United States Army Medical Research and Materiel Command

DEPARTMENT OF DEFENSE

BROAD AGENCY ANNOUNCEMENT
for Extramural Medical Research

W81XWH-BAA-15-1

October 2014

Fort Detrick, Maryland

This Broad Agency Announcement document consists of two documents containing instructions on how to prepare and submit a proposal/application. The second document, the General Submission Instructions, is available for downloading from Grants.gov.

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NEW FOR FISCAL YEAR 2015

The Fiscal Year 2015 (FY15) U.S. Army Medical Research and Materiel Command's (USAMRMC) Broad Agency Announcement (BAA) for Extramural Medical Research contains several changes from previous USAMRMC BAAs. Read each section carefully. Note the following:

- The "Program Description" that describes the "Research Areas of Interest" has been updated.
- **Submission of a pre-proposal/pre-application is required.** After review, if the USAMRMC is interested in receiving a full proposal/application, the Principal Investigator (PI) will be invited to submit. A full proposal/application will not be accepted if the PI has not submitted a pre-proposal/pre-application and received an invitation to submit a full proposal/application.
- A PI and the organization's business official must register in the USAMRMC's new electronic Biomedical Research Application Portal (eBRAP) before submitting a pre-proposal/pre-application.
- All pre-proposals/pre-applications must be submitted through eBRAP. Invited full proposals/applications (submitted through Grants.gov) will be available for viewing, modification, and verification in eBRAP, for a limited period.
- The Congressionally Directed Medical Research Program (CDMRP) office will be the execution management agent for this BAA; in general, this includes management of the new eBRAP system, receipt and processing of pre-proposals/pre-applications submitted through eBRAP, and retrieval and processing of full proposals/applications submitted to Grants.gov.
- Safety, surety, and environmental requirements have been revised.
- This BAA consists of two documents containing instructions on how to prepare and submit pre- and full proposals/applications. The second document, titled "General Submission Instructions," is available along with this BAA for downloading from Grants.gov.

NOTE: Any assistance agreement (grant or cooperative agreement) awarded under this BAA will be governed by the award terms and conditions that conform to the Department of Defense's (DoD) implementation of Office of Management and Budget (OMB) circulars applicable to financial assistance. Terms and conditions of awards made after December 26, 2014, may include revisions to reflect DoD implementation of new OMB guidance in 2 CFR[1] part 200, "Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards."

[1] Code of Federal Regulations

I. OVERVIEW OF THE FUNDING OPPORTUNITY

A. Administrative Overview

1. **Federal Agency Name: Department of Defense (U.S. Army Medical Research and Materiel Command)**
2. **Funding Opportunity Title: U.S. Army Medical Research and Materiel Command Broad Agency Announcement for Extramural Medical Research**
3. **Announcement Type: Broad Agency Announcement**
4. **Funding Opportunity Number: W81XWH-BAA-15-1**
5. **Catalog of Federal Domestic Assistance Number: 12.420**
6. **Key Dates:**

Release/Posted Date: October 1, 2014

Opening Date: October 1, 2014

Closing Date: September 30, 2015, 11:59 p.m. Eastern Time

This Funding Opportunity Announcement is a Broad Agency Announcement (BAA). It is continuously open for a 12-month period, from October 1, 2014 through September 30, 2015, at 11:59 p.m. Eastern Time. This BAA must be read in conjunction with the application guidelines in Grants.gov/Apply for Grants (hereafter called Grants.gov/Apply). It must also be read in conjunction with the document titled "General Submission Instructions" available with this BAA in Grants.gov.

Pre-Proposals/Pre-Applications: To conserve both submitters' and federal government resources, organizations are ***required to submit preliminary proposals/applications (pre-proposals/pre-applications)*** so that the government can determine whether a proposed research idea meets the USAMRMC's mission and requirements described herein. Pre-proposal/pre-applications may be submitted at any time throughout the 12-month period noted above. All pre-proposals/pre-applications must be submitted through eBRAP (https://eBRAP.org/). A registration process through eBRAP (https://eBRAP.org) must be completed before a pre-proposal/pre-application can be submitted.

Full Proposals/Applications: To submit a full proposal/application, the PI must have received an invitation to submit from a Contracting or Grants Officer. An invited full proposal/application must be submitted electronically through Grants.gov (http://www.grants.gov/) using the SF424 Research and Related (R&R) forms and the SF424 (R&R) Application Guide. ***Proposals/Applications will not be accepted by mail or in person.***

Invited full proposals/applications can be submitted under the FY15 BAA through September 30, 2015. If an invited full proposal/application is not submitted by this date, it will have to be submitted under the FY16 BAA (to be posted October 1, 2015).

An invited full proposal/application submitted under this FY15 BAA will be considered for funding for a period of 24 months from the date of submission to Grants.gov.

A compatible version of Adobe is required for download from Grants.gov. For assistance downloading this or any Grants.gov package, contact Grants.gov Customer Support at http://www.grants.gov/contactus/contactus.jsp.

B. General Program Overview

The USAMRMC mission is to provide solutions to medical problems of importance to the American Service Member at home and abroad, as well as to the general public at large. The scope of this effort and the priorities attached to specific projects are influenced by changes in military and civilian medical science and technology, operational requirements, military threat assessments, and national defense strategies. The extramural research and development programs play a vital role in the fulfillment of the objectives established by the USAMRMC. General information on USAMRMC can be obtained at https://mrmc.detrick.army.mil/.

This BAA is intended to solicit extramural research and development ideas and is issued under the provisions of the Competition in Contracting Act of 1984 (Public Law 98-369), as implemented in Federal Acquisition Regulation (FAR) 6.102(d)(2) and 35.016. In accordance with FAR 6.102, projects funded under this BAA must be for basic and applied research and that part of development not related to the development of a specific system or hardware procurement. Projects must be for scientific study and experimentation directed toward advancing the state-of-the-art or increasing knowledge or understanding rather than focusing on a specific system or hardware solution. Research and development funded through this BAA is intended and expected to benefit and inform both military and civilian medical practice and knowledge.

The selection process is highly competitive and the quantity of meaningful submissions (both pre-proposals/pre-applications and full proposals/applications) typically received exceed the number of awards that available funding can support.

This BAA provides a general description of USAMRMC's research and development programs, including research areas of interest, evaluation and selection criteria, pre-proposal/pre-application and full proposal/application preparation instructions, and general administrative information. Specific submission information and additional administrative requirements can be found in the document titled "General Submission Instructions" available in Grants.gov along with this BAA.

The execution management agent for this BAA will be the Congressionally Directed Medical Research Programs (CDMRP) office. The CDMRP manages the eBRAP system and retrieval and processing of full proposal/application submissions from Grants.gov. Refer to Section IX, Agency Contacts, for additional information.

The USAMRMC's supporting acquisition office, the U.S. Army Medical Research Acquisition Activity (USAMRAA), will be the awarding and administering office for proposals/applications selected for funding, unless approval is obtained from the USAMRMC Principal Assistant Responsible for Contracting to allow another federal acquisition office to execute and administer an award.

II. PROGRAM DESCRIPTION

A. Research Areas of Interest

1. Military Infectious Diseases Research Program

The Military Infectious Diseases Research Program (MIDRP) focuses on vaccines, anti-parasitic drugs, deployable field clinical diagnostics (human and vector), prophylactics and novel therapeutics to treat multidrug-resistant organisms in combat wound infections, as well as vector control pertinent to naturally occurring endemic diseases with demonstrated or potential capability to decrease military operational effectiveness. Diseases of principal interest to the MIDRP are malaria, dengue, diarrheal disease caused by bacteria and norovirus, and human immunodeficiency virus (HIV). The MIDRP also has smaller research programs focused on scrub typhus, adenovirus, and hemorrhagic fever viruses that are not on the Defense Threat Reduction Agency (DTRA) biothreat list. Proposals/applications involving viral and bacterial biowarfare threats, chemical threats, and cancer research cannot be supported by the MIDRP.

Research efforts are needed in novel technologies for the prevention, treatment, and detection of naturally occurring infectious diseases. Areas of interest include norovirus and other viral diarrhea, Q fever (*Coxiella burnetii*), Crimean-Congo hemorrhagic fever, protozoal diarrhea, Rickettsiosis, Chikungunya virus, and technologies that leverage current research efforts in malaria, dengue, bacterial diarrhea, and HIV.

The MIDRP is also interested in proposals/applications and products incorporating a systems biology approach. For more information, refer to Section V.E.2, Attachment 6.

a. Research and Development toward Preventive Measures for Infectious Diseases

- **Vaccines:** The MIDRP supports studies to characterize infectious agents that can result in a vaccine product, identify mechanisms of pathogenesis and protective immune responses in support of vaccine development, develop candidate field sites in conjunction with evaluation of vaccine efficacy in humans, and evaluate methods of vaccine delivery.
- **Anti-Parasitic Drugs:** Studies applicable to the discovery, design, and development of drugs to prevent malarial infections (including drug synthesis, screening of compounds, characterization of mode of action, and mechanisms of drug resistance) are of interest to the MIDRP. Additional topics for possible support include investigations of parasitic metabolism, structural biology, genomics, proteomics, and metabolomics directed toward the identification of potential novel molecular targets for intervention.
- **Vector Control Products:** The MIDRP supports investigations focusing on arthropod vectors and vector-borne diseases (with primary emphasis on malaria, dengue and scrub typhus). Current studies target vector-pathogen-human interactions, vector control (including personal protective measures), and risk assessment (including identification and classification of vectors, improved surveillance techniques, and field worthy assays for detecting pathogens in vectors).

The MIDRP also supports research toward products to detect, prevent, treat, and manage combat wound infections. In addition, novel chemotypes (chemical classes/materials[2]) and/or biologics as potential prophylactics/treatments for combat wound infection and/or biofilm formation are of interest.

b. Research and Development of Therapeutic Measures for Infectious Diseases

For the MIDRP, therapeutic drug development (including studies to screen, synthesize, and develop therapeutic drugs for malaria and other military-relevant infectious agents) is secondary to prophylactic development (see above). However, proposals/applications dealing with novel drug delivery systems (i.e., sustained-release and methods of targeting drugs to reduce toxicity or delivery of drugs of clinical importance to the active sites) would be considered. In addition, MIDRP supports investigations focusing on development of novel medical countermeasures and innovative treatment approaches (e.g., chelators, antibody, phage, antimicrobial peptides, quorum-sensing inhibitors, and host immunoaugmentation, etc.) for multidrug-resistant organisms in combat wound infections and/or biofilm formation, maintenance, or propagation. Given the tepid interest of the pharmaceutical industry to develop and market vaccines for diseases in areas of low commercial gain, the MIDRP is also interested in proposals/applications and products toward finding treatment options for infectious diseases that are likely to lead to U.S. Food and Drug Administration-licensable, broadly active therapeutics against multiple endemic disease threats.

2. Combat Casualty Care Research Program

The Combat Casualty Care Research Program (CCCRP) provides integrated capabilities for far-forward medical care to reduce the mortality and morbidity associated with major combat-related trauma across the spectrum of combat casualty care including point of injury and pre- or out-of-hospital care, the spectrum of en-route care, and facilities-based treatment. A primary emphasis of the CCCRP is to identify and develop medical techniques and materiel[3] (medical devices, drugs, and biologics) for early intervention in life-threatening battle injuries. Because battlefield conditions impose severe constraints on available manpower, equipment, and medical supplies available for casualty care, the CCCRP places a premium on medical interventions that can be used within the battle area or as close to it as possible, before or during medical evacuation. Preferred medical techniques and materiel that can be used by combat medics must be easily transportable (i.e., small, lightweight, and durable in extreme environments and handling); devices must be easy to use, low maintenance, with self-contained power sources as necessary. Drugs and biologics, ideally, should not require refrigeration or other special handling. All materiel and techniques must be simple and rapid to employ. The CCCRP is interested in existing material for which concept and/or patient care efficacy have already been demonstrated, but require improvement to meet military constraints. The CCCRP is also interested in proposals/applications and products incorporating a systems biology approach. For more information, refer to Section V.E.2, Attachment 6.

[2] Material is defined as the tangible substance that goes into the makeup of a physical object.
[3] Materiel is defined as equipment and supplies of a military force.

