grader of what we do or not do are

1 the veterans, the warfighters, and their families. Are we  
2 doing the right thing for them?

3 Senator Warren: Yes. Yes. I very much appreciate  
4 that and appreciate your comments here. And if I can, I  
5 want to go to the treatment part of this. Dr. Zafonte, you  
6 work at Home Base, and Home Base tries to be the one place  
7 that brings people in and gives a response.

8 That is on the side of our servicemember, not hostile  
9 to our servicemember. You are on the front lines. You see  
10 people with TBI every day. Can you talk just a little bit  
11 about how Home Base has organized itself, and what you are  
12 seeing, and what kind of needs you have?

13 Dr. Zafonte: Well, Senator, thank you for the  
14 excellent question. And, you know, I think we see  
15 ourselves as a partner with DOD, and that we are auxiliary  
16 in an important and differential way.

17 That we take a look at the whole person. And what we  
18 try to understand is that, you know, I think Mr. Larkin  
19 captured it brilliantly, somebody is not just a  
20 psychological illness, but we bring multiple specialists to  
21 bear on this person for a very intense evaluation that  
22 might take, as I said, months or years in a standard  
23 environment, and try to emerge them in a team based  
24 behavior where we listen to the patients and we develop a  
25 programmatic plan to treat.

1           If we can't treat the microscopic injury right away,  
2 let's treat their symptoms and get them relatively well.

3           Senator Warren: I am so proud of the work that Home  
4 Base does, and I really want to underscore the importance  
5 -- there is help. There are things we can do. And I take  
6 it, if I can just have you underscore it again, Dr.  
7 Zafonte, you actually return people to active duty military  
8 service. Can you say just a little more about that?

9           Dr. Zafonte: I am happy to. Thank you, Senator. I  
10 think one of the most extraordinary things, especially for  
11 our special operators, is the very high degree of return to  
12 duty, return to the force, return to fighting. Because if  
13 you think about it as a person, that is what they want to  
14 do.

15           They want to be well and go back to their teammates  
16 and contribute at a very high level. And indeed, that is  
17 the goal. The goal is being able to give people agency  
18 over their own health again. And that is what we do.

19           Very high rates of return. Large numbers of people  
20 still waiting for service, which we hope to provide. And I  
21 think that we see this as a means of enhancing programmatic  
22 excellence and serving as that bridge for mid-career, early  
23 career people who really need a bolus of help.

24           Senator Warren: Early and accurate intervention,  
25 which I think is the point you make as well, Mr. Larkin and

1 Dr McBirney. I appreciate the work you do. Thank you.

2 Senator Scott.

3 Senator Scott: Thank you, Chairwoman. Dr. Zafonte,  
4 NFL players are wearing -- some of them are wearing the Q  
5 collar.

6 Dr. Zafonte: Yes, sir.

7 Senator Scott: Okay, can you tell me how it works and  
8 what you think of it?

9 Dr. Zafonte: Thank you very much, Senator, for that  
10 excellent question. It is an area of debate that is  
11 certainly of interest in the field of traumatic brain  
12 injury. The theory behind the Q collar is that a  
13 compression here at the neck, slight compression, would  
14 result in less force shaking within the brain.

15 Its role in blast related injury, I believe, unless  
16 Dr. McBirney has more data, is unclear. In sport related  
17 injury, it has received preliminary approval, although the  
18 enthusiasm in many investigators is modest.

19 Senator Scott: Okay. All right. Knowing what you  
20 all know now, knowing the service is the service -- so if  
21 you had a child or grandchild that was 18 years old, wants  
22 to be a warfighter, enlist in the, whatever, what would  
23 your advice be to him? You want to start, Dr. McBirney?

24 Dr. McBirney: Is not enlisting an option? And I mean  
25 that as a serious question. Traumatic brain injury is such

1 -- there is such a huge risk of getting this injury. And  
2 as we have heard today, detection of this injury, treatment  
3 of this injury is not guaranteed.

4 I would -- in sitting here, I now have a 14 month old  
5 daughter, so this question is very relevant. I would  
6 strongly urge her to reconsider her decision. And  
7 unfortunately, that is a decision that I know many veterans  
8 that I personally know have asked their children to  
9 reconsider as well.

10 Senator Scott: Mr. Larkin.

11 Mr. Larkin: So, Ryan is with me here today in spirit,  
12 and much of what I am saying is actually him talking  
13 through me. He would tell you he loved being a SEAL and he  
14 wouldn't trade anything. It is just that we got to do it  
15 better.

16 And I will say that my own Naval Special Warfare  
17 community, the SEAL community, Ryan's story has deeply  
18 affected them, and they have moved aggressively to try to  
19 make a difference, along with the parent Command, USSOCOM,  
20 right up to the Commanding General. They are leading the  
21 way, in my opinion, within the Department of Defense.

22 And very often, you know, what Special Operations  
23 does, the conventional forces follow. So, thanks, Ryan.

24 Senator Scott: Dr. Zafonte.

25 Dr. Zafonte: Certainly, I think this is a point of

1 great debate. But I guess what I would say, and we see  
2 this in contact sport, we see it in the military. The  
3 first we can do is know what we know to do now, which is  
4 eliminate unnecessary exposure. Rules changes in sports  
5 have made a big difference.

