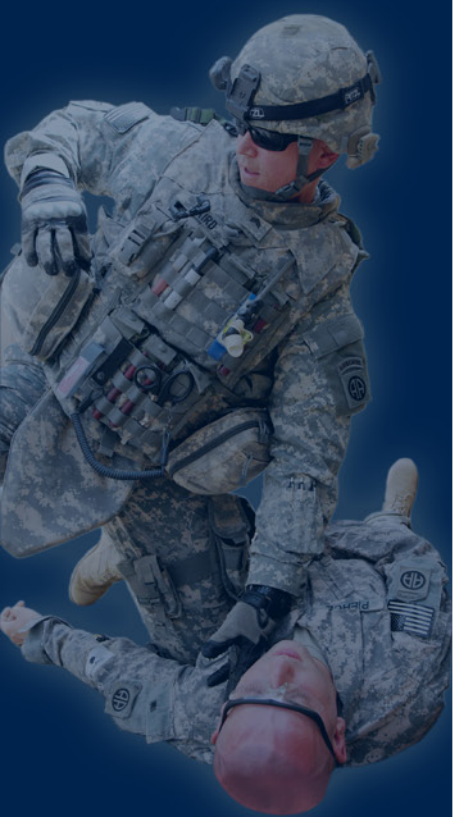
USAMRMC
STRATEGIC COMMUNICATION PLAN

U.S. ARMY MEDICAL RESEARCH AND MATERIEL COMMAND



USAMRMC Public Affairs Office
504 Scott Street
Fort Detrick, MD 21702
301.619.7549
https://mrmc.amedd.army.mil

Blast Injury Research Program Coordinating Office (PCO)

Mission: The Blast Injury Research Program Coordinating Office was established by the Commander, U.S. Army Medical Command to support the Executive Agent (EA) for Medical Research for Prevention, Mitigation, and Treatment of Blast Injuries by coordinating DoD biomedical research programs aimed at preventing, mitigating, and treating blast-related injuries. In carrying out its research coordination responsibilities, the PCO facilitates collaborative research among DoD laboratories and laboratories of other federal agencies, academia, and industry. These research collaborations enable DoD to leverage resources and take full advantage of the body of knowledge that resides both within and outside of DoD to solve complex blast injury problems.

Background

Blast-related injuries continue to be a primary source of injuries sustained by our Warfighters in deployment zones. The term "blast injury" creates much confusion. Simply stated, "blast injury" includes the entire spectrum of injuries that can result from exposure to an explosion. The DoD Blast Injury Research Program uses the Taxonomy of Injuries from Explosive Devices, as defined in DoDD 6025.21E, to characterize such injuries. This taxonomy assigns blast injuries to five categories based on the mechanism of injury:

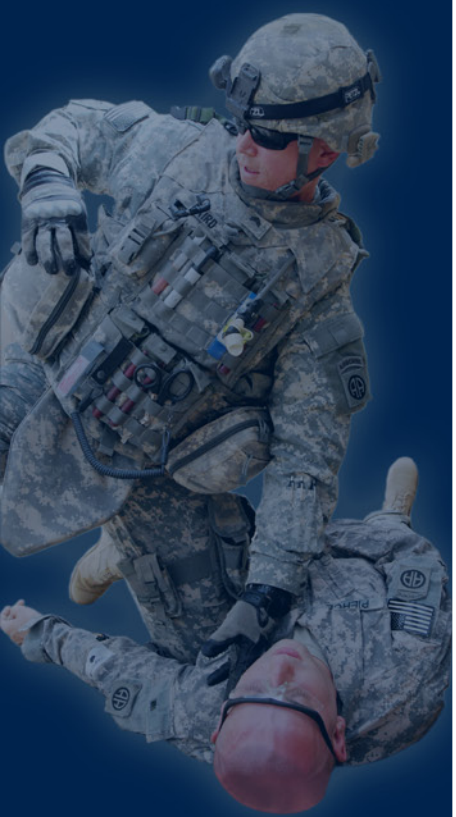
- Primary blast injuries result from the high pressures created by the blast itself. These high pressures, known as blast overpressure, can crush the body and cause internal injuries. Primary injuries are the only category of blast injuries that are unique to blast.
- Secondary blast injuries result when the strong blast winds behind the pressure front propel fragments and debris against the body and cause blunt and penetrating injuries.
- Tertiary blast injuries result from strong winds and pressure gradients that can accelerate the body and cause the same types of blunt force injuries that would occur in a car crash or a fall.
- Quaternary blast injuries are the result of other explosive products, such as heat, light, and toxic gases, that can cause burns, blindness, and inhalation injuries.
- Quinary blast injuries refer to the clinical consequences of "post-detonation environmental contaminants," including bacteria, radiation (dirty bombs), and tissue reactions to fuel and metals.

