

*****Special Notice*****

Effective April 27, 2012: White Papers and other submissions are suspended indefinitely under this BAA. White Papers should not be submitted during this suspension.

Reason for suspension: Lack of available funds. The suspension will be lifted if funds become available.

I. GENERAL INFORMATION

1. Agency Name -

Naval Medical Logistics Command (NMLC)

2. Research Opportunity Title –

Broad Agency Announcement (BAA) for the Naval Medical Research and Development Center-Frederick (NAVMEDRSCHDEVCTR-Frederick)

3. Program Name –

Navy Expeditionary Medicine Omnibus (NEMO)

4. Research Opportunity Number –

N62645-BAA-12-1

5. Response Date –

This announcement will remain open until 31 December 2012 or until replaced by a successor BAA, whichever first occurs. ***See above Special Notice***

6. Research Opportunity Description –

The Director, Naval Medical Research and Development Center-Frederick (NAVMEDRSCHDEVCTR-Frederick) is interested in receiving proposals for innovative approaches in infectious disease research, non-communicable disease research, and combat casualty care research. Readers should note that this is an announcement to declare NAVMEDRSCHDEVCTR-Frederick's broad role in competitive funding of meritorious research across a spectrum of science and engineering disciplines. Descriptions of the area of interests NAVMEDRSCHDEVCTR-Frederick is pursuing are provided below.

Potential offerors are urged to check the program areas that they are interested in throughout the year for updates.

Pgs. 2 – 4, Area of Interest #1 – Infectious Disease Research

Pgs. 5 – 8, Area of Interest #2 – Non-Communicable Disease Research

Pgs. 9 – 13, Area of Interest #3 – Combat Casualty Care Research

Area of Interest #1

INFECTIOUS DISEASE RESEARCH

SUMMARY

Infectious diseases are a constant threat to the readiness of US military forces at home and abroad. Given the dynamic nature of global pathogenic transmissibility, diseases that may have once been confined to remote areas of the world now have the capability to swathe entire regions and cross continents. Expeditionary operational forces are especially susceptible due to their exposure to areas/regions of high risk and the potential for rapid, high volume transmission among close quartered personnel. In support of vaccine development to combat such threats, current military efforts in disease research involve active surveillance from worldwide field sites, identification of recurring and emerging diseases, advanced characterization methods, and developing new technologies for pathogenic detection and viral mutagenic prediction. The recent prevalence of newly emerging, highly publicized novel disease pandemics has further strengthened the demand for expanding surveillance and research efforts.

INTRODUCTION

Infectious diseases are caused by “pathogenic microorganisms, such as bacteria, viruses, parasites, or fungi”¹ and are directly or indirectly communicable via airborne, waterborne, bloodborne, vector-borne or direct contact routes. Some examples of the more prevalent types that afflict military personnel include:

Enteric Diseases – Enteric diseases are some of the most common threats faced by military personnel abroad, and are often extremely debilitating – if not life threatening. Some dangerous culprits include the bacterial infections Enterotoxigenic *E. Coli* (ETEC), *Salmonella*, *Campylobacter* (especially the antibiotic-resistant strain *C. jejuni*), *Shigella*, and the rare Cholera; the viral gastrointestinal infections caused by Noroviruses and Rotaviruses; and various protozoans. Enteric diseases are of special concern because of the high morbidity involved and the potential to infect a large number of personnel through contaminated food and water sources, especially in regions overseas where food handling, water supply, and waste disposal practices are questionable.

Respiratory Diseases – With the recent spotlight given to pandemic influenzas such as the swine-originated H1N1 and potential outbreak risks for the more rare avian-originated H5N1 in Asia, respiratory disease has been and will continue to be a main focus of military disease research and vaccine development. Aside from influenzas, relevant interest is also given to the various febrile respiratory illnesses (FRIs), acute pneumonia, meningococcal disease, drug-resistant bacterial strains, and the possible reemergence of SARS-CoV and tuberculosis – all of

which have the capability of infecting a large number of personnel in close quarters (e.g., shipboard personnel, barracks) due to the airborne communicability.