6 I believe we can eliminate unnecessary exposure in  
7 this population of people where there isn't a lot of return  
8 on investment, either to their training or for their long  
9 term health, or for their team members. And that would be  
10 an awfully good place to start in enhancing force health.

11 Senator Scott: Thank all of you. I mean, I don't  
12 think -- if we care about our freedoms, we actually don't  
13 have a choice. We don't have a choice. We have to thank  
14 God every day somebody is willing to put on the uniform,  
15 because if we get to a point where people say there is too  
16 much risk, then say goodbye to all of our liberties.

17 So, I hope we get to the point where, you know, nobody  
18 would say you shouldn't go in because of the risk. So,  
19 thank you.

20 Senator Warren: Senator King.

21 Senator King: Just a closing comment on that  
22 question, Senator Scott, you know, thinking about what you  
23 would say to your kid. One of my three kids is a Marine  
24 who was an eight year infantry commander, now a Marine  
25 reservist, and keep thinking about him and how he might

1 answer that question.

2 But as I think about the question, let me just recount  
3 an amazing story that I heard not long ago from Doug  
4 Wilder, who is the former Governor of Virginia, first  
5 African American elected Governor.

6 He was drafted into the military in the Korean War.  
7 And the military, like society at that time, was still  
8 dealing with an awful lot of racial prejudice. He was in a  
9 unit where there were many African Americans, many  
10 Caucasians, and others. And Doug is a guy who is going to  
11 stand up for himself.

12 And he had a commanding officer that said, I want  
13 everybody here to be treated fairly. And he believed, as  
14 did others in his unit, in the middle of some really  
15 difficult battle circumstances -- the African Americans in  
16 the unit were not being treated well and they all agreed  
17 they were going to talk to their CO and pass that on. And  
18 when they all stood up to do it, they all just said to  
19 Doug, okay, now you do it. And so, he laid out his  
20 concerns about the way they were being treated.

21 And his commanding officer said, you have done what I  
22 asked you to do. Now you all go back to work and let me do  
23 what I need to do. And things didn't change for about 3 or  
24 4 weeks, and then all of a sudden one day everything  
25 changed because he did what he was supposed to do. He



1 stood up and he said, this isn't right, and we are a unit,  
2 and if we make some changes, things can be better.

3 And so, I would hope that people grappling with the  
4 decision, maybe your daughter might be in this position  
5 17.5 years from now, but people grappling with the decision  
6 will realize things don't just get better, you know, by  
7 themselves. Things don't just change by osmosis. It takes  
8 people at all levels from the, you know, private first  
9 class all the way up to a four star standing up and saying,  
10 we will be better if we make these changes.

11 And I think an awful lot of our young people, or  
12 people at all ages, but I think a lot of our young people  
13 have a lot of wisdom to offer. And so, I would hope that  
14 they might still say, yes, I am doing this, and I am also  
15 going to be committed to speaking up if I see areas where  
16 we can be better. Thank you.

17 Senator Warren: Thank you, Senator Kaine. And I will  
18 be calling on you, as we are doing the NDAA, both to  
19 tighten up the rules on reporting and get more resources  
20 into treatment. That surely has to come out of a hearing  
21 like this.

22 So, thank you. Thank you all for being with us today.  
23 And I would like to call up the second panel. Thank you.  
24 All right, are we ready? Secretary Martinez Lopez, if you  
25 can give us an opening statement, please.

1           JOINT STATEMENT OF HON. LESTER MARTINEZ-LOPEZ,  
2   ASSISTANT SECRETARY OF DEFENSE FOR HEALTH AFFAIRS,  
3   DEPARTMENT OF DEFENSE; KATHY M. LEE, DIRECTOR, WARFIGHTER  
4   BRAIN HEALTH POLICY, DEPARTMENT OF DEFENSE; AND CAPTAIN  
5   CARLOS D. WILLIAMS, USN, DIRECTOR, NATIONAL INTREPID CENTER  
6   OF EXCELLENCE

7           Dr. Martinez Lopez: Chairwoman Warren, Ranking Member  
8   Scott, distinguished members of the Senate Armed Services  
9   committee, we are pleased to represent the Office of the  
10   Secretary of Defense to discuss the Department of Defense's  
11   commitment to address warfighter brain health issues and  
12   initiatives.

13           We are honored to represent the dedicated military and  
14   civilian medical professionals and the military health  
15   system providing support to our combatant commanders and  
16   delivering or arranging health care for our 9.6 million  
17   beneficiaries.

18           We will inform the committee about the Department's  
19   initiatives to understand the causes and impact of brain  
20   injuries and blast exposures, support ongoing training of  
21   medical professionals, inform the development of treatment  
22   protocols, and improve the cognitive and physical  
23   performance of our servicemembers.

24           The Department of Defense's primary mission is to  
25   defend the nation. Fulfilling this mission means

1 warfighters need the ability to make expedient and  
2 effective decisions on the battlefield.