Research efforts are needed in principles and technologies to enhance self- and buddy-aid, also referred to as tactical care; techniques, methods, or materials to improve basic and advanced life support for severely injured persons; monitoring, sustainment, and management of severely injured casualties during episodes of delayed or protracted evacuation; and enhanced capability for triage of large numbers of casualties and staged treatment in the field.

The principal causes of death among Service members who die within the first hour of wounding are hemorrhage and traumatic brain injury (TBI). As a consequence, the following areas are of particular interest to the CCCRP:

a. ***Research and development of technologies to stop blood loss, resuscitate the casualty, and limit the immediate, short- and long-term deleterious consequences of severe hemorrhage:*** Included in this area of interest are diagnostics and therapeutics to predict, diagnose, prevent, and treat coagulopathy of trauma and noninvasive or minimally invasive sensors to detect and warn of impending vascular collapse and/or significant tissue damage due to perfusion deficits. Examples of specific products include local and systemic hemostatic agents or devices (exovascular or endovascular) for control of vascular disruption and subsequent compressible and non-compressible hemorrhage, treatments to sustain or enhance oxygen delivery and perfusion of vital tissues and organs, and equipment and procedures for effective fluid resuscitation and enhanced resuscitation fluids. Also of interest are the improved preservation, storage, transportability, and processing of red blood cells, platelets, and plasma and other blood or blood-like substitutes.

b. ***Research and development of technologies to diagnose and to limit the immediate, short- and long-term impairments that follow TBI and spinal cord injury:*** Included in this area of interest are non- or minimally invasive sensors or assays to rapidly diagnose the severity of brain and spinal cord injury within the battle area (or as close to it as possible), and drugs, biologics, or other agents to mitigate post-injury neural and immune cell overstimulation, inflammation, cell loss, and/or neurologic dysfunction.

Secondary damage to organs frequently occurs after severe trauma and resuscitation. The CCCRP is interested in materiel and/or devices that can reduce acute secondary organ damage such as ischemia/reperfusion injury, cell death, general organ failure, and secondary brain/spinal cord damage. Technologies to sustain or support single and multiple organ injury and failure are also of interest to the CCCRP. These objectives include methods to reduce cellular demand for oxygen and metabolic substrates and therapeutics to modulate the immune response to traumatic injury as well as single and multiple organ support or replacement technologies (extracorporeal). The utilities of these modalities during and the effects of longer distance en-route care on the critically injured casualty are also of interest. These include, but are not limited to, hypobaria, hypoxia, and physiological effects of vibration, shock, and G-forces.

The CCCRP supports additional aspects of casualty care. These include drugs, devices, and/or novel surgical techniques to decontaminate, debride, protect, and stabilize hard and soft tissue wounds to mitigate secondary tissue damage; orthopedic and maxillofacial trauma repair strategies; and the prevention and treatment of dental injury or disease in austere environments. The CCCRP is also interested in the development of non-invasive sensors; diagnostic and prognostic algorithms; data gathering or capture modalities; and processors to improve our capability for remote triage, monitoring, and management of casualties; as well as products to maintain casualties during prolonged evacuation.

The CCCRP also supports the conduct of military-relevant clinical research aimed at translating knowledge or materials from basic and preclinical trauma research into clinical practice. This includes, but is not limited to, single and multi-center clinical trials performed in the civilian setting to clarify the safety, efficacy, and optimal use of products stemming from the previously mentioned research areas.

The CCCRP supports the conduct of military-relevant, large data research projects including the use of large databases of common elements from trauma research projects (preclinical, translational, and clinical). Such studies should directly contribute to or effectively enable the data-driven conduct of combat casualty care. Examples include, but are not limited to, post-hoc analysis of data from completed trauma research projects, meta-analyses of a number of otherwise separate but completed studies, and the ability to harmonize data from planned or ongoing but otherwise separate research studies.

3. Military Operational Medicine Research Program

The Military Operational Medicine Research Program (MOMRP) conducts biomedical research to deliver products and solutions to the Service member that address health and fitness throughout the deployment cycle. The MOMRP is centered on cutting-edge scientific research and bringing science to the Service member on the battlefield in a relevant, timely manner. The MOMRP is divided into four research focus areas: Injury Prevention and Reduction, Psychological Health and Resilience, Physiological Health, and Environmental Health and Protection.

The mission of the MOMRP is to develop effective countermeasures against stressors and to maximize health, performance and fitness to protect the whole Service member head-to-toe, inside and out, and at home and on the battlefield. The MOMRP is interested in proposals/applications and products incorporating a systems biology approach. For more information, refer to Section V.E.2, Attachment 6.

The MOMRP focus areas of research emphasis are described below:

a. Injury Prevention and Reduction: This area of research addresses the requirement to provide the biomedical basis for countermeasures that prevent and mitigate Service member injuries that occur in training and operational environments and decrease attrition, medical cost, and minimize personal impact to the Service member. Specifically, this includes the need to prevent vision and hearing loss along with other blast-related and training injuries; identify validated fitness for duty/return-to-duty (RTD) standards following neurosensory and musculoskeletal injury; develop biomedically valid injury criteria and performance standards for individual (helmet and body armor) and crew protection systems; develop injury risk criteria and tools for health hazard and Service member survivability assessors; and Service member monitoring/sensor with accompanying algorithms that predict the likelihood of neurosensory, musculoskeletal, and brain injury.

b. Psychological Health and Resilience: Psychological health topic areas of interest include post-traumatic stress disorder (PTSD), suicide prevention, resilience, substance abuse, and violence within the military. Additional psychological health areas of interest that are understudied in the military context include military-related grief, guilt, or loss issues; moral

injury and/or anger, rage or aggression issues; interdisciplinary and comprehensive prevention and life-skills training strategies to reduce negative psychological health trajectories; psychosocial/psychological health challenges unique to military families, women Service members, the Reserve and Guard, persons of non-traditional sexual orientation, and sexual assault victims. This research area focuses on the development and validation of effective evidence-based training and prevention interventions, screening and assessment strategies, and treatment and rehabilitation interventions that address the psychological health topic areas and concussion/mild TBI as well as overall brain and cognitive fitness. Research areas of particular interest that are often overlooked but relevant include foundational studies to generate and validate theories and elucidate underlying mechanisms of psychological disorders and treatment response; studies addressing co-morbidities (including, but not limited to, PTSD, concussion, alcohol and other drug abuse, sleep disturbance, and mood disorders); studies focused on enhancing translation, implementation and uptake of evidence-based strategies and treatments; research focused on establishing validated objective RTD standards following psychological injury; and research focused on systems-approaches to psychological health. Research to incorporate and evaluate leveraging of technology (e.g., telemedicine, remote monitoring, biosensors, advance immunologic testing, and health information technologies) for prevention, treatment, and care management and decision support, and patient empowerment and education is of interest. Also of interest are rigorous studies on integrative medicine and complementary and alternative medicine (CAM) approaches spanning mind/body, movement, natural products, non-Western medicine approaches and spiritual practices, along with validation studies of CAM therapies. This area also supports research to inform the development of strategies for the diagnosis, treatment, and mitigation of cognitive dysfunction associated with TBI and war-related psychological injuries. Research topics of particular interest include those directed at evaluating efficacy of cognitive training approaches to promote resilience and prevent/mitigate acute negative responses to psychological trauma and promote brain health; and the development of a systematically applied set of therapeutic services designed to reduce cognitive dysfunction and restore functions that can be restored and/or improve quality of life.

c. Physiological Health: This area of research develops biomedical countermeasures to sustain Service member health and operational effectiveness and informs military policy, training, and the development of materiel solutions to establish, sustain, optimize, and monitor Service member health, physiological resilience, cognitive, and physical abilities throughout the military lifecycle, including training, deployment, reset, and injury recovery cycles. This research aims to prevent or mitigate the negative effects of operational and training stressors on the performance and fitness of Service members, as well as safely enhance performance with evidence-based pharmacological and non-pharmacological personalized strategies based on a systems medicine approach. Studies include use of dietary supplements and nutritional and behavioral interventions to mitigate threats to operational health and performance. Research also aims to develop advanced biomedical modeling and networked physiological status monitoring capabilities, healthy sleep and fatigue management strategies, development of strategies that exploit individual differences in sleep loss resilience, and individualized resilience to various operational stressors. Basic, applied, and advanced research studies utilizing technologies and strategies to monitor and promote Service member and family health to support the Surgeon General's Performance Triad are of interest.

d. Environmental Health and Protection: This area of research includes assessment and sustainment of health, force readiness, and the operational effectiveness of Service members exposed to harsh operational environments including altitude, cold, heat, and exposure to environmental health hazards. In addition, this research includes development of policy, training, planning/management tools, knowledge and materiel solutions, psychological status monitoring systems, interventions and reset solutions, to sustain Service member resilience, health, and operational effectiveness to environmental stressors. Additional research identifies biomarkers of exposure to environmental health hazards, cognitive and physical performance assessment tools for exposures to environmental hazards, and development of hand-held, fieldable devices for rapid identification of exposure effect biomarkers in bodily fluids in support of military operational requirements.

The MOMRP supports research toward solving critical problems facing the Army today and in the future. Service- and platform-specific issues are addressed through close coordination with Navy and Air Force counterparts to prevent duplication of effort.

4. Clinical and Rehabilitative Medicine Research Program

The Clinical and Rehabilitative Medicine Research Program (CRMRP) focuses on the innovations required to reset our wounded Service Members, both in terms of duty performance and quality of life. Innovations developed from CRMRP-supported research efforts are expected to improve restorative treatments and rehabilitative care to maximize function for RTD or civilian life. The interest is in medical technologies (drugs, biologics, and devices) and treatment/rehabilitation strategies (methods, guidelines, standards, and information) that will significantly improve the medical care provided to our wounded Service members within the DoD health care system. Implementation of these technologies and strategies should improve the rate of RTD of Service members, the time to RTD, clinical outcome measures, and quality of life, as well as reduce the hospital stay lengths, clinical workload (patient encounters, treatments, etc.), and initial and long-term costs associated with restorative and rehabilitative or acute care. Development and validation of in vitro and in vivo assessment models that represent military-relevant conditions in wounded Service members are of interest to the CRMRP when they can be used to identify and describe in a predictable manner the safety and efficacy of novel technologies in patients. The CRMRP is interested in proposals/applications and products incorporating a systems biology approach. For more information, refer to Section V.E.2, Attachment 6.

The CRMRP focuses its efforts on the following research areas: neuromusculoskeletal injury (including amputees), sensory systems (including hearing, balance, tinnitus, and vision), acute and chronic pain, and regenerative medicine. While research topics of highest priority interest are listed below for each of these areas, proposals/applications for topics that align within an overall research area will also be considered, except as specifically noted. TBI research proposals/applications will only be considered if the focus is related to one or more of the following: hearing, balance, tinnitus, vision, or pain related to TBI. Novel manufacturing technologies necessary to translate innovative therapies or devices into clinical development are a focus.

All projects should adhere to a core set of reporting standards for rigorous study design. The CRMRP strongly encourages award recipients to follow the Animal Research: Reporting *In*

Vivo Experiments (ARRIVE) guidelines (http://www.nc3rs.org.uk/page.asp?id=1357). While these standards are written for animal studies, the basic principles of randomization, blinding, sample-size estimation, and data handling derive from well-established best practices in clinical studies and should be applied to those projects as well.