Vector-borne Diseases – Viruses, bacteria, and parasites spread by arthropods (e.g., mosquitos, flies, fleas) are some of the most imminent threats to military forces abroad due to geographic risk factors and a general lack of effective vaccines and treatment. In tropical climates, the most prevalent dangers are dengue and malaria, spread by the *Aedes* and *Anopheles* mosquito, respectively. While malaria has been somewhat curbed by successful prophylaxis use (excluding new drug-resistant strains), dengue, a virus, continues to lack effective preventative medicine and treatment. In the rural areas of the Southeast Asia region, Japanese encephalitis has also become a significant mosquito-borne disease threat. Rickettsial diseases (e.g., various forms of typhus and spotted fevers) are also reemerging as a major concern due to their transmission by fleas and lice, which can be easily spread among expeditionary personnel. Leishmaniasis, a potentially serious parasite spread by the sand fly, has continued to be a daily threat for personnel operating in the Middle East Theater.

Emerging Diseases – An emerging disease can be defined as “one that has appeared in a population for the first time, or that may have existed previously but is rapidly increasing in incidence or geographic range.”ⁱⁱ Emerging diseases also include new drug-resistant variants (e.g., MRSA, Chloroquine-resistant malaria) as well as new mutational strains of viral agents (e.g., Influenzas H1N1, H5N1). Such novel diseases not only present innumerable risks to operational forces, but also bring great challenges to the medical research and development (R&D) community in being able to quickly and effectively find therapeutic solutions. Future technologies in development may include advanced capabilities in viral mutation prediction, thereby empowering vaccine R&D with forecasts of potential new viral strains before they occur. This grouping includes HIV/AIDS.

Bioweapons – The use of pathogenic agents as a weapon of mass destruction (WMD) in war or as an act of terror, albeit unlikely, is still a realistic scenario for which we must be prepared. Detection and identification of bioterror events, if perpetrated, would likely be congruent with existing systems of surveillance, public health, and military response, therefore emphasizing the importance of expanding systems capabilities for the future.

ENVIRONMENTAL PRESSURES AND DISEASE

The prevalence of disease is essentially defined by geography and society – that is, certain natural factors contribute to why a disease emerges and afflicts a population of a given area/region. Pathogenic adaptation is also often linked to such environmental ‘pressures’. It is thus necessary for military expeditionary forces to consider the nature of the area in which they will operate and the diseases endemic/prevalent in that location. The following are geographic factors that often determine disease prevalence:

Climate – Tropical diseases generally tend to be the most dynamic due to an ecosystem that is ideal for diseases to thrive and spread throughout – i.e., high temperatures and humidity, significant rainfall, and an abundance of natural insect vectors. Because of this, many risks can be associated with forces operating in locales such as Southeast Asia, Sub-Saharan Africa, and the South American rainforests.

Infrastructure and practices – In developing countries, poor infrastructure systems combined with rapid urbanization and high population growth continue to propagate disease, especially in regard to available water supplies, sewage and garbage disposal, and the proximity to and

practices with animals for consumption. Also, the increased use of immunosuppressives or antibiotics has played a role in the upswing in mutagenic/drug-resistant pathogens.

Mobility – Cities with high population density (e.g., Mexico City, Tokyo, Bangkok), increased travel between rural and urban locations (especially remote areas), and increased international air travel all play a key role in rapid transmission of infectious disease.

BASIC FACTORS IN EPIDEMIOLOGY

Epidemiology, while a complex science, is based in theory on the assessment of factors within the dynamic interaction between the infectious agent (pathogen), its host (population), and its environment.ⁱⁱⁱ Some of these factors often include:

- **Infectious Agent** – Infectivity, pathogenicity, virulence, immunogenicity, antigenic stability, survival
- **Host/population** – Age, sex, genotype, behavior, nutritional status, health status
- **Environment** – Weather, housing, geography, occupational setting, air quality, food^{iv}

METHODOLOGY TO COMBAT INFECTIOUS DISEASE

Surveillance – Detection of pathogens via active surveillance is the first step in combating infectious disease. The DoD Global Emerging Infections System (GEIS) is the US military network that actively surveys pathogenic threats at various OCONUS/FOREIGN military installations and vessels, DoD-operated research laboratories, and corresponds with international partners to maintain awareness worldwide. Data attained (in real time) from network sites is passed along to major research hubs for full-scale identification and characterization.

Identification & Characterization – Increasingly, pathogens are being identified at their source of detection with the use of rapid assays, including state-of-the-art portable “backpack” systems utilized in surveying shipboard personnel and in the field. However, upon detection of new and emerging pathogens, surveillance sites must often rely upon further research support to accomplish identification via more in-depth techniques. With a pathogen identified, diagnostics are performed (e.g., genomics, sequencing) to effectively characterize the agent and understand its pathogenic elements.