3 Promoting brain health enables our effectiveness as a  
4 fighting force operationally, and mitigating the impact of  
5 traumatic brain injury in all its form is a top priority of  
6 DOD as we focus on near and long term health care of our  
7 servicemembers.

8 In support of these priorities, the DOD established a  
9 joint effort between the operational and medical forces  
10 called the Warfighter Brain Health Initiative. This  
11 initiative was finalized in 2022 to codify a policy and  
12 direction in support of unified efforts across the military  
13 to address TBI and blast overpressure.

14 The Warfighter Brain Health Initiative focuses on  
15 cognitive and physical performance, identification of known  
16 and emerging brain threats in military environments, and  
17 methods to immediately detect and treat brain injury. The  
18 WBHI Initiative is an important organizing function for our  
19 Department wide efforts to address brain injury and related  
20 diagnosis, such as PTSD and suicide.

21 Between 2000 and 2023, 485,553 servicemembers were  
22 diagnosed with TBI. The annual members of TBI grew from  
23 just above 10,000 per year in 2000, to a peak of 33,000 per  
24 year in 2011. The DOD responded to this increasing rate of  
25 TBI in combat during Operation Iraqi Freedom and Operation

1 Enduring Freedom through rapid expansion of TBI clinical  
2 care and research to support military forces around the  
3 globe.

4 We recognize, however, that more research and insight  
5 is needed in both the care and research dimensions to  
6 better understand the risk, how to protect the warfighters,  
7 and how to treat brain injuries more effectively.

8 Our strategic approach to this issue is an iterative  
9 one involving policy to coordinate clinical changes and gap  
10 driven research investment. When policies work, we look at  
11 how to refine for broader effectiveness. When they do not  
12 work as expected, we review why and modify them to invest  
13 in research to advance alternative solutions.

14 With that overarching policy mindset, we hope to  
15 discuss that we see as pivotal actions, research findings  
16 and their impact on our current approach as implemented  
17 within the WBHI. We communicate these insights not because  
18 we believe they are foolproof solution. Rather, enable  
19 collective action through shared knowledge.

20 We know there is still much to learn about the brain  
21 and not everybody responds in the same way to similar  
22 exposures or injuries. We seek to integrate solutions for  
23 the future as we provide recommendations to inform and  
24 affect change to safety, doctrine, and policy. This  
25 mission is more both personal and professional.

1           As providers, researchers, and military leaders, we  
2 are committed to mitigating the risk of and improving the  
3 treatment for BOP exposures and TBI. We appreciate your  
4 continued support of military medicine, and for inviting us  
5 to be here with you today to discuss the important issues  
6 surrounding the brain health of our warfighters.

7           We thank Senator Warren, Senator Scott, and the  
8 members of the subcommittee for leading continued  
9 Congressional attention on blast exposures and brain  
10 injuries, and we look forward to your questions.

11           [The prepared joint statement of Dr. Martinez Lopez,  
12 Ms. Lee, and Mr. Williams follows:]

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1           Senator Warren: Thank you very much. I appreciate  
2 it, Dr. Martinez. So, I appreciate that DOD has begun to  
3 take steps toward mitigating the risks associated with  
4 traumatic brain injury.

5           Starting this year, new troops will be given regular  
6 cognitive assessments to help monitor potential impacts  
7 from blast exposure on their brain health. This will help  
8 medical providers recognize brain injuries and changes in  
9 cognitive function more quickly, and it will help  
10 servicemembers get the clinical help that they need. I am  
11 glad that DOD is taking this critical step, but it is  
12 important that we do this right.

13           Captain Williams, your organization, the National  
14 Intrepid Center of Excellence, works with servicemembers  
15 with TBIs and other invisible wounds of war. As you know,  
16 one of the -- and we have discussed here repeatedly today,  
17 one of the most significant ways that troops are exposed to  
18 blast overpressure is through training.

19           To ensure that we are accurately monitoring the impact  
20 of blast exposure on servicemembers' brain health, would it  
21 be helpful to give a cognitive test before the service  
22 member begins training and firing weapons?

23           Mr. Williams: Thanks, Senator, for the question, and  
24 thank you for the opportunity to talk about this important  
25 issue. Absolutely, yes. Let me start out by saying yes,

1 it is critically important.

2 Baseline is something that we utilize in all aspects  
3 of medicine for surveillance. We utilize it prior to  
4 treatment, utilize prior to modals that we know cause risk.  
5 So, we have moved to now -- this year, we hope to move to,  
6 all members, once they join the military and before they  
7 start the initial military training, they get cognitive  
8 testing.

9 They get cognitive testing, because we know that the  
10 highest risk of TBIs in the military are in the training  
11 environment. And so, it would be valuable, and we wanted  
12 to use the same precision medicine we have been using in  
13 the past for other modalities, that we do with TBI.

14 Senator Warren: Okay. So, if the baseline assessment  
15 is not starting until after training, that is not an  
16 accurate measure of the service member's brain health  
17 changes over time. We are going to miss the front end of  
18 this. And as we have talked about the importance of  
19 isolating the problem early is absolutely critical.