The CRMRP focus areas of research emphasis are described below:

a. Neuromusculoskeletal Injury Rehabilitation: Research directed toward functional outcome assessments focusing on return-to-duty and/or community reintegration. Of particular interest are technologies and rehabilitative strategies that restore function after sustaining neuromusculoskeletal injuries. Topics of interest include, but are not limited to, amputation, limb salvage, spinal cord and column injuries, polytrauma, contractures, and injuries such as sprains and strains that represent a significant burden of injury. Additional areas of interest include therapies to restore tissue and function, amputee-specific technologies and strategies that address/assess fitness sustainment and residual limb health, the prevention and treatment of heterotopic ossification, and mechanistic approaches to optimizing function in rehabilitative techniques and technologies.

b. Vision Restoration and Rehabilitation: Research aimed at treating traumatic and war-related injuries (including blast and burn injuries) to ocular structures and the visual system. Research focused on the diagnosis, treatment, and mitigation of TBI-associated visual dysfunction. Additional areas of interest include studies supporting diagnostic capabilities and assessment strategies, restoration of the visual system (including regeneration and tissue repair following traumatic injury), and vision rehabilitation strategies (including but not limited to rehabilitation for multi-sensory dysfunctions, low vision and blindness, and oculomotor and binocular vision disorders).

c. Hearing Loss/Dysfunction, Balance Disorders and Tinnitus: Research to support the development of strategies and technologies (including but not limited to medical devices, pharmaceuticals, and regenerative medicine based approaches) to restore and/or rehabilitate patients with hearing loss, balance disorders, and/or tinnitus due to trauma (including TBI). Research focused on the etiology of injury including studies to support an understanding of the molecular, cellular, and physiological mechanisms underlying hearing loss, balance disorders, and tinnitus. Additional areas of interest include studies supporting the development and evaluation of objective diagnostics for hearing loss, balance disorders, and tinnitus and research identifying and addressing the biopsychosocial aspects of auditory and vestibular dysfunction (including but not limited to the impact of co-morbidities and polypharmacy).

d. Pain Management: Primary interest is in management of pain associated with traumatic or war-related injuries. The CRMRP's specific needs include development of alternatives to current opioid analgesics for severe pain management by the medic/corpsman on the battlefield/remote locations; development of strategies for management of chronic pain under the care of a clinician in non-deployed settings; identification of pain generators, development of strategies for acute pain management in deployed locations, including battlefield and resource-limited environments; development of strategies for identifying and addressing biopsychosocial aspects of pain; development of strategies for management of acute pain under the care of a clinician in non-deployed settings; development of strategies

for chronic pain management in deployed locations, including battlefield and resource-limited environments; and development of substance misuse and abuse assessments and treatments in pain management.

e. Regenerative Medicine and Composite Tissue Engineering: Regenerative medicine involves the use of innovative technologies such as scaffolds and tissue engineering, growth factors, and cell-based treatments to restore Service members who have suffered extremity injuries, craniomaxillofacial injuries, burn injuries, or genitourinary/lower abdomen injuries. Research topics of particular interest include those directed toward the use of regenerative medicine-based technologies to repair functional nerve deficits (other than central nervous system or spinal cord), repair/replace neuromuscular tissue units of the extremities or face including composite facial features (eyelids, lips, and nares), regenerate bone defects (weight bearing and alveolar), regenerate skin, address vascular repair/revascularization, regenerate cartilage/musculoskeletal connective tissues for the prevention of post-traumatic arthritis, muscle protection/regeneration, repair/replace composite tissue units composed of two or more of the above-mentioned tissues, vascularized tissue allotransplantation, immunomodulation and tolerization related to vascularized tissue allotransplantation and wound management and tissue preservation such as promotion of scarless wound healing (not to include infection control). Research topics of particular interest addressing genitourinary/lower abdomen injuries focus on pelvic reconstruction and urogenital reconstruction. Pelvic reconstruction efforts should focus on promoting technologies that address injury to the anus. Urogenital reconstruction efforts should focus on promoting technologies that address injury to genitalia (penile, scrotal, urethral tissues), perineal tissue, and bladder.

5. Medical Biological Defense Research Program

The Defense Threat Reduction Agency (DTRA) Joint Science and Technology Office for Chemical and Biological Defense (JSTO-CBD) manages research directed toward medical biological defense. The DTRA JSTO-CBD has limited funding for proposals/applications submitted through the USAMRMC BAA. DTRA also seeks proposals/applications for its requirements through the Federal Business Opportunities (FedBizOpps) and the DoD Small Business Innovation Research (SBIR) Program solicitations. For information regarding DTRA business opportunities, visit the website at http://www.dtra.mil/Business.aspx.

The Medical Biological Defense Research Program (MBDRP) provides medical countermeasures for biological warfare agents. These countermeasures include specialized medical materiel or procedures designed to enhance protection. The priorities of the program are (a) prophylaxis or pretreatment to prevent any casualty; (b) identification and diagnosis of biological agents; and (c) treatment or supportive care regimens. The MBDRP is interested in proposals/applications and products incorporating a systems biology approach. For more information, refer to Section V.E.2, Attachment 6.

Examples of some of the infectious agents of interest are those causing anthrax, plague, glanders; the Ebola, Marburg, Venezuelan, western and eastern equine encephalitis viruses; and poxvirus models of variola virus. Examples of toxins of interest include those from plants (Ricin) and bacteria (Staphylococcal enterotoxins, botulinum).

The following are the overarching research and development goals:

a. Viral, Toxin and Bacterial Studies

- Identification and characterization of organisms and toxins. Molecular antigenic analysis; development of diagnostic assays; studies on structure and function that are related to mechanism of action, binding, internalization and interaction with the immune system and neutralizing antibodies; investigation of pathogenesis and immunology that will allow decisions regarding the optimal approach to disease prevention and control. Specific long-term goals include development of physiological support methodologies, diagnostic tests, rational prevention and control strategies, and improvement of existing products.
- Vaccine development, with emphasis on protection from agents in aerosol exposure, molecular approaches for development of vaccines, measurement of relevant cellular and humoral protective immune responses, and expression or production of protective antigens using recombinant technology. Development of vaccines for specific toxins and disease agents involving the generation, selection and characterization of attenuated strains or inactivated purified antigen preparations, to include polyvalent vaccines that are more broadly effective. Safer means of passive immunization such as production of human monoclonal or modified antibodies that are despeciated are also of interest. Identification of surrogate markers of protection for the agents identified above and development of assays to assess such protection are needed.
- Development of improved methods for delivery of vaccines, including adjuvants, nucleic acid vaccines, methods for oral or nasal immunization with inactivated, live, and subunit antigens; sustained release formulations; and development of methods for delivery of antigens for specific induction of mucosal immunity and development of methods to enhance appropriate immune responses to include co-delivery of cytokines.
- Preparation of research quantities of highly purified and characterized toxins as well as studies on basic chemistry, mechanisms of action, metabolism, and excretion.

b. Drug Development: Development, synthesis, and testing of compounds that possess antiviral, antibacterial, immunomodulatory or antitoxin activities, with emphasis on compounds that provide broad, nonspecific protection against viruses, bacteria and toxins described above. Studies of their pharmacokinetics and other measurements relevant to more effective drug use are also of interest. Development of lead compound(s) that are potent, active-site inhibitors that may include combinatorial-derived organic molecules and/or rationally designed transition-state substrate analogs. Testing for potency is required. Approaches that will be considered include, but are not limited to, computational chemistry, combinatorial organic synthesis, high-throughput in vitro screening and X-ray analysis of ligand-toxin co-crystals.

Research areas of interest include:

- Discovery of novel or unique biochemical elements or compounds with antiviral, antibacterial, or antitoxin activity against biological organisms.
- Development of testing models for evaluation of compounds effective against toxins of several classes, including pre- and post-synaptic toxins, membrane-damaging toxins, and toxins that inhibit protein synthesis and others.

- Mechanism of action studies of immunomodulators, including characterization of effector cells (lymphocytes, macrophages) effector mechanisms, ancillary effects on other cells of the immune system and production and characterization of cytokines released as a consequence of immunomodulation.

c. ***Identification and Diagnosis:*** The investigation and evaluation of sensitive and specific methods of identifying and diagnosing both antigens and antibodies of viruses, bacteria, and rickettsia in biological materials. Development of sensitive and specific immunologic, chemical, or biological assays for the rapid (within minutes) and reliable (1) diagnoses of acute diseases due to agents of potential biological threat and (2) identification of toxins or their metabolites in biological samples. Assay may include antigen, antibody or metabolite detection or the use of nucleic acid probes or synthetic antigens. In addition, there is interest in the development of rapid identification and diagnostic methods for the assay of toxins, metabolites and analogs in clinical specimens.

d. ***Biosurveillance (BSV):*** The process of gathering, integrating, analyzing and communicating a range of information that relates to health threats for people, animals, and plants to help inform decisions and provide for increased global health security. The Joint Biosurveillance Common Framework (JBCF) will be the first materiel solution and provides a single enterprise environment that supports collaboration, data sharing and coordination between multiple BSV stakeholders. The JBCF and future BSV applications, tools, and devices will provide a conduit between the medical, physical, and operational communities. This topic includes:

- Algorithms for rapid identification of baseline deviation; novel/unknown pathogens, naturally occurring versus intentional release.
- Models to predict the likelihood of an outbreak, forecast the associated epidemic curves and impacts of interventions, and update forecast based on field (and simulated) data.
- Applications to engage citizens via social media, crowd sourcing, gaming, etc.

In addition, two specific topics currently of interest are:

- Next-generation analytic capabilities for BSV: The objective is to develop next-generation methodologies to enhance analytic capabilities in the detect-identify-respond timeline for a bioevent. Research should be exploratory, with low technology readiness level, and should address long-term challenges in threat surveillance. Efforts should significantly contribute to the current body of knowledge and lead to new concepts for technology application that may have impact on future BSV analytic capabilities.
- Biosurveillance Ecosystem (BSVE) Analytics 2.0: The objective is to ensure state-of-the-art technologies are made rapidly accessible through the BSVE. This topic seeks to develop analytic applications to synthesize and interrogate multiple sources of data to provide high confidence in the prediction, early warning and forecasting (inclusive of mitigation strategies) of disease events. Metrics shall be devised such that successful utilization of these analytic tools will result in a measureable impact on the bioevent timeline. Efforts in this area should result in flexible, extensible, and sustainable analytics and models that are designed to plug into the BSVE as a la carte services rather than as standalone capabilities.

6. Medical Chemical Defense Research Program

The DTRA JSTO-CBD manages research directed toward medical chemical defense. The DTRA JSTO-CBD has limited funding for proposals/applications submitted through the USAMRMC BAA. DTRA also seeks proposals/applications for its requirements through the Federal Business Opportunities (FedBizOpps) and the DoD Small Business Innovation Research (SBIR) Program solicitations. For information regarding DTRA business opportunities, visit its website at http://www.dtra.mil/Business.aspx.

The Medical Chemical Defense Research Program (MCDRP) seeks to preserve combat effectiveness by timely provision of medical countermeasures in response to Joint Service chemical warfare defense requirements. The fundamental orientation of the program is to protect U.S. forces from the effects of chemical warfare agents by developing protective, pretreatment, and prophylactic products, providing products usable by the individual Service Member for immediate treatment of chemical warfare agent exposures, developing antidotes/therapeutics to chemical warfare agents, defining care procedures for chemical warfare agent casualties, and advancing management of these casualties. The medical countermeasures are intended to preserve and sustain the Service members' combat effectiveness in the face of combined threats from chemical and conventional munitions on the integrated battlefield. The MCDRP is interested in proposals/applications and products incorporating a systems biology approach. For more information, refer to Section V.E.2, Attachment 6.

The broad goals of this program are described below:

a. Maintain the technologic capability to meet present requirements and counter future chemical warfare agent threats: The program will maintain the scientific base and technological capability to develop timely medical countermeasures for both current and future chemical warfare agent threats. Research funded by this program will be used to identify concepts and candidate medical countermeasures for use by the individual Service member or by medical personnel. Basic and applied research are both supported and may address topics as diverse as determining sites/mechanisms of action and effects of exposure to chemical warfare agents with emphasis on exploitation of neuroscience technology, and respiratory, ocular, and dermal pathophysiology; identifying sites and biochemical mechanisms of action of medical countermeasures; exploiting molecular biological and biotechnological approaches for development of new approaches for medical countermeasures to chemical warfare agents; and exploiting molecular modeling and quantitative structure-activity relationships in support of drug discovery and design.

b. Provide medical countermeasures for the individual Service member to maintain combat effectiveness and prevent or reduce injury from chemical warfare agents: This goal encompasses research supporting development of new concepts for prophylaxes, pretreatments, antidotes, and therapeutic countermeasures; development of skin protectants and decontaminants; identification of factors which influence safety and efficacy of candidate medical countermeasures; and development and maintenance of preformulation, formulation, and radiolabeling capabilities.

c. Provide medical management of chemical casualties to enhance survival and expedite the RTD of chemical warfare agent casualties through definitive therapies and life support technologies: This goal includes developing concepts and therapeutic regimens and procedures for the management of chemical warfare agent casualties; developing diagnostic and prognostic indicators for chemical warfare agent casualties; and developing life-support equipment for definitive care of chemical warfare agent casualties.