Vaccine/Drug Development – Applied research of infectious disease vaccines is regulated by the Federal Drug Administration (FDA) Investigational New Drug (IND) protocol, which oversees all US clinical research programs in drug development. Because of the scope of the work required, the DoD and its components often seek partnership with industry via Clinical Research Organizations (CROs) for vaccine applied research and development (R&D).

Deficiencies and Future Advancements – Increased globalization necessitates the expansion of current capabilities in establishing more surveillance and R&D sites in strategic locations, and integration with other international partners. Also, according to the World Health Organization, surveillance needs to “represent both human and animal infections and provide information on antimicrobial resistance and the environment including water, insect vectors and animal reservoirs.”^v Eventual development of new systems to advance beyond the scope of current react-and-respond technologies – e.g., viral mutation prediction algorithmic technology – may be sought as well.

Area of Interest #2

NON-COMMUNICABLE DISEASE RESEARCH

SUMMARY

Non-Communicable Diseases (NCDs), often referred to as chronic diseases, are diseases that cannot be transmitted amongst others in a population as could an infectious disease. Nevertheless, NCDs account for the most deaths and medical complications in the US general population today, with billions spent annually as a result. NCDs include a wide-range of diseases, with the most prevalent being cancer, diabetes, obesity, and cardiovascular diseases (CVDs). The US military continues to conduct and support research of NCDs in order to find solutions for the chronic ailments that plague service members and their families, veterans, and the general public. This paper discusses a few of the major NCDs that pose a threat in the military health community, and some examples of recent and current efforts to address the diseases.

BONE MARROW PROGRAM

As an integral part of the national effort for matching unrelated marrow donors, a marrow donor program was established within the Department of Defense. The primary objectives of this program is the development and application of this distinctive life-saving technology toward the military medical application for rescue of casualties with marrow damage resulting from radiation or certain chemical warfare agents containing mustard. The program was named for Congressman C.W. Bill Young, who initiated and supported the development of the National Marrow Donor Program (NMDP) and the DoD program for unrelated donor marrow transplantation. The Department of Defense established the C.W. Bill Young Department of Defense Marrow Donor Center in Washington, DC to support DoD volunteer marrow donors. The C.W. Bill Young Marrow Donor Center coordinates all the medical and logistic support for DoD personnel who volunteer for the possibility of donating marrow.

Established by Congress on 25 May 1990, Public Law 101-302 directed the DoD to:

1. Recruit and HLA type DoD volunteers as part of the overall national effort;
2. Expand the Navy medical research program to improve the technology of identifying donors;
3. Provide support to increase the number of civilian donors with an emphasis on improving American minority donor recruitment; and
4. Support programs tied to the National Marrow Donor Program to improve military contingency and Homeland Security capabilities to respond to both ionizing radiation and chemical-induced (mustard containing chemical warfare agents) marrow damage.

A Memorandum from the Assistant Secretary of Defense (Health Affairs) was instituted on 18 June 1991 to implement and administer the DoD wide program in an effort to recruit DoD personnel and their dependents, DoD civil service employees, National Guard, Coast Guard and Reservists and also includes associated research programs. The program was named the C. W. Bill Young Marrow Donor Recruitment and Research Program (the DoD Marrow Donor Program) and the Navy (Bone Marrow Registry Directorate, Naval Medical Research Center) was identified as the Executive Agent.

The DoD program focuses the efforts of this national program towards military contingency and Homeland Security initiatives for the treatment of casualties exposed to marrow toxic injury. The program provides for humanitarian support for patients every day while the same medical technology for treating patients is available to provide rapid and effective marrow rescue for military or civilian casualties exposed to marrow toxic ionizing radiation or chemical agents containing mustards. During both military exercises and recent conflicts, the program demonstrated military medical support capability.

Eligible volunteers under the DoD program include all active duty military members and their dependents, DoD civilians, Coast Guard, National Guard and Reservists, ages 18 to 60 and in good health. A blood sample or buccal swab is taken from volunteers and the samples sent to the C.W. Bill Young/DoD Marrow Donor Program laboratory in Washington, DC. The tissue-type (HLA-human leukocyte antigen) of the volunteer is registered with the National Marrow Donor Program (NMDP) without identifying demographics.

The National Marrow Donor Program is the coordinating center in Minneapolis, MN with over 200 participating organizations, including donor centers, transplant centers, clinical and research laboratories for transplant matching. The NMDP provides a national coordinating center where patients can become matched with volunteers registered at donor centers, like the C.W. Bill Young/DoD Marrow Donor Center. This transplant therapy is used to treat as many as 70 different potentially fatal diseases that can be cured by replacement of diseased marrow from a healthy donor. If a volunteer matches a patient, they will be contacted by a staff member of the C.W. Bill Young/DoD Marrow Donor Center and they will receive extensive counseling and medical evaluation to ensure their desire to proceed with the process and that they are in good health.