Key functions of the Blast Injury Research PCO include:

- **Identify blast injury knowledge gaps and prioritize research to fill gaps.** The Blast Injury Research PCO established a "State of the Science Meeting Series" to assist in identifying knowledge gaps pertaining to key blast injury issues. These are narrowly focused meetings that help determine what is known and what is unknown about a particular blast injury topic. These meetings are designed to

bring in top researchers, worldwide, from academia, DoD, other government organizations, and industry to share their expertise in helping focus future research investments that address these gaps.

- **Oversee the Joint Trauma Analysis and Prevention of Injury in Combat (JTAPIC) Program to enhance Warfighter survivability.**
  - The JTAPIC program partners with the medical, operational, intelligence and materiel communities to coordinate the joint collection and integration of data and information to improve understanding of our vulnerabilities to threats and enable the development of improved tactics, techniques, and procedures, requirements, materiel solutions, models, etc. to prevent and mitigate injuries.
  - The JTAPIC program was the medical lead for data analysis of the Generation I Helmet Mounted Sensor System (Gen I HMSS) and will provide data analysis for the Gen II HMSS and other DoD blast sensor initiatives.
- **Recommend blast injury prevention standards, including protection equipment performance standards for DoD.** PCO is collaborating with the Johns Hopkins University Applied Physics Laboratory to develop a Blast Injury Prevention Standard Recommendation (BIPSR) process, an unbiased and inclusive process that identifies the best Military Health System Blast Injury Prevention Standards for approval by the Assistant Secretary of Defense for Health Affairs (ASD [HA]) and DoD use.
- **Leverage expertise from industry, academia, and federal agencies to solve difficult blast injury problems.**
  - The state-of-the-science meetings on Non-Impact, Blast-Induced Mild Traumatic Brain Injury (mTBI), Blast Dosimetry, and Blast-Related Tinnitus brought together national and international subject matter experts to help identify knowledge gaps that will inform future research investments in these areas.
  - PCO established the DoD Brain Injury Computational Modeling Expert Panel to assess the state of the art in computational modeling to understand the injury mechanism of blast-induced mTBI, integrate ongoing DoD efforts, leverage ongoing efforts of other organizations (e.g., Department of Transportation and the National Institutes of Health [NIH]), and accelerate the transition of preventive and treatment strategies.
  - PCO is the DoD Medical Lead for the Under-Body Blast (UBB) Warrior Injury Assessment Manikin (WIAMan) effort to develop new injury metrics to improve under-body blast testing protocols.
- **Serve as "one-stop-shopping" for blast injury research information.**
  - PCO has established a Blast Injury Research Program website (https://blastinjuryresearch.amedd.army.mil) to provide current information on the DoD Blast Injury Research program and allow individuals and organizations to submit blast injury-related questions directly to PCO.
  - To illustrate the value of a single point of contact for blast-related information, PCO coordinated a rapid response to a request from the Directors of the DoD Veterinary Services Activity and the DoD Military Working Dog Veterinary Services office for information on primary blast effects on dogs. PCO reviewed historical data from an extensive blast injury research program that took place at the Blast Test Site located on Kirtland Air



USAMRMC Public Affairs Office
504 Scott Street
Fort Detrick, MD 21702
301.619.7549
https://mrmc.amedd.army.mil

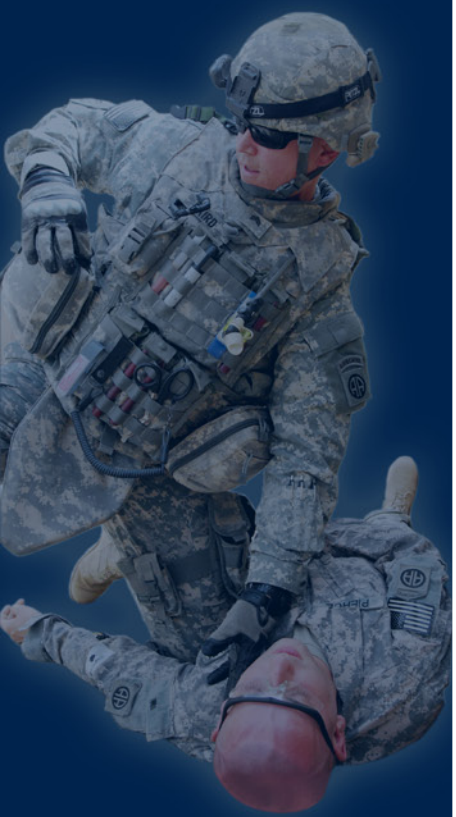
Force Base in Albuquerque, New Mexico, from 1951–1998. It described the susceptibility of dogs to blast injury and lethality, post-blast survival times, possible injury mechanisms, and an extensive list of observed symptoms. The response to this request illustrated the tremendous value of the blast injury research archive in providing answers to current problems without having to conduct new animal research.