Recent changes in the security situation facing the U.S. have not materially reduced the threat that chemical weapons present to American forces in the field. Many Third World countries and terrorist groups have the capability of producing and delivering chemical warfare agents, thus posing a substantial and serious threat to the armed forces of the U.S.

Classical chemical agent threat categories include vesicant or blister agents (e.g., sulfur mustard), blood agents (e.g., cyanide), respiratory agents (e.g., phosgene), and nerve agents (e.g., GA or Tabun, GB or Sarin, GD or Soman, and VX).

Examples of pertinent research topics and areas currently of interest include:

- Characterizing the mechanisms of vesicant agent pathophysiology to identify medical countermeasures against vesicant agents.
- Developing innovative models of the pathophysiology of vesicant agent injury.
- Identifying and/or evaluating innovative candidate medical countermeasures against vesicant agents.
- Identifying, exploring, and developing innovative clinical diagnostic, prognostic, and management approaches to vesicant agent casualties.
- Characterizing the ocular lesions associated with vesicant agent exposures; developing treatments to ameliorate these injuries.
- Characterizing the mechanisms of nerve agent-induced seizures and resulting pathophysiology to identify medical countermeasures against nerve agent-induced seizures.
- Identifying, synthesizing, and/or evaluating innovative candidate medical countermeasures against nerve agent-induced seizures.
- Developing innovative models of the pathophysiology of nerve agent induced seizures.
- Developing catalytic and/or stoichiometric chemical warfare agent scavengers from biological molecules (e.g., antibodies and enzymes) that provide protection against nerve agent incapacitation and lethality for extended periods following their administration.
- Developing innovative models for evaluation of chemical warfare agent scavengers.
- Identifying, expressing, synthesizing, and/or evaluating biotechnologically derived or pharmaceutically based scavengers as candidate medical countermeasures against chemical warfare agents.

- Developing and evaluating custom-synthesized pharmaceuticals based on a detailed understanding of the pathophysiology and mechanisms of action of the chemical warfare agent structure and the function of the intended target molecule.
- Developing catalytic and/or stoichiometric additives for use in skin protectants, or decontaminants, to protect against chemical warfare agents, especially vesicant and nerve agents.
- Developing innovative models for evaluation of catalytic and/or stoichiometric additives in skin protectants or decontaminants.
- Developing candidate formulations for skin protectants or decontaminants containing catalytic and/or stoichiometric additives and evaluating these formulations against chemical warfare agents.
- Characterizing the pathophysiology and natural progression of chemical warfare agent-induced damage to human tissues.
- Developing and validating innovative techniques for rapid and accurate analysis of human tissues and body fluids for detection of chemical warfare agent exposures.
- Characterizing the effects of long-term or chronic exposures to chemical warfare agents and/or medical countermeasures to these agents.
- Identifying, exploring, and developing innovative clinical diagnostic, prognostic and management approaches to nerve agent casualties.
- Developing and validating field usable procedures for diagnosis, prognosis, and treatment of chemical warfare agent casualties under both field and laboratory conditions.

7. Medical Simulation and Information Sciences Research Program

The mission of the Medical Simulation and Information Sciences Research Program (MSIS) is to explore the implications of models and technology for medical education and for the provision, management and support of health services in the military. The MSIS research program plans, coordinates, and oversees a responsive world-class, tri-service science and technology program focused on two areas of research. One area is focused on improving military medical training through medical modeling, simulation, educational gaming, assessment systems, and objective training metrics. The second area is focused on improving the use and sharing of health-related data for better strategic planning, process development, and software applications. It is organized into two portfolios, one for each of the two focus areas. Each portfolio is further organized into sub-focus areas as described below:

a. The Medical Modeling Simulation and Training Technologies Portfolio

- **Combat Casualty Training Initiative:** This initiative strives to advance pre-hospital combat casualty training with an emphasis on the combat first responder. Research in this area will examine the efficacy of modern simulation system technology versus current models as well as validation of system and training metrics/evaluation outcomes. Improvement of tissue fidelity, whether as it applies to mannequins or virtual reality, and accurate and appropriate tissue response to health care provider actions is another area of interest. The effort includes research and develops training assets for continual high state

of readiness and provides stress training prior to deployment to reduce/mitigate (inoculate) effects of anticipated stressors. Goals include:

- Optimization of critical lifesaving skills and procedures through training and educational simulation systems.
- Improved assessment systems of user's cognition, psychomotor skills, and affective behavior before, during, and after (retention) training.
- Emphasizing approaches toward "anytime readiness" in a near-future era of reduced deployment.
- Building psychological resilience into pre-deployment training.
- Significant improvements in material properties representing tissue as well as models that represent tissues in virtual reality.

- **Medical Practice Initiative:** This initiative focuses on the maintenance of military and medical skills over a medical provider's health care career. Research efforts are aligned with maximizing health care professionals' training and investigating degradation of existing medical cognitive and psychomotor skills. The initiative seeks to research improved intelligent automated assessment systems that will assist in directing and catering the type of training courses an individual needs as well as systems that connect medical training to real-world patient outcomes. The initiative will lead to further research and development in team-based cooperative training methods, patient transfer points and efforts related to evidence-based clinical skills with clear, definitive outcomes. Goals include:
  - Leveraging and creating training technology advances to keep U.S. military medicine on top.
  - Understanding acquisition of skills to achieve competency and proficiency and how to best maintain them.
  - Pioneering automated adaptive learning to tailor training to health care providers' needs.
  - Leading the way to a sustainable medical education lifecycle.
- **Health-Focused Initiative:** This initiative seeks to develop and test self-care technologies for patients use, whenever and wherever they choose to manage personal health and wellness. The Health-Focused Initiative is aimed at promoting patient engagement and resilience; this research will deliver technologies that improve the human-machine interface and bridge the gap between patients and clinicians. The focus is on advanced medical technologies research targeting the management of acute and chronic health challenges and technologies that encourage health promoting behaviors at home and in theater. Goals include:
  - Researching innovative learning and behavioral concepts that incorporate technologies to maximize compliance regardless if physical, medical, and/or psychological (behavioral) rehabilitation/recovery.

- Researching and applying social media and large database mining information along with effective and efficient learning theories to educate both individual and/or group with processing and decision making during acute, emergent, and catastrophic events.
- Emphasizing innovative learning and behavior concepts to educate individuals on healthy choices to potentially prevent medical conditions and encourages health promoting behaviors at home and in theater.

- **Tools for Medical Education:** This initiative assists in developing and testing trans-disciplinary open-source/open-licensed development toolkits and models that are accessible to the community at large, allowing developers to focus on content generation rather than on developing basic technology. This reduces content development costs and encourages a more diverse authorship community. Widely accepted standardization will enable instructors to greatly increase the available training opportunities at reduced cost. The intent is to shift the focus from developing basic medical training technology to generating evidence-based training content in order to improve patient safety, maximize system and organization-level return on investment, increase available training opportunities, and minimize training. Goals include:
  - Ensuring that advanced medical simulation capabilities are ubiquitous.
  - Researching effective, efficient, elegant, accurate, appropriate, and robust medical models (anatomical, physiological, and/or behaviorally) for next-generation mannequin prototyping and virtual reality/immersive reality models.
  - Democratizing access to advanced medical simulator technology so that it can be used by large and small innovators alike.
  - Saving money by eliminating wasteful and redundant research and development.

b. The Health Informatics and Health Information Technology Portfolio

- **Theater/Operational Health Services and Support:** Research in Theater/Operational Health Services and Support provides services to the armed forces to promote, improve, conserve, and restore the mental or physical well-being of personnel through improved information management and the use of emerging technologies in the following categories:
  - Medical Command and Control: Enable commanders to more efficiently and effectively manage medical information and medical workflows.
  - Medical Logistics and Blood Management: Explore transformational technologies to improve core logistics systems, e.g., information systems, automatic identification technologies, medical materiel management to include blood, oxygen, or other materiel with special environmental handling requirements.
  - Health Information Capture, Documentation, and Transmission to Include Biomonitoring and Telehealth/Mobile Health: Improve the capturing of physiologic data and care documentation from Role 1 through Role 3 and the transmission of that data to support patient care and evacuation, improve technology platforms for better physiologic monitoring during evacuation including enhancements to predictive algorithms and enhanced biosensory monitoring and communicative capabilities to

support the delivery of remote care and consultation across theater and garrison environments. Research to determine and prototype optimal information technology capabilities to support the provision of telehealth/telebehavioral health within theater and between theater and Role 4 facilities to include provider-to-provider as well as provider-to-patient interactions. Research to examine technology integration and clinical/business process integration to reduce implementation barriers with regard to remote health monitoring.

- Surgical Analytics Strategy Tactical Tools: Research into business analytics, modeling and decision support, and tools to examine population health forecasting and readiness management in military surgery.
- Global Health/Support Operations: Improved technologies to provide assistance during natural or manmade disasters worldwide. Research to determine and prototype optimal Information technology capabilities to support global humanitarian assistance health care missions in response to natural or manmade disasters.

- **Health Operations Resourcing:** Research to improve financial and personnel management for better delivery of health care services.
  - Training Management: Explore technologies to streamline the access to and management of educational systems across the Military Health System (MHS).
  - Provision of Training: Conduct research to explore the use of health informatics or information technology (HIT) in the provision of training.
- **Health Services and Population Health:** Research into how health care providers and patients can better use health services and population health-related information and technologies to improve health:
  - Clinical Decision Support: Improve systems or applications that will better assist health professionals in making clinical decisions.
  - Provide Unified View: Provide a user view of information that is comprehensive of the patient record with the ability to exclude certain sensitive information for specific users when necessary (e.g., mental health record information).
  - Computational Biology and Advanced Analytics: Focus on the development and application of methods for analysis, interpretation, prediction, and modeling of biological data. The objective is to use mathematical tools to extract practical information from data produced by high-throughput biological techniques. For more information, refer to Section V.E.2, Attachment 6.
- **Health Enterprise Infrastructure:** Research to improve health enterprise infrastructure by improving information technology and communications infrastructure.
  - System Interoperability: Research into system interfaces that will ensure that products or systems work efficiently with other products or systems, present or future, without any unintended restrictions.
  - Information Interoperability: Research to move toward a common data format capable of exchanging data seamlessly within the MHS and with external organizations.

- Medical Device Interoperability: Improve the ability for medical devices to securely and reliably exchange information with other devices and with medical documentation and management systems.
- Reliable Patient/Beneficiary Identification: Research to ensure the unique identification of each patient to support safe and efficient patient/beneficiary care and management.
- Data Management: Research to provide real-time access to data from sources in multiple, disparate physical locations and aggregation as necessary to facilitate crawling, indexing, security, identity, authentication, authorization, and privacy. Research to support making Milestone D decisions on legacy systems to include research to explore the mandatory data requirements (including legal or regulatory mandates) related to these decisions and to prototype alternative technical approaches.
  - Research to define the optimal transition model that enables write-back to Armed Forces Health Longitudinal Application (AHLTA), Composite Health Care System (CHCS), and Essentris as necessary but allows easy access to and search of past medical records, is legal (nonrepudiation), and realistically accommodates projected growth from initial operational capability to full operational capability.
  - Research to define the optimal approach to transitioning necessary encounter/clinical notes from AHLTA along and map the concepts for use in the modernized system for clinical care and research.
  - Research to define the optimal set of any other capabilities/data necessary for transition to support clinical analytics, research, and archiving.
  - Research to aid in determining alternative strategies for transitioning current MHS registries and to evaluate alternatives approaches through prototyping where useful.
  - Research to prototype and develop proofs of concepts prior to implementing production capabilities related to large volume terminology mapping using extract, transform, and load approaches in the Big Data Ecosystem.
  - Research to explore the optimal approach to the ability to persist data that are acquired through the legacy health information exchange.