20 So, to make sure that we are able to detect signs of  
21 cognitive decline due to blast exposure, we have got to do  
22 this assessment before the training starts. Second thing,  
23 we also need to do regular tests of servicemembers'  
24 cognitive health after the baseline assessment. While  
25 Special Operations Command will conduct these tests every

1 three years, DOD is currently planning to retest troops  
2 only every five years.

3 Dr. Martinez, you are responsible for assessing the  
4 effects of and improving how DOD tracks blast pressure  
5 exposure. Would annual cognitive testing for  
6 servicemembers help increase the chance that we detect  
7 changes in cognitive function and detect them earlier when  
8 intervention would be more effective?

9 Dr. Martinez Lopez: Ma'am, the -- as the Department,  
10 we are looking into this. I think if there is value into  
11 doing it every year, we don't know. So, maybe three years,  
12 maybe five years. There is more data and more science that  
13 we need to look into. I am not looking at 10 year  
14 research.

15 I am looking at short term research to figure out what  
16 would be the best frequency of doing the test. And not  
17 only that, but what kind of other testing we should add to  
18 the battery to assess the condition of the soldiers -- the  
19 servicemembers.

20 Senator Warren: So, I just want to say I feel a  
21 little bit frustrated here that Special Operations Command  
22 already clearly says five years is not enough. They are at  
23 three. And frankly, until we have better data, I don't  
24 know why we wouldn't be saying, let's do an annual test and  
25 see what we can detect.



1           And if the data show us that three years is often  
2 enough interval to be able to detect changes, that is fine.  
3 But it seems to me, given what else we know, and given how  
4 catastrophic the implications of untreated TBI can be, that  
5 we ought to be erring on the side at least of collecting  
6 these data annually. So, I really want to push on this,  
7 waiting five years to test is just not often enough.

8           Another way that DOD needs to show that it is serious  
9 about protecting servicemembers from blast overpressure is  
10 by establishing effective weapon use safety limits. We had  
11 some conversation about this earlier. In 2022, DOD  
12 directed the services to establish a maximum allowable  
13 number of rounds for servicemembers to fire to mitigate  
14 blast overpressure injury risk.

15           Now good start, but I see two problems with this.  
16 First, the limits don't include brain injury risk. Blast  
17 pressure experts have raised concerns that this means that  
18 our current safety thresholds are built on things like  
19 whether or not it is likely to cause your eardrum to burst.  
20 They are very old guidelines, and they are not about  
21 traumatic brain injury.

22           Ms. Lee, you are in charge of overseeing DOD's  
23 warfighter brain health policy. Why is it important that  
24 DOD establish a maximum allowable number of rounds for  
25 servicemembers to fire that takes into account brain injury

1 as well as injury just to the ears?

2 Ms. Lee: Senator Warren, thank you so much for the  
3 question, and thanks for having us here today to be able to  
4 talk about warfighter brain health, blast overpressure, and  
5 traumatic brain injury.

6 This is an excellent question. We absolutely -- it is  
7 imperative that we have allowable number of rounds for all  
8 the weapon systems that are commonly used so that we can  
9 avoid unnecessary blast exposure in our servicemembers. We  
10 believe that this also gives us an opportunity to be able  
11 to ensure the usage is correct, the position, crew  
12 position, proximity, and all those pieces can come  
13 together.

14 Our policies are moving in that direction to be able  
15 to look at the brain. As you mentioned, historically, it  
16 has been through ear and lung. However, we are looking at  
17 what the brain effects are, and we will follow suit with  
18 our policies as such.

19 Senator Warren: So again, I want to say I feel a  
20 little bit of frustration here. I appreciate that you are  
21 working on establishing these limits, but we are going to  
22 get this off the ground now.

23 We know enough to start moving in the right direction.  
24 My office has heard stories of servicemembers having to  
25 take their own initiative in setting limitations for their

1 troops. We have got training instructors who just say, I  
2 have decided that is enough, and that is not enough to get  
3 this job done.

4 So again, I urge you better to make your best estimate  
5 and get started on forcing these weapons manufacturers to  
6 start collecting these data so that they will be able to  
7 give us limits on how they can be used.

8 One more concern here. It is how we measure these  
9 weapons use safety limits. DOD's own studies found that it  
10 took 70 to 96 hours to resolve servicemembers cognitive  
11 deficits after firing heavy weapons. So that is about how  
12 long it appears before people are back to their original  
13 steady state. But DOD guidelines say they are only going  
14 to test for the first 24 hours.

15 Ms. Lee, could servicemembers benefit from  
16 establishing weapons use safety limits for longer periods  
17 of time, like 72 hours?

18 Ms. Lee: Yes, ma'am. We are looking to expand that  
19 timeframe so that we allow for those differences that are  
20 coming up with blast overpressure. So that is again where  
21 our policies, the direction that our policies are headed so  
22 that we can cover that time period. We are firmly  
23 committed to early detection, provides the opportunity to  
24 treat, and that maximizes our outcome.

25 Senator Warren: Well, I hope you do this soon. The

1 Department of Defense's Inspector General has raised  
2 concerns that military health system providers are not  
3 consistently providing a 72 hour follow up appointment for  
4 patients with mild TBIs, so clearly, a longer time frame is  
5 something that DOD itself recognizes is important and that  
6 we need to get done.