The DoD has played a vital role in the development of this life-saving national program due to the established spirit of volunteerism of members within the Armed Forces. The C.W. Bill Young/DoD Marrow Donor Center is one of the largest in the world and provides the largest volume of life-saving marrow for patients throughout the world.

CANCER

A 2007 study by the US National Cancer Institute's Surveillance Epidemiology and End Results (SEER) Program estimated that in the US general population, nearly 11,714,000 people are afflicted by a major form of cancer, with the most prevalent forms being breast (2.6M), prostate (2.27M), and colorectal (1.12M) cancer.^{vi} Financially, the overall economic impact of cancer on both individuals and society as a whole was estimated around \$228B in 2008.^{vii}

Due to lifestyle differences (exercise and diet), occupational exposure to certain risk factors, and a younger age range, the incidence of cancer among active military is generally expected to differ greatly from that of the general population. In the 2009 study "Cancer Incidence in the US Military Population: Comparison with Rates from the SEER Program" researchers compared the incidence of cancer between active duty (AD) military and the general US population. A major finding of the study was that prostate and breast cancer rates for AD military "were significantly higher," with AD prostate rates nearly twice that of the general population and AD breast cancer rates 20%-40% higher than the general population.^{viii} Several theories were suggested to explain this considerable difference: (1) free access to medical care for AD military raises the likelihood of undergoing cancer screening; (2) heightened risk factors of breast cancer for AD women include occupational exposure to certain chemicals and a greater tendency to use oral contraceptive pills; (3) heightened risk factors of prostate cancer for AD men include exposure to depleted uranium, a material used in armor plating and armor-piercing ammunition.^{ix}

Currently, there are many research efforts being conducted and/or supported by the US military to address issues of cancer. Some examples include:

- Proton Beam Therapy – Research of effective proton therapy methodology that may improve the treatment of some cancers by more accurate targeting of cancer cells and alleviating unintended side effects associated with traditional cancer treatments (i.e., chemotherapy and radiation therapy).
- Prostate Cancer Vaccine – The US Navy is working toward development of a vaccine for prostate cancer that utilizes prostate specific antigens (PSC). This vaccine has potential use in treatment of recurrent prostate patients, who currently have no effective therapeutic option.
- Cancer Sample Repository & Genomics – A repository is being proposed at the Penn State Cancer Institute which will collect samples from cancer patients to be used in genomic research of individual responses to various therapies.

DIABETES

According to information published in the 2011 National Diabetes Fact Sheet, diabetes currently affects 25.8 million people nation-wide, or nearly 8.3% of the US general population (18.8M diagnosed and 7M undiagnosed).^x Young adults are increasingly at risk for developing Type-2 diabetes, which could affect US military recruitment because diabetes is a condition that will warrant rejection of a candidate into military service.^{xi} Furthermore, service members who develop diabetes during active duty could possibly be referred for medical discharge, as diabetic complications have the potential for causing hindrances to performance of duties. Because the onset of diabetes has been linked with risk factors such as body mass index (BMI), exercise and diet, it would seem safe to assume that AD military, who are seemingly healthier and more active than the average American, would be less likely to develop Type-2 diabetes. However, a 2001 epidemiological study conducted on diabetic AD military revealed that, in actuality, incidence of the disease among AD military is generally congruent with that of the general population, especially when taking into account traditional risk factors such as BMI, race/ethnicity, and socioeconomic status (in this case, determined by rank).^{xii} These findings, as the study concluded, may have the following implications:

Considering the national trends of increased prevalence of obesity and diabetes, this may become problematic for military recruitment, retention, and readiness. Although not examined, physical activity levels likely played a role in the development of diabetes. It is possible that the activity levels required to meet fitness standards in the military are inadequate to prevent diabetes or that moderate to high levels of physical activity are inadequate to prevent diabetes in a younger population at higher risk. This and other alternative hypotheses, to include hereditary factors, occupational and environmental exposures, and other risk factors, must be explored.^{xiii}

The Naval Health Research Center (NHRC) in San Diego is currently supporting a diabetes research effort at the Diabetes Research Institute, University of Miami, that utilizes non-embryonic sources of insulin-producing cells to analyze therapeutic potential in the treatment of Type 1 diabetes. Continuing support for this and other diabetes research is needed for thorough exploration of cures and treatments for diabetic patients.