8. Radiation Health Effects Research Program

The Radiation Health Effects Research Program (RHERP) focuses on developing medical countermeasures for acute ionizing radiation injury. The program has interest in the following research focus areas: post-exposure mitigation of radiation injury; protection and prevention of injury from ionizing radiation exposure (prophylaxis); mechanism of radiation injury; and development of novel biodosimetry tools. The RHERP is interested in proposals/applications and products incorporating a systems biology approach. For more information, refer to Section V.E.2, Attachment 6.

9. Special Investment Areas/Innovation Funding

The USAMRMC is continually seeking new and innovative science that promises benefit to military health and medicine. Many efforts are now integrated into programs of record or current research areas of interest as noted in this BAA. The USAMRMC initiatives of interest include, but are not limited to, cross-cutting new science and technologies that may not have an apparent place elsewhere in this announcement, non-hypothesis driven research, development of enabling technologies, and new uses of current science that have not been considered in the past for a given application. A part of the investment process involves activist management that encourages Service Member-centered projects that can be eventually integrated into the current research area taxonomy.

Innovation Funds may be available to support proposals/applications that offer proof of concept, prototype development, and other activities that initiate or enhance potentially "game-changing" technologies and systems. Innovation funds generally range from $100,000 to $500,000 per project and are for a limited period of performance, generally 18 months or less. Innovation Funding requests may include out-years, but these must be expressed as options to the government. Proposals/applications must be written in such a way as to ensure a valuable deliverable after the first period of performance; multi-year longitudinal plans with incremental deliverables do not fit the Innovation Funds paradigm and should be submitted as a standard BAA submission, consistent with guidance elsewhere in this BAA.

Examples include approaches based upon convergence science principles and may address investment areas such as:

a. Medical Logistics: The objective is to research potentially transformational technologies to apply to core logistics systems, focusing on devices, practices, and business processes that will improve military medical logistics. Research priorities include information systems and the application of automatic identification technologies to the management of medical materiel. This will include supply chain management and asset management (inventory and lifecycle management), business processes, and technologies. Technologies to support improved delivery of critical medical supplies including blood, oxygen, intravenous fluids, biologics, and other medical materiel that has specific environmental handling requirements and limitations, as well as medical assemblages to the battlefield are of interest. Improvements in the storage of these commodities in the austere environment are also of interest.

Innovations that improve and support optical fabrication, hospital services, facilities, and biomedical management and repair will be considered. Special attention may be given to the extension of advanced and transformational technologies to support the operational/deployed force. Areas of special interest include cold chain management in extreme conditions and the safe destruction/ management of medical, biological, and pharmaceutical waste in austere environments. The ability to treat and potentially recycle/reuse waste water (both gray water and black water) that may contain medical (biological) and/or chemical (pharmaceutical) contaminants may be included in this area of special interest.

b. Biomonitoring Technologies: Research focus is on the development and integration of systems and/or platforms of technologies that will enable (remote and wireless) monitoring of a person's health to include assessing environmental factors in any setting including at home, in hospital, or in the field. This also includes development of algorithms and decision support tools.

c. Cross-Cutting Technologies in Neuroscience: Research in this area includes training, treatment, prevention, protection, assessment, and diagnosis, using a variety of methodologies, techniques, materials, and technologies. Efforts in this area may fall in the following categories: brain-machine interfaces, neurodegenerative conditions, and neuroimaging.

d. Medical Robotics and Intelligent Systems: Objectives target adapting, integrating, and/or developing intelligent systems, human computer interfaces, and robotic technologies for medical applications. These include, but are not limited to, capabilities for location, assessment, treatment, and rescue of battlefield casualties and development and integration of clinical robotic/intelligent system capabilities to improve patient medical outcomes. These technologies are also enablers for other scientific and technology domains such as advanced prosthetics and human performance, trauma, health information technology, simulation and training, medical logistics, and nanomedicine and biomaterials.

e. Nanomedicine and Biomaterials: The objective is to identify novel developments in materials science and biomaterials that can lead to new drugs and improved devices for diagnosing diseases and treatments. This includes nanotechnology and material fabrication with properties that mimic biological tissues.

B. Research and Development of Devices or Technologies

The USAMRMC may provide financial support for research and development related to medical devices or technologies. Such projects should be for scientific study and experimentation directed toward advancing the state of the art or increasing knowledge or understanding rather than focusing on a specific system or hardware solution (see FAR 6.102). Additional information is required for such projects as indicated below:

- Discussion of the technical feasibility of the proposed project including background of the problem, theoretical model/approach, previous and current solutions, an awareness of similar projects previously undertaken, and knowledge of related activities.
- Discussion of the engineering/technical design to achieve the project goals demonstrating the feasibility of the proposed product development. Discussion of the perceived engineering/design strengths and flaws and recommendations for overcoming/preventing them.
- Discussion of the background intellectual property relevant to the project.
- Discussion of the plans for translation, implementation, and/or commercialization for the device or technology.

III. AWARD INFORMATION

A. Funds Available and Anticipated Number of Awards

A specific amount of funding has NOT been set aside for this BAA, and the number of awards is indeterminate and contingent upon funding availability. Selection of research projects is a highly competitive process and is based on the evaluation of the proposal/application's technical merit, programmatic considerations, and the availability of funds. The quantity of meaningful submissions received (both pre-proposals/pre-applications and full proposals/applications) normally exceeds the number of awards that the available funding can support. Any funding that is received by the USAMRMC and is appropriate for a research area described within this BAA may be utilized to fund proposals/applications.

B. Award Amounts and Periods of Performance

There are no specified funding limitations identified for a proposal/application submitted under this BAA, except for the "Special Investment Areas/Innovation Funding" area of interest. Funding for those projects generally ranges from $100,000 - $500,000 per project. A budget should be commensurate with the nature and complexity of the proposed research. Researchers should submit budgets that include the entire period of performance of the research project. Budgets should include all direct and indirect costs, based on supportable, verifiable estimates. The budget for the full proposal/application should not differ significantly from the Pre-Proposal/Pre-Application Budget Summary Form provided in the pre-proposal/pre-application submission.

The total period of performance may be up to 5 years in length, except for the "Special Investment Areas/Innovation Funding" area of interest. Periods of performance for those projects generally are 18 months or less; option periods may be proposed for out-years. Because the nature and scope of each proposed research project will vary, it is anticipated that the size and duration of each award will vary. Start dates will vary depending upon when proposals/applications were submitted and reviewed and the negotiation process. However, no proposal/application submitted under this BAA will be considered for funding after 24 months from the date of submission to Grants.gov.

PIs seeking additional or continuation funding must submit new pre-proposals/pre-applications and be invited to submit full proposals/applications.

See the General Submission Instructions, Section II.C.5., for additional information regarding the research and related budget.

C. Mechanisms of Support

The USAMRMC executes its extramural research program primarily through the award of contracts and assistance agreements (grants and cooperative agreements). The type of instrument used to reflect the business relationship between the organization and the government will be a matter of negotiation prior to award.

The USAMRAA will negotiate the award types for proposals/applications selected for funding. The Federal Grant and Cooperative Agreement Act of 1977, 31 USC[4] 6301-6308, provides the legal criteria to select a procurement contract or an assistance agreement. Refer to the General Submission Instructions, Appendix 3, for additional information.

IV. ELIGIBILITY INFORMATION

A. Eligible Applicants

Awards are made to organizations only. Organizations eligible to apply include national, international, for-profit, non-profit, public, and private organizations. Refer to the General Submission Instructions, Appendix 1, for general eligibility information.

NOTE: In accordance with FAR 35.017, Federally Funded Research and Development Centers (FFRDCs) are not eligible to directly receive awards under this BAA. However, teaming arrangements between FFRDCs and eligible organizations are allowed so long as they are permitted under the sponsoring agreement between the federal government and the specific FFRDC.

The USAMRMC is committed to supporting small businesses. Small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and woman-owned small business concerns must be given the maximum practical opportunity to participate through subawards on research proposals/applications submitted through the BAA.

B. Eligible Investigators

Eligible investigators include all individuals, regardless of ethnicity, nationality, or citizenship status, who are employed by, or affiliated with, an eligible organization.

Investigators are cautioned that awards are made to organizations, not individuals.

C. Cost Sharing or Matching is not required under this announcement.

D. Other Review Information

The following information will be reviewed prior to the award of a contract or assistance agreement:

1. "Exclusions" Identified in SAM

To protect the public interest, the federal government ensures the integrity of federal programs by striving to conduct business only with responsible organizations. The USAMRMC uses the "Exclusions" within the Performance Information functional area of the System for Award Management (SAM); data from the Federal Awardee Performance and Integrity Information System, a component within SAM, is used to verify that an organization is eligible to receive

[4] United States Code

federal awards. More information about the "Exclusions" reported in SAM is available at https://www.sam.gov/. Refer to the General Submission Instructions, Section II.A., for additional information.

2. Conflicts of Interest

All conflicts of interest (COIs) or potential COIs must be disclosed with the proposal/application submission, along with a plan to resolve them. All COIs on the part of an organization or individual investigators that could bias the research project must be resolved prior to the award of a contract or assistance agreement. Refer to the General Submission Instructions, Appendix 1, for additional information.

3. Review of Risk

The following areas may be reviewed in evaluating the risk posed by the an applicant: Financial stability; quality of management systems and operational controls; history of performance; reports and findings from audits; ability to effectively implement statutory, regulatory, or other requirements imposed on non-federal entities; degree of institutional support; integrity; adequacy of facilities; and conformance with safety and environmental statutes and regulations.

4. Subcontracting Plan

If the resultant award is a contract that exceeds $650,000 and the offeror is a large business or an institution of higher education (other than Historically Black Colleges and Universities/Minority Institutions), the contractor will be required to submit a subcontracting plan for small business and small disadvantaged business concerns, in accordance with FAR 19.7. A mutually agreeable plan will be incorporated as part of the resultant contract.

V. PROPOSAL/APPLICATION SUBMISSION INFORMATION

A. Where to Obtain the Submission Package

To obtain the complete Grants.gov proposal/application package (hereinafter, submission package), including all required forms, perform a Grants.gov (http://www.grants.gov/) basic search using the Funding Opportunity Number **W81XWH-BAA-15-1**.

Submission is a two-step process requiring both: (1) Pre-proposal/pre-application submission through eBRAP (https://eBRAP.org/); and (2) full proposal/application submission through Grants.gov (http://www.grants.gov/).

B. Pre-Proposal/Pre-Application Submission and Content

Submission of a pre-proposal/pre-application is required and must be submitted through eBRAP (https://eBRAP.org/). If the USAMRMC is interested in receiving a full proposal/application, the PI will be sent an invitation to submit via eBRAP.

Because the invitation to submit a proposal/application is based on the contents of the pre-proposal/pre-application, a PI should not change the title or research objectives after the pre-proposal/pre-application is submitted. A PI and organization identified in the pre-proposal/pre-

application should be the same as those intended for the full proposal/application submission. If any changes are necessary after submission of the pre-proposal/pre-application, the PI must contact the CDMRP Help Desk at help@eBRAP.org or 301-682-5507. A change in PI or organization after submission of the pre-proposal/pre-application will be allowed only at the discretion of the USAMRAA Contracting or Grants Officer.

The organization, Business Official, and PI must register in eBRAP before submitting a pre-proposal/pre-application. Upon completion of an organization's registration in eBRAP and approval by the CDMRP Help Desk, the organization name will be displayed in eBRAP to assist the organization's Business Officials and PIs as they register. The organization, Business Officials, and PIs must all be registered and affiliated in eBRAP. (See *eBRAP User Guide* at *https://ebrap.org/eBRAP/public/UserGuide.pdf*.)

Pre-proposals/pre-applications may be submitted at any time prior to the BAA closing date. Pre-proposals/pre-applications should describe specific ideas or projects that pertain to any of the areas described under "Program Description" in this BAA. A pre-proposal/pre-application must include a brief description of the scientific methods and design to address the problem as described below. Brochures or other descriptions of general organizational or individual capabilities will not be accepted as a pre-proposal/pre-application. ***DO NOT include any proprietary information in the pre-proposal/pre-application.***

The pre-proposal/pre-application consists of the following components, which are organized in eBRAP by separate tabs. Refer to the General Submission Instructions, Section II.B., for additional information on pre-proposal/pre-application submission.