7 Look, I get it, this is hard, and I am grateful that  
8 you are doing the work you are doing. I want to be a  
9 partner, but a partner that urges you to move faster and  
10 deliver more for our servicemembers as quickly as possible.  
11 We need to do better for our troops, and we need to do it  
12 right now. Senator Scott.

13 Senator Scott: Thank you, Chair. So, I will ask you  
14 the same question, what would you tell your son or daughter  
15 who was going to go in and be a warfighter, 18 years old,  
16 go enlist -- what would you tell them today, based on what  
17 you know?

18 Dr. Martinez Lopez: Sir, I have three boys. Two of  
19 them served in the military. One is still in the reserves.  
20 So, I am very proud of their service just like, you know,  
21 and I will tell my grandkids, I have eight of them -- so,  
22 that there is a great opportunity in the services.

23 And I think there is some value as a human being that  
24 we develop, that service to country is very important.  
25 Even if you do it for a short time, it makes a big

1 difference as you as a person.

2           And I don't care how you -- where you serve or how you  
3 serve, is it critical now? They need to understand that  
4 this is a risky business. And what -- so they need to come  
5 out with their eyes wide open, right.

6           So, my kids knew that .I very, very -- I made it very  
7 clear and -- but I am still very proud. I will tell my  
8 grandkids, if they really think about, there is something  
9 that triggers them to serve, go fetch.

10          Senator Scott: Captain.

11          Mr. Williams: Thank you for the question, sir. I  
12 have no children at this point, but I have many -- nephews,  
13 nieces, and friends of the family who I have encouraged to  
14 join the military. This has been the greatest honor in my  
15 lifetime to serve in uniform.

16          I wouldn't change that requirement for anyone or  
17 request to anyone. I would tell them to follow their  
18 heart, and I would encourage them to know that there are  
19 inherent risks to the job, and our job is to make sure that  
20 the people who you are entrusting your life to, they have a  
21 responsibility -- a responsibility to care for you. So, no  
22 different. And the reason why I am here today is saying we  
23 want to make sure that our men and women in uniform know  
24 that we are caring for them in every possible way.

25          Senator Scott: Thank you. Ms. Lee.

1 Ms. Lee: Yes. So, I have five children and one  
2 grandchild, and I would absolutely say to support and  
3 defend our homeland, to join the military and join the  
4 armed services. One of them is a Marine.

5 And through that service, it is about the trust. And  
6 I have seen working in this environment for the last 20  
7 years, especially around the traumatic brain injury realm,  
8 that you really do need to be credible and have integrity  
9 based on that trust and ensuring that we are going to do  
10 right by you.

11 We are a family, and we are going to take care of you.  
12 Mr. Larkin is part of our team. We are all in this  
13 together with the same mission to take care of our people  
14 and take care of servicemembers that make the sacrifice.

15 Senator Scott: Thanks. Secretary Martinez, the  
16 Department's report to Congress on the longitudinal blast  
17 study says the Department plans to conduct a business case  
18 analysis and review lessons learned to inform its way  
19 forward with blast monitoring.

20 So, who is conducting the business case analysis?  
21 When do you expect the analysis to be completed? And what  
22 factors is the Department including in its analysis?

23 Dr. Martinez Lopez: Sir, do you mind if I defer to  
24 Ms. Lee.

25 Ms. Lee: So, the business case analysis kickoff

1 meeting was the 14th of February. It is being conducted by  
2 a contract service. We are expecting the results in  
3 September of 2024. We looked at -- we are looking -- we  
4 have extensively involved military departments in this so  
5 that the outcome that comes, the outcome and  
6 recommendations will be able to be implemented by the  
7 military departments.

8 Both the service communities and the operational  
9 communities are heavily invested in this business case  
10 analysis so that we can review the necessary resources, the  
11 -- and look at how to establish a standardized monitoring  
12 program throughout the force.

13 Senator Scott: When do you think you will be  
14 completed?

15 Ms. Lee: The business case analysis will be completed  
16 in September.

17 Senator Scott: September? Okay. Right. The '23,  
18 the Fiscal Year 2023 NDAA also authorized but didn't  
19 require the Director of the Defense Health Agency to  
20 conduct a pilot program to monitor blast exposure to the  
21 use of commercially available, off the shelf wearable  
22 sensors. Do you all plan to do it, and do you have any  
23 sensors in mind that you think are working?

24 Ms. Lee: So, yes, sir. So, we are awaiting the BCA  
25 results, the business case analysis results in September,

1 to make a decision on whether or not that pilot that could  
2 be the segue from our Section 734 work into a full blown  
3 standard monitoring blast program throughout the  
4 Department.

5 So, again, those decisions, we will probably make in  
6 the in the September 2024 time period. In terms of blast  
7 sensors, we have various communities to include the Special  
8 Operations Command that have been looking at the -- right  
9 now, the three available, commercially available products.

10 And those decisions are, right now, living in the  
11 acquisition world as they are doing suitability and  
12 fielding exercises, and based on the requirements of each  
13 individual community.