The Blast Injury Research Program focuses on filling gaps in the blast injury knowledge base. Key focus areas include:

- Injury Prevention. Injury Prevention mitigates the risk of blast injuries by providing medically based design guidelines and performance standards for individual and vehicle crew protection systems; comprehensive injury surveillance systems that link injury, operational, and protection system performance data; tools to identify individual susceptibility to injury; and individual resilience training to mitigate or prevent injuries.
- Acute Treatment. Acute Treatment mitigates injury by providing acute and definitive treatment across the spectrum of blast-related injuries through improved diagnostic tools, health care provider training, wound care, and medical treatment outcomes analysis.
- Reset. Reset mitigates disability by providing a biomedically based performance assessment capability for return to duty in redeployment and following injury; restoring full performance capabilities in redeployed individuals; and restoring seriously injured service members with prosthetics and regenerative medicine. The term “reset” acknowledges a concept that extends beyond rehabilitation to include all activities necessary to return injured service members to duty or to productive civilian life.

Key Themes & Messages

- From its inception in 2007, the Blast Injury Research PCO recognized that only a coordinated medical research effort involving DoD, other federal agencies, and academia, industry, and international partners can solve our toughest blast injury research challenges. Achievements span the range of blast injury research issues within the broad framework of prevention, acute treatment, and reset and include diverse scientific areas ranging from the mathematical modeling of blast-related brain injuries to combat trauma care and the emerging field of regenerative medicine.
- Blast injury includes the entire spectrum of injuries that can result from exposure to an explosion. The DoD Blast Injury Research PCO uses the Taxonomy of Injuries from Explosive Devices defined as primary, secondary, tertiary, quaternary, and quinary.
- The Blast Injury Research PCO focuses on identifying gaps in the blast injury knowledge base and facilitating collaborative research among the world’s experts to help fill these gaps.



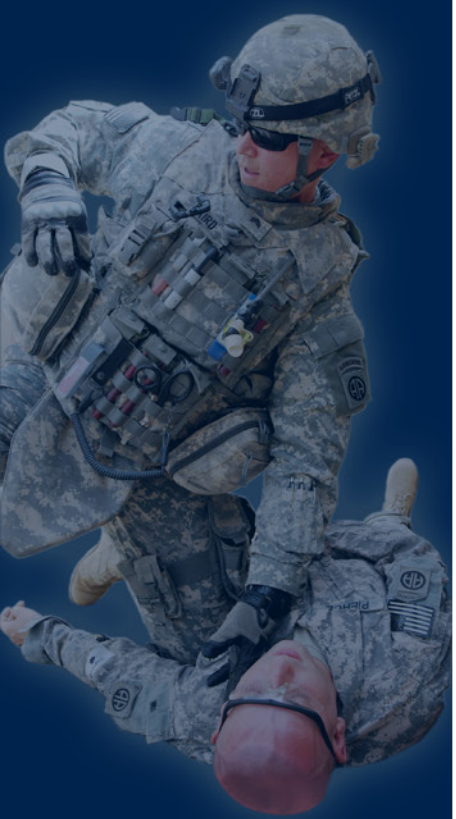
USAMRMC Public Affairs Office
504 Scott Street
Fort Detrick, MD 21702
301.619.7549
https://mrmc.amedd.army.mil

Q & A

Q: What are some of the most significant successes for the Blast Injury Research PCO?