- **Tab 1 – Application Information:** Enter the information as described in eBRAP before continuing the pre-proposal/pre-application.

- **Tab 2 – Application Contact:** Enter contact information for the PI and the organization's Business Official responsible for sponsored program administration (or equivalent). This is the individual listed as "person to be contacted on matters involving this application" in Block 5 of the Grants.gov SF424 form. The Business Official must either be named or invited in order for the pre-proposal/pre-application to be submitted. If the organization's Business Official is not in eBRAP, an invitation to the Business Official to register in eBRAP must be sent. In addition, it is recommended that the PI identify an Alternate Submitter in the event that assistance with pre-proposal/pre-application submission is needed.

  NOTE: The eBRAP system does not require an approval of the pre-proposal/pre-application by the PI's organization.

- **Tab 3 – Collaborators and Conflicts of Interest (COI):** To enable the USAMRMC to avoid COIs during the screening and review processes, list the names of all scientific participants in the proposed research project, including co-investigators, mentors, collaborators, consultants, and subrecipients/subawardees.

  Federal agency personnel involved in the review process and/or with making funding recommendations are prohibited from being involved in the research proposed or

assisting in any pre-proposal/pre-application, including, but not limited to, concept design, application development, budget preparation, and the development of any supporting documentation. ***If formal collaboration with Military Facility personnel is planned (i.e., included in the proposal/application in performance of the research), this prohibition is not applicable. However, these Military Facility personnel cannot be involved in the review process and/or with making funding recommendations.***

Refer to the General Submission Instructions, Appendix 1, for additional information. For questions related to COIs, contact the CDMRP Help Desk at help@eBRAP.org or 301-682-5507.

- **Tab 4 – Required Files**

  NOTE: Figures, charts, graphs or other additional material will not be accepted during the pre-proposal/pre-application process.

  Provide responses in the appropriate data fields for the following in eBRAP. Fields cannot be blank. eBRAP will truncate characters exceeding the limit specified for each data field. Enter "none" if there is no information to be included.

  - Problem to Be Studied (4,000 character limit, including spaces).
  - Theoretical Rationale, Scientific Methods, and Design (4,000 character limit, including spaces).
  - Significance and/or Uniqueness of the Proposed Effort (4,000 character limit, including spaces).
  - Military Relevance and Impact (4,000 character limit, including spaces).
  - Brief Description of Animal and/or Human Use (4,000 character limit, including spaces).
  - Plans and Strategy for Translation, Implementation, and/or Commercialization (4,000 character limit, including spaces).

  Upload document(s) as individual PDF files. eBRAP will not allow a document to be uploaded in the Required Files tab if the number of pages exceeds the limits specified below.

  - Budget Summary: Upload as "BudgetSummary.pdf." – Complete the two-page Budget Summary Form (available for download in eBRAP) as instructed.
  - PI and Key Personnel Biographical Sketches (five-page limit per individual): Bold or highlight publications relevant to the proposed project.

  Refer to the General Submission Instructions, Section II.C.4., for detailed information.

- **Tab 5 – Submit Pre-Application:** This tab must be completed for the pre-proposal/pre-application to be accepted and processed.

C. Notification of Pre-Proposal/Pre-Application Screening Results

The USAMRMC scientists or outside experts will screen pre-proposals/pre-applications for technical merit and programmatic considerations. Based on the screening of the pre-proposal/pre-application, a PI may be invited to submit a full proposal/application.

Following the pre-proposal/pre-application screening, PIs will be notified as to whether or not they are invited to submit full proposals/applications; however, they will not receive feedback (e.g., a critique of strengths and weaknesses) on their pre-proposals/pre-applications. Within 120 days of submission, PIs should receive email notification via eBRAP regarding disposition of their pre-proposals/pre-applications.

D. Full Proposal/Application Submission Content and Forms

A proposal/application will not be accepted unless the PI has received an invitation to submit.

If the USAMRMC is interested in receiving a full proposal/application, the PI will receive an invitation to submit via email from eBRAP. An invited full proposal/application must be submitted through Grants.gov (http://www.grants.gov/). It should be submitted within 90 days of the PI's receipt of an invitation to submit. Agency receipt of a full proposal/application will be acknowledged by an email sent to the PI via eBRAP. The proposal/application log number for the full proposal/application will be the same number as used for the pre-proposal/pre-application, e.g., BA15xxxx.

The organization and PI will have registered in eBRAP during the pre-proposal/pre-application stage. This will permit an organization's representatives and PIs to be able to view and modify Grants.gov proposal/application submissions associated with them, but only if the organization, Business Officials, and PIs are registered and affiliated in eBRAP.

Proposal/Application viewing, modification, and verification in eBRAP are strongly recommended, but not required. Modification of proposal/application components is permitted at any time ***within 5 calendar days of proposal/application submission to Grants.gov, i.e., the verification period.*** If modification and/or verification are not completed by the end the verification period, the proposal/application will be reviewed as submitted through Grants.gov, provided there is no cause for administrative rejection of the proposal/application (Section VII.A., Rejection).

Each proposal/application submission must include the completed submission package of forms and attachments provided in Grants.gov for this BAA. The submission package is to be submitted by the Authorized Organizational Representative through the Grants.gov portal (http://www.grants.gov/). Refer to the General Submission Instructions, Section II, for submission information.

Proprietary information should ***only be included if necessary*** for evaluation of the proposal/application. Conspicuously and legibly mark any proprietary information that is included in the proposal/application.

The PI should receive disposition regarding the proposal/application via an email from eBRAP within 180 days of submission.

E. Grants.gov Proposal/Application Package Components

The Grants.gov submission package includes the following components (refer to the General Submission Instructions, Section II.C., for additional information on proposal/application submission):

1. **SF 424 (R&R) Application for Federal Assistance Form:** Refer to the General Submission Instructions, Section II.C., for detailed information.

2. **Attachments Form**

- **Attachment 1: Project Narrative (20-page limit)**: Upload as "ProjectNarrative.pdf." – There is no form for this information. The attachments must be in PDF in accordance with the formatting guidelines specified for full proposal/application preparation.

  A detailed description of the research to be undertaken should be submitted. This should include the areas provided below, and address their relationship to the state of knowledge in the field and to comparable work in progress elsewhere. Evaluation of the proposed research will be influenced by the adequacy of this information. Literature references and curriculum vitae will be shown in separate addenda entries.

  The following general outline should be followed:

  - **Background:** Provide a brief statement of ideas and theoretical reasoning behind the proposed study. Describe previous experience most pertinent to this proposal/application. Cite relevant literature references. Include discussion of any findings (if available) from relevant pilot or preliminary work or any related work underway. For development of devices and technologies, provide an intellectual property plan as part of the supporting documentation.
  - **Hypothesis:** State the hypothesis to be tested and the expected results. For development of devices and technologies, discuss the technical feasibility of the proposed project including background of the problem, previous and current solutions, similar projects previously undertaken, and related development activities.
  - **Technical Objectives:** State concisely the question to be answered by each research objective.
  - **Project Milestones:** Identify timelines for critical events that must be accomplished in order for the project to be successful in terms of cost, schedule, and performance. For development of devices and technologies, discuss the timelines and provide a commercial strategy plan for the technology being developed.

- **Military Significance:** State precisely the estimates as to the immediate and/or long-range usefulness of this study to the Armed Forces, as distinguished from general advancement of knowledge in medicine.
- **Public Purpose**. If appropriate, provide a concise, detailed description of how this research project will benefit the general public.
- **Methods:** Give details about the experimental design and methodology. If the methodology is new or unusual, describe in sufficient detail for evaluation. For synthetic chemistry proposal/applications, include a clear statement of the rationale for the proposed syntheses. Outline and document the routes to the syntheses. For development of devices and technologies, discuss the engineering/technical design to achieve the project goals demonstrating the feasibility of the proposed product development. Discuss the perceived engineering/design strengths and flaws and recommendations for overcoming/preventing them. For studies involving human subjects, describe recruitment plan and access to populations. The proposal/application should describe a plan for data access. (Access to subjects and data is the sole responsibility of the investigator.) As relevant, describe plans for addressing issues unique to working with military populations.
- **Additional Information:** If human and/or animal subjects are included in the research, proposals/applications may be submitted without human and/or animal use protocols and institutional approvals. However, protocols with required institutional approvals must be submitted no later than 60 days after award to demonstrate continued progress and ensure continuation of payment. The Contracting or Grants Officer may make exceptions in situations where human and/or animal use are not expected to begin until after the first year of the research project. In such cases, a timeframe for submission of the appropriate protocols and institutional approvals will be established prior to award.

  PIs and collaborating organizations may not use, employ, or subcontract for the use of any human participants, including the use of human anatomical substances, human data, and/or human cadavers, or laboratory animals until applicable regulatory documents are approved by the USAMRMC to ensure that DoD regulations have been met.

  - For studies with prospective accrual of human subjects, indicate quarterly enrollment targets.
  - Identify cell line(s) and commercial or organizational source(s) to be used. If human anatomical substances (including cell lines) will be used, specify whether or not identifiable information is accessible to the research team by any means.
  - If applicable, indicate time required for submission and/or approval of documents (e.g., Investigational New Drug and Investigational Device Exemption) to the U.S. Food and Drug Administration or appropriate government agency.

- For studies involving human subjects, allow at least 2 to 3 months for regulatory review and approval by the USAMRMC Human Research Protection Office (HRPO); this does not include the additional time required for local Institutional Review Board (IRB) review and approval.
- For animal studies, allow at least 2 to 3 months for regulatory review and approval by the USAMRMC Animal Care and Use Review Office (ACURO); this does not include the additional time required for local Institutional Animal Care and Use Committee (IACUC) review and approval.
- Refer to the General Submission Instructions, Appendix 5, for additional regulatory information.

- **Attachment 2: Supporting Documentation:** Start each document on a new page. Combine and upload as a single file named "Support.pdf." If documents are scanned to pdf, the lowest resolution (100 to 150 dpi) should be used. ***There are no page limits for any of these components unless otherwise noted.***
  - **Bibliography & References Cited:** List the references in the order they appear in the proposal/application narrative. Use a reference format that gives the title of the citation. Do not send or attach copies of articles in print. There is no form for this information. The attachments should be in PDF in accordance with the formatting guidelines specified for full proposal/application preparation.
  - **List of Abbreviations, Acronyms, and Symbols:** Provide a list of abbreviations, acronyms, and symbols.
  - **Facilities and Other Resources:** Describe the facilities available for performance of the proposed request and any additional resources proposed for acquisition at no cost to the USAMRMC. Indicate if a government-owned facility is proposed for use. Reference should be made to the original or present award under which the facilities or resources are now accountable. There is no form for this information. The attachments must be in PDF in accordance with the formatting guidelines outlined for full proposal/application preparation.
  - **Equipment:** Include a description of existing equipment to be used for the proposed research project.
  - **Publications and/or Patent Abstracts (five-document limit):** Include relevant publication URLs and/or patent abstracts. If publications are not publicly available, then a copy/copies of the published manuscript(s) must be attached.
  - **Letters of Organizational Support:** Provide a letter (or letters, if applicable), signed by the Department Chair or appropriate organization official, confirming the laboratory space, equipment, and other resources available for the project. A letter for each organization involved in the project should be provided.
  - **Collaboration:** Provide letter(s) supporting stated collaborative efforts necessary for the project's success, even if provided at no cost.
  - ***If the project involves collaboration with a Military Facility (military health system facility, research laboratory, treatment facility, dental treatment facility,***

or a DoD activity embedded with a civilian medical center), special requirements apply. A DoD researcher must obtain a letter from his/her commanding officer or Military Facility director authorizing his/her participation in the research project. This letter must be included with the proposal/application. (Refer to the General Submission Instructions, Section II.C.4., for additional information.)