14 Senator Scott: Good. Also, the Fiscal Year 2023 NDAA  
15 required a report describing the strategy and  
16 implementation plan for the Warfighter Brain Health  
17 Initiative. I guess this was due at the end of last year  
18 or so. Is that different than the others?

19 Ms. Lee: That is the strategy and action plan that  
20 has five lines of effort. And I believe that is headed  
21 over your way right now.

22 Senator Scott: Oh, okay. All right. Thank you.

23 Senator Warren: So can I just ask one more question.  
24 It is seven months before the business case analysis. What  
25 are you going to do over the next seven months?



1 Ms. Lee: So, in the original memo that was produced  
2 before we had finished Section 734, the Assistant Secretary  
3 of Defense for Readiness put out this interim guidance  
4 memo. Before we had completed all of the information, all  
5 the data, we felt it was imperative to try to get brain  
6 health guidance out at that time.

7 So, we sent the memo out. Included in that four PSA  
8 memo are six actions to try to avoid unnecessary blast  
9 exposures. So, what we are doing in the meantime is  
10 updating that memo with more data that we have from our  
11 research studies and from the blast community of  
12 researchers, so that we can provide more direction and  
13 guidance to the military departments on how they can have  
14 safer actions out in the operational environment, in the  
15 training environment.

16 Senator Warren: Okay. I appreciate that. And how  
17 are you going to make sure that it makes it all the way  
18 down to the ground level? There are anecdotes that suggest  
19 that we make policy changes, we all talk to each other up  
20 here in the abstract, and then down at the ground nothing  
21 has changed. Dr. Martinez.

22 Dr. Martinez Lopez: Ma'am, the first issue is this is  
23 a joint effort between the operational forces and we in the  
24 medical sector. So, it is the medical leadership and the  
25 operational leadership.

1           If we don't work it together, this is not going to pan  
2 out. So, the way we exercise that at DOD is through a  
3 safety oversight council. So, we are meeting with all the  
4 services and laid out the guidance, and we rely on the  
5 services then to push it down. It is an issue of policy  
6 internal to the services.

7           It is an issue of training in the services. It is an  
8 issue of equipping in the services. And we will give them  
9 the medical guidance, you know, the best knowledge we have,  
10 but the implementation itself, how are you going to fire  
11 your weapon, where, and those kind of things have to be  
12 exercised by the line.

13           Now, I went over to Fort Campbell, and I talked to the  
14 CG of Fort Campbell. He was -- and I told him, it is  
15 simple. Less is better, and less often and better. So  
16 really look at -- pay attention to that.

17           Senator Warren: Right. Right. Captain Williams, did  
18 you want to add anything on that? Okay, good. Senator  
19 Scott.

20           Senator Scott: So, have you guys ever had a glucose  
21 monitor? Do you know how they work? Okay, so I can put on  
22 glucose monitor, I can put in my exercise, I can put in my  
23 food, and I can just do it myself. I can sort of track to  
24 see, you know, how I feel when my glucose goes up. So, why  
25 don't we have something just simple that people can do on

1 their own?

2 Because if I knew, gosh, I get headaches or I get, you  
3 know -- I have sleeping problems or I have any of these  
4 issues, then I would say, I mean, I can't do this anymore.  
5 I mean, why don't we do something -- I mean, the technology  
6 is so simple, right.

7 I mean, it is basically you just go you go to -- there  
8 is two companies that do the glucose one now that I know  
9 of. Why don't we just go there and say, will you give us  
10 the technology and we can implement this and just give it  
11 to everybody and let them monitor it themselves?

12 [Technical problems.]

13 Dr. Martinez Lopez: I am going to state the first  
14 steps -- [technical problems]. The problem with glucose is  
15 I know exactly where the thresholds are. So, I know that  
16 like at 126 it is abnormal blood sugars, so anything above  
17 that or below that, and I can monitor it. On this issue, I  
18 don't know what the threshold is. So, we haven't  
19 determined that threshold yet. And even worse --

20 Senator Scott: No, I will decide for myself. I will  
21 decide that -- the way I would look at it is, I will put  
22 the information in there and then I would say, hey, here is  
23 what I noticed. If I do this number of blasts, I get a  
24 headache. I do this number of blast, I can't sleep.

25 And so, then I start saying to myself, and I say,

1 well, okay, I am not going to do that. I am not doing that  
2 to myself anymore because -- you know what, this has  
3 happened to me so I am not an expert on this, but you would  
4 think, I mean, you know, we are all -- we are all going to  
5 be better if we self-monitor ourselves, right? I mean,  
6 rather than some top down program that tries to tell us  
7 everything. And even glucose -- I mean, your body is going  
8 to be different than my body.

9 So, what my high level should be is going to be  
10 different than yours, right. So, I am just saying, put the  
11 information in there. It is a real simple mode. Give it  
12 to everybody. Let them start following it on their own,  
13 and then they can easy -- you know, like on those  
14 -- anybody can connect.