A: Successes include:

- **Identification of Blast Injury Research Knowledge Gaps.**
  - PCO held the first DoD blast injury research planning meeting in July 2006, during which representatives from DoD, federal agencies, academic institutions, and industry assessed the state of the science and identified knowledge gaps in blast injury research. These gaps, detailed in the January 2008 Annual Report to Congress, were used to develop a prioritized list of program funding requirements and prepare program announcements and solicitations for research proposals.
  - PCO met with representatives from the Military Operational Medicine, Combat Casualty Care, and Clinical and Rehabilitative Medicine research programs and the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury to identify knowledge gaps and develop and prioritize topics for the state-of-the-science meetings. The state-of-the-science meetings identified additional knowledge gaps and helped focus future research investments to address these gaps.
  - The DoD Brain Injury Computational Modeling Expert Panel identified knowledge gaps in our understanding of the injury mechanism of blast-induced mTBI. It is developing a roadmap to integrate ongoing DoD efforts, leverage ongoing efforts of other organizations, and accelerate the transition of preventive and treatment strategies.
- **Strengthened and Expanded Collaborations Between the Medical Research Community and the Protection Equipment Developers.** The medical research community has always played a critically important role in the development of individual and vehicle crew blast protection equipment and systems by providing materiel developers with biomedically valid injury criteria, performance standards, and testing methods. PCO continues to strengthen and expand this important relationship as illustrated in the following activities:
  - Served as the medical lead for the Vice Chief of Staff of the Army's Gen I HMSS fielding initiative and will provide data analysis for the Gen II HMSS and other DoD blast sensor initiatives.
  - Serving as DoD medical lead for the UBB WIAMan effort to develop new injury metrics to enhance Warfighter survivability by improving under-body blast testing protocols for the Live Fire Test and Evaluation community.
- **Active Participation on Various Committees.** The PCO staff participates as voting members on numerous research program planning and management committees to ensure blast injury knowledge gaps are addressed in DoD medical research programs. These include:
  - Joint Program Committees (JPCs): JPCs, with membership from the Component services, Department of Veterans Affairs, NIH, science and technology community, and the operational and requirements community, are responsible for developing research program plans and program announcements, reviewing research proposals for programmatic relevance, and evaluating research progress for major DoD medical research programs,



USAMRMC Public Affairs Office
504 Scott Street
Fort Detrick, MD 21702
301.619.7549
https://mrmc.amedd.army.mil

such as the Deployment Related Medical Research Program, that include blast injury research topics.

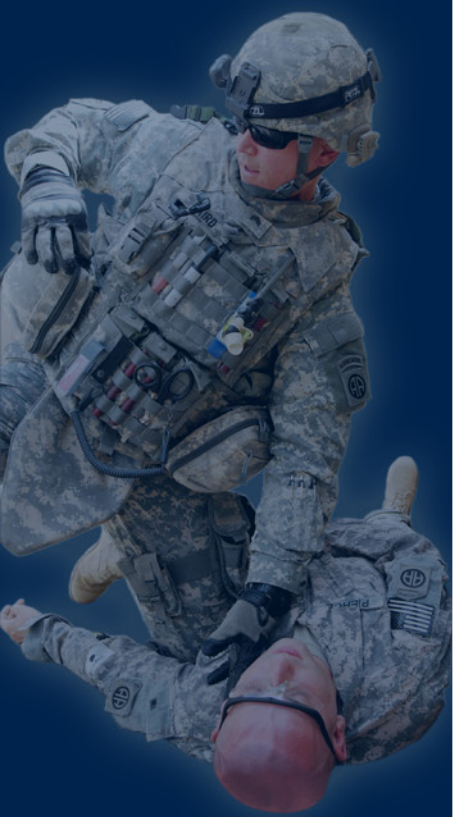
- Joint Technology Coordinating Groups (JTCGs) are organized under the Armed Services Biomedical Research Evaluation and Management Committee. JTCGs are responsible for coordinating medical research programs across the services, including programs that address blast injury research topics in the areas of Military Operational Medicine, Combat Casualty Care, and Clinical and Rehabilitative Medicine.