- **Joint Sponsorship:** Describe present or prospective joint sponsorship of any portion of the program outlined in the proposal/application. In the absence of agreements among sponsors for joint support, the proposal/application should be structured so that the research can be carried out without the resources of any other sponsor. If, however, it is desirable to request partial support from another agency, the proposed plan should be stated and the reasons documented. If the plan cannot be formulated at the time the proposal/application is submitted, information should be sent later as an addendum to the proposal/application. Prior approval from both agencies must be secured for research to be undertaken under joint sponsorship. Provide letters of support related to recruitment, subject access, and data access plans.
- **Intellectual Property (if applicable):** All software and data first produced under the award are subject to a federal purpose license in accordance with applicable requirements of the Federal Acquisition Regulations (FAR) Part 27, Defense FAR Supplement Part 227, and DoD Grant and Agreement Regulations (Chapter I, Subchapter C of Title 32 Code of Federal Regulations).
  - **Background and Proprietary Information:** Provide a list of all background intellectual property to be used in the project or provide a statement that none will be used. If applicable, state and identify the proprietary information that will be provided to the government and indicate whether the applicant will require a waiver of the federal purpose license.
  - **Intellectual and Material Property Plan:** Provide a plan for resolving intellectual and material property issues among participating organizations.
  - **Commercialization Strategy:** Describe the commercialization plan. The plan should include intellectual property, market size, financial analysis, strengths and weaknesses, barriers to market, competitors and management team. Discuss the significance of this development effort, when it can be anticipated and the potential commercial use for the technology being developed.

- **Attachment 3: Technical Abstract (one-page limit):** Upload as "TechAbs.pdf." The abstract is vitally important to both the scientific peer and programmatic review processes. It is paramount that the investigator submits a technical abstract that fully describes the proposed work. The abstract must contain the title of the project and the name of the PI. Do not include figures or tables in the abstract. Use only characters available on a standard QWERTY keyboard. Spell out all Greek or other non-English letters. Abstracts of all funded proposals/applications may be posted; ***therefore, proprietary information should not be included in the abstract.***

The structured technical abstract should be clear and concise, and at a minimum, provide the following information:

- **Background:** Provide a brief statement of the ideas and theoretical reasoning behind the proposed work.
- **Objective/Hypothesis:** State the objective/hypothesis to be tested. Provide evidence or rationale that supports the objective/hypothesis.
- **Specific Aims:** State concisely the specific aims of the study.
- **Study Design:** Briefly describe the study design.
- **Relevance:** Provide a brief statement explaining the potential relevance of the proposed work to the specific topic area being addressed and its impact on health outcomes.

- **Attachment 4: Statement of Work (SOW) (two-page limit):** Upload as "SOW.pdf." The SOW outlines and establishes the PI and an organization's performance expectations for which the USAMRMC may provide funding. Unlike the general objectives, which are agreed to in a grant or cooperative agreement SOW, the contract SOW sets rather specific goals and conditions for each year of the contracted project. The PI and contractor are expected to meet the provisions and milestones of the SOW. The SOW will be incorporated into the award document and, as such, is subject to release under Freedom of Information Act.

  A series of relatively short statements should be included that comprise the approach to each of the major goals or objectives of the proposed research. The statements should outline the specific tasks, systems, and materials that are reasonable estimates for testing the proposed hypotheses of the study. An outline should be included that shows the work statements to be accomplished in each year of the award. Allow at least 2 to 3 months for the USAMRMC Office of Research Protections' regulatory review and approval processes for studies involving human subjects and 2 to 3 months for studies involving animal subjects.

- **Attachment 5: Impact/Outcomes Statement (one-page limit):** Upload as "Impact.pdf." Explain the potential impact of the research in the field, the significance of this impact, and when it can be anticipated. Explain how the results of this research are expected to impact the intended beneficiaries. Expound upon the dual (military and public) purpose for the research, as appropriate. For development of devices and technologies, include the potential translation, implementation, and/or commercial use for the product/technology being developed.

- **Attachment 6: Data- and Research Resource-Sharing Plan (one-page limit):** Upload as "Sharing.pdf." Describe how unique and/or final research data will be shared with the research community, along with any resulting research resources. This includes cases where pre-existing data or research resources will be utilized and/or modified during the course of the proposed project. If there are limitations associated with a pre-existing agreement for the original data or research resources that preclude subsequent sharing, the applicant should explain this in the data- and/or

research resource-sharing plan. For projects involving clinical trials, PIs may be required to register their clinical trials on Clinicaltrials.gov (https://clinicaltrials.gov/). For projects involving TBI, PIs may be required to report data to the Federal Interagency Traumatic Brain Injury Research (FITBIR) informatics system (http://fitbir.nih.gov/). If the project includes systems biology (SB)-related research, the PI may be required to make the SB data, generated via an award, available to the research community by depositing research data into the SysBioCube system (https://sysbiocube-abcc.ncifcrf.gov). Refer to the General Submission Instructions, Appendix 3, for additional information.

- **Attachment 7: Translation, Implementation, and/or Commercialization Strategy, *if applicable*:** Upload as "Trans_Imp_Comm.pdf." Describe the translation, implementation, and/or commercialization plan. The plan should include intellectual property, market size, market potential, cost of research and development, strengths and weaknesses, barriers to market, competitors, and management team. Discuss the significance of this development effort, when it can be anticipated, and the potential translation, implementation, and/or commercial use for the technology being developed.

- **Attachment 8: Conflicts of Interest, *if applicable*:** Upload as "COI.pdf." Provide details with the proposal/application submission of all organizational or individual investigator COIs, or potential COIs, along with a plan to resolve them. A contract or assistance agreement will not be awarded if it is determined by the respective Contracting or Grants Officer that a COI cannot be resolved.

  Federal agency personnel involved in the review process and/or with making funding recommendations are prohibited from assisting in any proposal/application, including, but not limited to, concept design, application development, budget preparation, and the development of any supporting documentation. ***If formal collaboration with Military Facility personnel is planned (i.e., included in the proposal/application in performance of the research), this prohibition is not applicable. However, these individuals cannot be involved in the review process and/or with making funding recommendations.***

  Questions related to this topic should be directed to the CDMRP Help Desk at help@eBRAP.org or 301-682-5507. Refer to the General Submission Instructions, Appendix 1, for additional information.

- **Attachment 9: Collaborating DoD Military Facility Budget Form(s), *if applicable*:** Upload as "MFBudget.pdf." If a Military Facility will be a collaborator in performance of the project, complete the Collaborating DoD Military Facility Budget Form (available for download on the Full Announcement page in Grants.gov), including a budget justification, for each Military Facility as instructed. Refer to the General Submission Instructions, Section II.C.8., for detailed information.

3. Research & Related Senior/Key Person Profile (Expanded): Refer to the General Submission Instructions, Section II.C.3., for detailed information.

- PI Biographical Sketch (five-page limit): Upload as "Biosketch_LastName.pdf."

- PI Previous/Current/Pending Support (no page limit): Upload as "Support_LastName.pdf."
- Key Personnel Biographical Sketches (five-page limit each): Upload as "Biosketch_LastName.pdf."
- Key Personnel Previous/Current/Pending Support (no page limit): Upload as "Support_LastName.pdf."

4. Research & Related Budget: Refer to the General Submission Instructions, Section II.C.4., for detailed information.

- Budget Justification (no page limit): Upload as "BudgetJustification.pdf."

NOTE: Proposals/Applications from **federal agencies** must include in their budget justifications a **Federal Financial Plan**. Proposals/Applications from organizations that include **collaborations with DoD Military Facilities** must comply with special requirements. Refer to the General Submission Instructions, Section II.C., Research & Related Budget, for detailed information.

5. Project/Performance Site Location(s) Form: Refer to the General Submission Instructions, Section II.C.5., for detailed information.

6. R & R Subaward Budget Attachment(s) Form (if applicable): Refer to the General Submission Instructions, Section II.C.6., for detailed information.

F. Verification of Grants.gov Proposal/Application in eBRAP

Organizational representatives and PIs can view their proposals/applications as submitted through Grants.gov within a period of 5 calendar days of proposal/application submissions to Grants.gov, i.e., ***the verification period***. This will enable applicants to make modifications to proposals/applications until the end of the verification period, prior to scientific and programmatic evaluations.

After proposal/application submission to Grants.gov, eBRAP will retrieve and validate the submission. eBRAP will notify the organizational representatives and PI via email and instruct them to log into eBRAP to review, modify, and verify the proposal/application. Files that fail eBRAP validation will be noted in both the email and in the Full Application Files tab. eBRAP does not validate the accuracy or completeness of content in the files. PIs are strongly encouraged to review all proposal/application components. ***If either the Project Narrative exceeds the page limit or the Budget form contains only zeros, an updated Grants.gov application package must be submitted via Grants.gov as a "Changed/Corrected Application" with the previous Grants.gov Tracking ID.*** Refer to the General Submission Instructions, Section II.C., for more information.

G. Data Universal Number System Numbers, Commercial and Government Entity Code, and System for Award Management

An applicant organization and any subaward organization must have Data Universal Number System (DUNS) numbers (issued by Dun and Bradstreet) before submitting a

proposal/application to Grants.gov. In addition, an applicant organization must have a Commercial and Government Entity (CAGE) Code. Also, the organization must be registered as an Entity with the System for Award Management (SAM) and have an "Active" status before submitting a proposal/application through Grants.gov or receiving an award from the federal government.

Refer to the General Submission Instructions, Section II, for additional information.

H. Submission Dates and Times

The BAA is an open and continuous announcement for a 12-month period, from October 1 through September 30 of each year. A pre-proposal/pre-application can be submitted at any time throughout the 12-month period. A full proposal/application may only be submitted if the PI has submitted a pre-proposal/pre-application and received an invitation to submit. No pre-proposal/pre-application or full proposal/application can be submitted to this BAA after September 30, 2015, at 11:59 p.m. Eastern Time. If an invited proposal/application is not submitted by September 30, 2015, it will have to be submitted under the FY16 BAA (to be posted to Grants.gov on October 1, 2015).

I. Intergovernmental Review

This BAA is not subject to Executive Order (EO) 12372.

J. Funding Restrictions

There are no specified funding limitations identified for a proposal/application submitted under this BAA, except for the "Special Investment Areas/Innovation Funding" area of interest (refer to Section II.A.9., for more information). Refer to the General Submission Instructions, Section II.C.4, "Research & Related Budget," for discussion of allowable costs, including pre-award costs and collaborations with Military Facilities.

K. Other Submission Requirements

Proposals/applications must be submitted electronically to Grants.gov. Refer to the General Submission Instructions, Appendix 2, for detailed Grants.gov formatting guidelines.

VI. PROPOSAL/APPLICATION REVIEW AND SELECTION INFORMATION

All invited proposals/applications are evaluated by USAMRMC scientists, other federal agency representatives, outside scientists with diverse expertise, clinicians, consumers, or combinations thereof, using a two-tier review process. The first tier is **peer review** of proposals/applications against established criteria for determining technical merit. The second tier is **programmatic review** based on established criteria for determining relevance to the mission of the USAMRMC and its programs.

All USAMRMC review processes are conducted confidentially to maintain the integrity of the merit-based selection process. Panel members sign agreements to protect the confidentiality of the information that proposal/application and evaluation information will not be disclosed

outside the panel. Violations of confidentiality can result in the dissolving of a panel(s) and other corrective actions. In addition, personnel at the applicant or collaborating organizations are prohibited from contacting persons involved in the review process to gain protected evaluation information or to influence the evaluation process. Violations of these prohibitions will result in the administrative withdrawal of the organization's application. Violations by panel members or applicants that compromise the confidentiality of the review process may also result in suspension or debarment from federal awards. Furthermore, the unauthorized disclosure of confidential information of one party to another third party by military personnel or employee of the Federal government is a crime in accordance with 18 USC 1905.