15 You can say, oh, I am going to allow this person to  
16 connect. There is a company out there that allows people  
17 to do that now that -- it is call levels and they are doing  
18 they are doing -- I think they have 50,000 people or so on  
19 a study, where they are doing it on their own as a private  
20 sector, just with everybody voluntarily putting their data  
21 in there.

22 Mr. Williams: Sir, if I may, one of the most  
23 important things -- and what you are speaking about is  
24 really and truly precision medicine and targeted therapy to  
25 the individual. It is very variable for each individual

1 who has had a TBI, the symptoms that they have.

2 And so, one of the things that the past NDAA said was  
3 that the DOD needed to partner with private industry and  
4 private organizations to improve research and to improve  
5 treatment. And that is one of the things that we want to  
6 look at, is look at what type of modalities are out there,  
7 or that can be developed to allow patient to focus on their  
8 individual symptoms.

9 But we have to know what that baseline is first for  
10 that individual. Biofeedback is something that we do in  
11 the Defense Intrepid network, at NICO, we help patients  
12 understand how to control their own individual symptoms.

13 But if each person is different, then that is going to  
14 be a challenging, should I say, monitoring to create, but  
15 it is possible. And so, as we continue to do research, I  
16 think we can come -- we can get there soon.

17 Senator Scott: So, to me, I just gave you my answer,  
18 that is a big government answer. Okay, just my -- you  
19 might be absolutely right. Just, I am not saying you are  
20 wrong. I am just -- I just actually do believe that I will  
21 do a better job of monitoring my health than anybody else  
22 will ever do my health. I don't care what the study is, I  
23 will do a better job.

24 I think -- if I started -- I can just say personally,  
25 if I eat something and I don't feel good, I am never

1 touching it again, all right, period. And I assume -- I  
2 mean, it is smart -- these are smart kids going in the  
3 service.

4 And I mean, just look at these sports. All these  
5 people are getting smarter about this and saying, I am not  
6 doing this to my brain. And so, I just think we ought to  
7 do exactly all the things you are doing, but it is pretty  
8 simple to set up a program to give and, you know -- let the  
9 person monitor themselves because their body is going to be  
10 totally different than everybody else's. Like your blood  
11 glucose level is different than mine, I guarantee you.

12 Mr. Williams: So, I totally agree with you, sir. And  
13 as an internist and a pediatrician, I always listen to the  
14 patient. I always listen to the parents, right. It is  
15 very important.

16 [Technical problems.]

17 Mr. Williams: But I do want to say, though, I agree  
18 with you. I think as a medical professional though, and  
19 even as a researcher, we want to come up with a pathway  
20 forward for the patients to monitor their own.

21 And so, that means we need to come up with baselines,  
22 with normals, which we just don't have at this point in  
23 time for TBI in general. When we move towards blood  
24 biomarkers, when we move towards much more concrete  
25 evidence, I think we can come up with the tool that you are

1 talking about, that can allow a patient to monitor  
2 themselves.

3 Senator Scott: Thank you.

4 Senator Warren: Good. So, I want to thank you all  
5 for being here -- absolutely.

6 Senator Budd: Thank you all for being here. So,  
7 North Carolina universities, including East Carolina  
8 University, ECU, UNC Chapel Hill, and health care providers  
9 like Atrium Health have prioritized research, care, and  
10 support for servicemembers and veterans diagnosed with  
11 TBIs.

12 I was able to see that when I was in the State last  
13 week. So again, I appreciate this hearing. Further  
14 understanding the cause of TBI will significantly improve  
15 that care that they offer, and I look forward to supporting  
16 their ongoing efforts.

17 Dr. Martinez, in the longitudinal study on blast  
18 pressure exposure of members of the armed services that you  
19 published in December, one of the key findings is a greater  
20 likelihood of TBI -- can you explain what you mean by a  
21 greater likelihood and quantify the increased likelihood of  
22 TBI? So, what percentage of people were exposed to what  
23 level blaster, likely to develop TBI?

24 Dr. Martinez Lopez: Senator, I will defer to me Ms.  
25 Lee for the answer.

1 Senator Budd: Certainly. Thank you.

2 Ms. Lee: So, the Section 734 longitudinal study that  
3 you are referencing, where we looked at monitoring and  
4 documenting blast exposure and then also offerings a review  
5 of weapon systems, which we codified as 15 weapon systems  
6 that were most commonly used, and we went deep to figure  
7 out what all the safety regulations were about those.

8 And under the safety rubric as well, we looked at what  
9 the health and performance effects are, the brain health  
10 effects from all this blast overpressure stuff. And in the  
11 report, we were able to -- we reviewed 40 studies. 26 of  
12 those studies were funded by the Department of Defense.

13 And we looked at what type of effects happen when you  
14 are doing blast overpressure, and then where do you have  
15 concerns about traumatic brain injury. And most of the  
16 areas that we found correlations were in the neurocognitive  
17 and thinking areas.

18 Also, in some health care utilization areas. We  
19 looked at blood biomarkers and proteins to try to see if  
20 there was any correlations, and we believe that that will  
21 bear fruit, but right now there is no clear trends in that  
22 regard.