- **International Cooperation and Collaborative Activities.** Not all knowledge of blast injury prevention, mitigation, and treatment resides within the United States. Therefore, PCO hosts international experts and participates in international meetings to facilitate an exchange of information and ideas, pursue opportunities to leverage the research and experience from other countries, and explore opportunities for developing common international standards for future joint operations. Significant international events include:
  - Co-Chaired a Scientific Session on "Brain, Spinal Cord Mapping and Image Guided Therapy" at the 7th Annual World Congress of International Brain Mapping & Intraoperative Surgical Planning Society at the Uniformed Services University of the Health Sciences. The theme of the session was entitled "Computational Models of Non-Impact Blast Induced Traumatic Brain Injury." This topic represents a recognized knowledge gap in the DoD Blast Injury Research Program, and it was the focus of the first International State-of-the-Science Meeting hosted by PCO in May 2009.
  - Co-chaired the Program Committee for the NATO Research and Technology Organisation, Human Factors and Medicine (HFM)-207 Symposium entitled "A Survey of Blast Injury Across the Full Landscape of Military Science" in Halifax, Nova Scotia in October 2011. This meeting brought together scientists and engineers from eight Nations to present and discuss a wide range of relevant topics focused on the prevention and treatment of blast injuries.
  - Member of the NATO Task Group on "Injury Assessment Methods for Vehicle Active and Passive Protection Systems" (HFM-198).

Q: What are some of the key initiatives for the Blast Injury Research PCO?

A: Initiatives include:

- **Blast Injury Prevention Standards Recommendation process.** The BIPSR process will help fulfill an important responsibility of the EA to identify blast injury prevention criteria and treatment standards and to recommend appropriate criteria and standards to the ASD(HA) for approval and DoD-wide implementation.
- **HMSS fielding initiatives.** The HMSS fielding initiatives collect information on real-life combat exposures of Soldiers and Marines to head impacts, including blast-related impacts, to help guide the development of head protection systems and to provide the basis for the development of objective head injury screening tools that can be used to rapidly identify Warfighters needing medical evaluations from head injuries.
- **Under-Body Blast Warrior Injury Assessment Manikin.** The PCO is the DoD lead for the medical portion of the WIAMan program for understanding the human tolerance limits and injury mechanisms needed to accurately predict injuries, including skeletal and soft tissues, to ground combat vehicle occupants caused



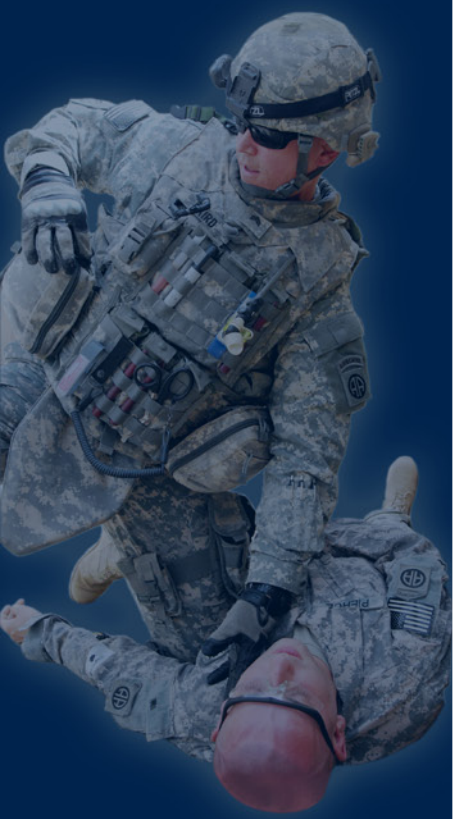
USAMRMC Public Affairs Office
504 Scott Street
Fort Detrick, MD 21702
301.619.7549
https://mrmc.amedd.army.mil

by UBB events. The aim of the WIAMan project is to enable the Live Fire Test and Evaluation community to conduct realistic survivability testing of ground combat vehicles subjected to UBB threats.

- **The International State-of-the-Science (SoS) Meeting Series.** The SoS meeting series brings together the world's leading blast injury researchers to assess the scientific community's current understanding of key blast injury topics and to identify knowledge gaps to focus future research investments.
- **DoD Expert Panel on Computational Modeling of Non-Impact, Blast-Induced Mild TBI.** This panel provides a venue for the world's leading computational modeling experts to work collaboratively to assess the state of the art in computational modeling to understand the injury mechanism of blast-induced mTBI, integrate ongoing DoD research efforts, leverage ongoing efforts by other organizations (Department of Transportation, NIH, etc.), and accelerate the transition of preventive and treatment strategies by developing a roadmap to inform and guide future research efforts.

Q: Is the Blast Injury Research PCO conducting any research on TBI and post-traumatic stress disorder (PTSD)?

A: PCO coordinates research. It does not conduct research itself. The DoD blast injury research program is currently addressing critical medical research gaps for blast-related injuries, including TBI and PTSD.



USAMRMC Public Affairs Office
504 Scott Street
Fort Detrick, MD 21702
301.619.7549
https://mrmc.amedd.army.mil