A. Peer and Programmatic Review

1. Peer Review: To determine technical merit, all proposals/applications will be evaluated according to the following scored criteria, which are listed in descending order of importance:

- **Research Objectives:** The degree to which the stated objectives are clear, valid, and logical. For development of devices and technologies, the degree to which the performance objectives are plausible; the proposed effort demonstrates familiarity with the historical background of the problem and previous/current solutions; and the awareness of similar projects previously undertaken and related activities. The extent that the proposed research projects demonstrate an innovative approach and relate to the Research Areas of Interest identified in Section II.A.
- **Scientific Design Excellence:** The degree to which proposed plans, methods, techniques and procedures are feasible, clear, valid, adequately referenced, and state-of-the-art. The merit of the statistical features of the study. The extent to which literature searches were used to document the strengths of the proposed project. For development of devices and technologies, the feasibility of the proposed product/technology development plan; how well the engineering/technical design is likely to achieve the goals indicated; adequacy of the engineering/design solutions; and how well the perceived engineering/design strengths and flaws are addressed.
- **Impact/Outcomes:** The potential impact of the research in the field, the significance of this impact, and when it can be anticipated. For development of devices and technologies, the potential translation, implementation, and/or commercial use for the product/technology being developed.
- **PI and Key Personnel Qualifications:** The qualifications, capabilities, and experience of the proposed PI and other key personnel to demonstrate that the proposed staff has the knowledge, technical expertise, and management skills to achieve the proposed objectives as well as the time available for the percentage of efforts indicated for the project.
- **Facilities:** The proposed facilities and equipment, or unique combinations of these, to demonstrate that the organization has the necessary facilities required for the accomplishing the proposed objectives.
- **Budget:** The degree to which the budget reflects the actual needs of the proposed work, is thoroughly detailed and fully justified so that the government can evaluate and determine the cost to be allocable, allowable and reasonable, and commensurate with the complexity and nature of the research proposed.

2. Programmatic Review: To make funding recommendations, the following criteria will be used by programmatic reviewers:

- Scientific peer review results
- Military relevance (mission, health, medicine, and beneficiaries)
- Portfolio balance
- Programmatic priorities

NOTE: Military-relevant research must be responsive to the health care needs of the Armed Forces, family members of the Armed Forces, and the U.S. Veteran population. Proposals/ applications must address a military-relevant health problem responsive to one of the Research Areas of Interest identified in Section II.A.

B. Submission Review Dates

This is a continuously open announcement through September 30, 2015; therefore, reviews occur throughout the year. Pre-proposals/pre-applications may be submitted and will be evaluated at any time throughout the 12-month period noted above. An invited full proposal/application should be submitted within 90 days of the PI's receipt of an invitation to submit. No pre-proposal/pre-application or full proposal/application may be submitted under this BAA after September 30, 2015. If an invited proposal/application is not submitted by September 30, 2015, it will have to be submitted under the FY16 BAA (to be posted to Grants.gov October 1, 2015). No proposal/application received under this BAA will be considered for funding after 24 months from the date of submission.

C. Proposal/Application Selection Process

After the two-tier evaluation, proposals/applications recommended for funding may be prioritized. A prioritized listing of alternates (deferred decisions) may also be prepared, when warranted. Subsequent awards depend upon the availability of funds and fulfillment of requirements and priorities determined to exist at the time of award. In some cases, funding priorities may change as certain scientific tasks are addressed and new mission assignments arise.

If selected for funding, the award may also be dependent upon the organization providing adequate additional regulatory documentation, such as human subjects/anatomical substances/use of cadavers protocols and approvals, animal subjects protocols and approvals, and environmental information. The award may also be dependent upon additional supporting administrative and budgetary information.

D. Notification of Proposal/Application Review Results

Each PI and organization will receive email notification via eBRAP of the funding recommendation. Notifications should be sent within 180 days of submission. Each PI will receive a peer review summary statement on the strengths and weaknesses of the proposal/application.

A recommended for funding notification is NOT an authorization to begin performance or a guarantee of an award. Awards are contingent upon availability of funding, adequacy of supporting documentation submitted, fulfillment of all requirements, and upon completion of successful negotiations. Authorization to begin performance will be received via an award document (contract, grant, or cooperative agreement, as applicable) signed by the USAMRAA Contracting or Grants Officer. Awards may be issued at any time throughout the year.

VII. ADMINISTRATIVE ACTIONS

After agency receipt of proposals/applications from Grants.gov, the following administrative actions may occur:

A. Rejection

The following will result in administrative rejection of the proposal/application:

- Project Narrative exceeds the page limit.
- Project Narrative is missing.
- Budget form contains only zeros.

B. Modification

- Pages exceeding the specific limits may be removed prior to review for all documents other than the Project Narrative.
- Documents not requested may be removed.
- Following proposal/application submission to Grants.gov, the PI will receive an email request from eBRAP to review, modify, and verify the proposal/application submitted to Grants.gov. During this verification period, the PI may upload missing documents (excluding those listed in Section VII.A., Rejection), replace files, and re-categorize files. These modifications must be completed by the end of the application verification period; otherwise, the proposal/application will be reviewed as submitted

C. Withdrawal

The following may result in administrative withdrawal of the pre-proposal/pre-application or proposal/application:

- Federal agency personnel involved in the review process and/or with making funding recommendations are named as being involved in the research proposed or found to have assisted in the pre-proposal/pre-application or proposal/application processes, including, but not limited to, concept design, proposal/application development, budget preparation, and the development of any supporting documentation. ***If formal collaboration with Military Facility personnel is planned (i.e., included in the proposal/application in performance of the research), this prohibition is not applicable. However, these Military Facility personnel are prohibited from being involved in the review process and/or with making funding recommendations.***

- Inclusion of any employee of USAMRMC review contractors in pre-proposals/pre-applications or full proposals/applications for funding without adequate plans to resolve conflicts of interest. Refer to General Submission Instructions, Appendix 1, for detailed information.
- Personnel from applicant or collaborating organizations are found to have contacted persons involved in the review process to gain protected evaluation information or to influence the evaluation process.
- The PI does not meet the eligibility criteria as described in this BAA.
- The full proposal/application does not propose the same research project as described in the pre-proposal/pre-application.
- The full proposal/application budget differs significantly from the budget included in the pre-proposal/pre-application.

D. Withhold

Proposals/Applications that appear to involve research misconduct will be administratively withheld from further consideration pending organizational investigation. The organization will be required to provide the findings of the investigation to the USAMRAA Contracting or Grants Officer for a determination of the final disposition of the proposal/application.

VIII. AWARD ADMINISTRATION INFORMATION

A. Award Notice

The PI should receive disposition regarding the full proposal/application via an email from eBRAP within 180 days of submission. A recommended for funding notification is NOT an authorization to begin performance nor a guarantee of an award.

The awarding agency will be the USAMRAA. The USAMRAA Contracting and Grants Officers are the only individuals authorized to obligate funds and bind the federal government. Authorization to begin performance will be received via an award document (contract, grant, or cooperative agreement, as applicable) signed by the USAMRAA Contracting or Grants Officer. No commitment on the part of the government should be inferred from discussions with any other individual.

Awards will be made at any time throughout the year and are contingent upon availability of funding, adequacy of supporting documentation submitted, fulfillment of requirements, and completion of successful negotiations. No proposal/application submitted under this BAA will be considered for funding after 24 months from the date of submission to Grants.gov.

Refer to the General Submission Instructions, Appendix 3, for additional information.

B. Administrative Requirements

Refer to the General Submission Instructions, Appendix 3, for general information regarding administrative requirements.

C. National Policy Requirements

Refer to the General Submission Instructions, Appendix 4, for general information regarding national policy requirements.

D. Reporting Requirements

Refer to the General Application Instructions, Appendix 3, for general information on reporting requirements.

E. Changes of Principal Investigator and Organization

Refer to the General Submission Instructions, Appendix 3, for general information on changes to PIs and organizational transfers.

IX. AGENCY CONTACTS

A. CDMRP Help Desk

Questions related to BAA content or submission requirements as well as questions related to the submission of the pre-proposal/pre-application through eBRAP should be directed to the CDMRP Help Desk, which is available Monday through Friday from 8:00 a.m. to 5:00 p.m. Eastern Time. Response times may vary depending upon the volume of inquiries.

Phone: 301-682-5507

Email: help@eBRAP.org

B. Grants.gov Contact Center

Questions related to full proposal/application submission through the Grants.gov portal should be directed to the Grants.gov Contact Center, which is available 24 hours a day, 7 days a week (closed on U.S. federal holidays). Note that the CDMRP Help Desk is unable to provide technical assistance with Grants.gov submission.

Phone: 800-518-4726

Email: support@grants.gov

Sign up on Grants.gov for "send me change notification emails" by following the link on the Synopsis page for the BAA or by responding to the prompt provided by Grants.gov when first downloading the application package. If the application package is updated or changed, the original version of the application package may not be accepted by Grants.gov.

X. OTHER INFORMATION

A. Recipient Qualification

Refer to the General Submission Instructions, Appendix 1, for general information on required qualifications.

In addition to other information provided herein, by submitting a proposal/application and accepting an award, the organization is: (1) certifying that the investigators' credentials have been examined; (2) verifying that the investigators are qualified to conduct the proposed study and to use humans or animals as research subjects, if proposed. Investigators include all individuals, regardless of ethnicity, nationality, or citizenship status, who are employed by, or affiliated with, an eligible organization.

Investigators are cautioned that awards are made to organizations, not individuals. A PI must submit a proposal/application through an organization in order to receive support.

Should the PI of a funded project leave the award organization, both the PI and organization must contact the USAMRAA as soon as possible to discuss options for continued support of the research project. Every effort should be made to notify the USAMRAA prior to the PI leaving the organization.

B. Proprietary Information

Do not include any proprietary information in the pre-proposal/pre-application or full proposal/application. Proprietary information should ***only be included*** in the full proposal/application ***if necessary for evaluation purposes.*** Abstracts of all funded proposals/applications may be posted; ***therefore, proprietary information should not be included in the abstract.***

Conspicuously and legibly mark any proprietary information that is included in the full proposal/application. Identify any proprietary information that will be provided to the government and whether the applicant will request a waiver of government purpose rights.

C. Common Submission Problems

- Failure to enter an email address for change notifications under the BAA Funding Opportunity Announcement in Grants.gov for notifications on any modification made to the initial posting.
- Attachments are uploaded into the incorrect form on Grants.gov forms. (See Proposal/Application Submission Checklist below.)
- Failure to contact the Grants.gov Help Desk when needed.
- Failure to send attachments.
- Inability to locate attachment forms. (Select "Search Grants" at http://www.grants.gov and enter W81XWH-BAA-15-1 in the "Funding Opp #" block. When the Funding Opportunity appears, select the Funding Opportunity #. When you reach the "View Grant Opportunity" screen, select "Full Announcement." The forms will be listed on the following screen.)

- Use of “illegal” characters in attachment titles.
- Attachments exceed size limits.
- Upload attempts of unacceptable attachments: bitmap, TIFF, etc.
- Duplicate upload of documents.

XI. PROPOSAL/APPLICATION SUBMISSION CHECKLIST

Grants.gov Submission Package Components	Action	Completed
SF-424 (R&R) Application for Federal Assistance	Complete as instructed.	
Attachments Form	Project Narrative: Upload as Attachment 1 with file name "ProjectNarrative.pdf."	
	Supporting Documentation: Upload as Attachment 2 with file name "Support.pdf."	
	Technical Abstract: Upload as Attachment 3 with file name "TechAbs.pdf."	
	Statement of Work: Upload as Attachment 4 with file name "SOW.pdf."	
	Impact/Outcomes Statement: Upload as Attachment 5 with file name "Impact.pdf."	
	Data- and Research Resource-Sharing Plan: Upload as Attachment 6 with file name "Sharing.pdf."	
	Translation, Implementation, and/or Commercialization Strategy (if applicable): Upload as Attachment 7 with file name "Trans_Imp_Comm.pdf."	
	Conflicts of Interest (if applicable): Upload as Attachment 8 with file name "COI.pdf."	
	Collaborating DoD Military Facility Budget Form(s) (if applicable): Upload as Attachment 9 with the file name "MFBudget.pdf."	
Research & Related Senior/Key Person Profile (Expanded)	Attach PI Biographical Sketch (Biosketch_LastName.pdf) to the appropriate field.	
	Attach PI Previous/Current/Pending Support (Support_LastName.pdf) to the appropriate field.	
	Attach Biographical Sketch (Biosketch_LastName.pdf) for each senior/key person to the appropriate field.	
	Attach Previous/Current/Pending (Support_LastName.pdf) for each senior/key person to the appropriate field.	
Research & Related Budget	Attach Budget Justification (BudgetJustification.pdf) to the appropriate field. Complete form as instructed.	
Project/Performance Site Location(s) Form	Complete form as instructed.	
R&R Subaward Budget Attachment(s) Form (if applicable)	Complete form as instructed.	