23 So, we are relying on the symptom reporting as being  
24 the most indicative of someone that would have had a  
25 traumatic brain injury, and again, early detection of that



1 through evaluation of multiple domains like their balance  
2 and their eye movements, and their thinking skills, and  
3 their symptom reporting.

4 Senator Budd: Thank you for that. Dr. Williams, what  
5 recommendations would you make to improve the Department's  
6 ability to diagnose and treat military personnel who are  
7 repeatedly exposed to low level blast?

8 Mr. Williams: Thank you for the question, Senator.  
9 As we spoke earlier in terms of baselining early. So, it  
10 has been stated several times, and when you know better,  
11 you do better. One of the most important things we can do  
12 is baseline our members from the moment they come into the  
13 military.

14 And so, that means before they start the military  
15 training. And that allows us to follow them over time. I  
16 admit we have to find the right baselining tool. Right  
17 now, we use ANAM. ANAM focuses on cognition and that is an  
18 appropriate component, but we can do more. We can do  
19 better. And our goal is to, again, start early so we can  
20 continue to monitor.

21 Senator Budd: Thank you. So, North Carolina is the  
22 proud home of the Kennedy Special Warfare Center and School  
23 at Fort Liberty. And research suggests that Special  
24 Operations forces experience higher rates of blast exposure  
25 in training and combat than other military personnel, and

1 thus are at an elevated risk for repeated blast exposure  
2 related brain injury. So, does that track with your  
3 research?

4 Ms. Lee: Absolutely.

5 Senator Budd: All three of you?

6 Mr. Williams: Yes.

7 Senator Budd: Thank you. While we certainly need to  
8 conduct more research, we have to also do a better job  
9 protecting our servicemembers with what we know today.  
10 That lines up with Dr. Williams, with what you were just  
11 sharing.

12 So, I am concerned that the Department is not moving  
13 quickly enough to address these TBI risks. So, there is  
14 tested, FDA approved devices that can limit TBIs, including  
15 some like neck collars that are currently being used by  
16 Special Operators and just like you see in the NFL.

17 Now, I am hearing, however, that there is still years  
18 of DOD testing that need to take place before they can be  
19 fielded for the broader force.

20 So, for the panel, for each of you, why aren't we  
21 expanding the fielding, FDA approved wearable devices now  
22 to keep our warfighters safer from TBI inducing head trauma  
23 and overpressure protection, rather than waiting for  
24 duplicative testing to be completed within Department? And  
25 how can we expedite those devices, the use of those

1 devices?

2 Mr. Williams: You know, I would start with a simple  
3 answer, our goal is to do no harm. And so, right now we  
4 need more information for some of these devices to  
5 determine if they would do harm in the operational setting.

6 Senator Budd: Even, doctor, if they are already FDA  
7 approved devices?

8 Mr. Williams: I totally understand. FDA approval,  
9 oftentimes, is not tested in our population, and that is a  
10 different story. So, we realize now that a lot of times  
11 this research is being done and is not inclusive of  
12 operators, especially high level operators that we are  
13 caring for. And so, I think our goal is to make sure we do  
14 no harm to that general population.

15 Senator Budd: Thank you. Secretary.

16 Dr. Martinez Lopez: We may have to look at the data  
17 and we look at the size, if it is sound. Even in our  
18 study, we will adopt it. If it is really going to make a  
19 difference, we will. But we will put them through our  
20 internal processes. And that is true for every  
21 intervention we do have with our patients.

22 Senator Budd: And Ms. Lee.

23 Ms. Lee: Senator, the jugular vein compression  
24 devices that you are speaking about had mainly been studied  
25 in head impact in the sports community. So, pivoting to

1 blast overpressure, which has a different mechanism of  
2 injury, is worth a look -- definitely worth more than a  
3 look -- to do more research to make sure that it is safe  
4 and effective in both the military population, as well as  
5 blast overpressure as the mechanism.

6 Senator Budd: Understood. Thank you all. I yield.

7 Senator Warren: Thank you, Senator Budd. I want to  
8 thank you all, all of our witnesses for being here today.  
9 I want to thank you for the work you do every day. My  
10 takeaways from this are that the Department of Defense  
11 needs to do better.

12 We need to identify those who were most at risk for  
13 TBI because of the particular work they do. And we need to  
14 collect better data, and we need to do all of this on a  
15 much faster timetable.

16 Congress also needs to do better. We need to make  
17 sure that you have the resources to do your work, and we  
18 also need to make sure that those who are treating TBI like  
19 Home Base have the resources they need.

20 It is shameful that there are active duty military who  
21 have what appears to be TBI and they cannot be treated  
22 because the resources simply are not there. A waiting list  
23 at a place like Home Base is our failure.

24 We need those resources, and we need that capacity to  
25 be able to treat those who have suffered brain injuries

1 because of their service to our nation. We owe that to our  
2 servicemembers. So, again, thank you all for being here.  
3 I want to thank the senators who have been here.

4 I want to thank my partner, Senator Scott, in this.  
5 And this will be an issue we will take up during the next  
6 round of NDAA negotiations. Thank you.

7 [Whereupon, at 5:02 p.m., the hearing was adjourned.]

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