MENTAL HEALTH, SUBSTANCE ABUSE, & SUICIDE

Mental health is one of the most serious concerns for AD military, especially those who have served in combat. Although for the purposes of this paper, Post Traumatic Stress Disorder (PTSD) and Traumatic Brain Injury (TBI) will be considered under the auspices of Combat Casualty Care and therefore not discussed in detail, the fact that today's mental health disorders among returning combat soldiers most often result from combat-related PTSD/TBI cannot be ignored. While the etiological interrelations of PTSD/TBI are still much in debate, it seems clear that the rising incidence of PTSD/TBI has at least some correlation with the increased rates of substance abuse and suicide among returning combat soldiers (along with other factors such as stress incurred from the increased frequency of combat deployments). In 2009, Army records indicated that 9,199 soldiers enrolled in alcohol treatment after diagnosis of alcohol addiction and, overall, 16,388 enrolled in some sort of counseling that year, which shows a 56% increase from 2003 (5,873 alcohol enrollees/11,309 total counseling enrollees).^{xiv} Since these numbers are based on reported cases, it is also very likely that many more unreported cases were not represented in the data. Suicide rates among AD Army personnel rose steadily from 2004 until peaking in 2009 (162 total) and slowing in 2010 (156 total).^{xv} Among Army guardsmen and reservists, recent figures are even more ominous as the suicide numbers increased from 80 in 2009 to 145 in 2010 – a spike of nearly 81%.^{xvi}

OCCUPATIONAL HEALTH

AD military service members are often exposed to various environmental and occupational hazards – e.g., chemical agents, toxic metals such as tungsten and depleted uranium, jet fuel hydrocarbons, environmental particulates – that have the potential for causing chronic conditions. Although exposure is always minimized, risks are nevertheless a reality when operating in unique military environments. To address these wide-ranging concerns, Congress-directed special research programs as well as the efforts of specific DoD/military medical research commands have seen an increase in funding for environmental/occupational health research since the early 1990s. Additionally, the rise in female AD military service members, especially deployed females in combat roles, has raised awareness for research related to particular concerns of women's health in military settings. One current example is the research being conducted to assess the hazards for women operating in submarines. After a 2010 Navy decision to begin deploying females in submarines, an in-depth study into potential environmental risks was deemed necessary before any deployments are made, due to the fact that, unlike surface ships where air can be replenished, the confined atmosphere of submarines can be described as a “soup of carbon monoxide, carbon dioxide, aerosol trace elements and ‘other hazardous substances’” that could have serious adverse effects on women's fertility and pregnancies.^{xvii} To investigate, the Environmental Health Effects Laboratory at the Naval Health Research Unit, Dayton (NAMRU-D) is conducting a histopathology study, using rodent tissue samples exposed to similar environmental elements, to determine any potentially harmful conditions that may arise for women submariners.

Area of Interest #3

COMBAT CASUALTY CARE RESEARCH

SUMMARY

Combat Casualty Care (CCC) is more than simply treating the wounded – it is a term given to the comprehensive treatment and related research of unique injuries that afflict the warfighter. In today’s context, CCC deals almost exclusively with injuries sustained in the Middle East Theater. CCC encompasses issues that range from saving “preventable combat deaths” in the tactical field, to rehabilitation of special patient populations (e.g., Traumatic Brain Injury (TBI), limb amputee), and post-war psychological health. Ongoing research seeks to advance technologies and techniques, with the goal of supporting the unique health issues of warfighters and veterans alike. This area includes research associated with modeling, simulation, and mission support; and deployment health research or warfighter performance research not addressed in the other areas of interest.

TACTICAL COMBAT CASUALTY CARE (TCCC)

Uncontrolled Hemorrhage

Tactical Combat Casualty Care (TCCC) specifically entails the techniques and technologies used in treating serious trauma injuries incurred in combat, with the intent of saving “preventable combat deaths.” In the current Middle East campaigns, approximately 81% of total combat deaths are attributed to hemorrhage, and about 15-18% of casualties that die prior to reaching a medical treatment facility can be saved if effective interventions are performed to control blood loss.^{xviii} As such, a major emphasis of TCCC is placed upon effectively training soldiers to apply lifesaving devices and techniques such as tourniquets and hemostatic agents in order to control hemorrhage until the casualty can be transported to a medical facility. However, these current practices are more applicable to extremity wounds; in fact, nearly half of hemorrhage deaths are related to “truncal penetrating trauma,” which cannot be field treated with a tourniquet or pressed manually.^{xix} Research and development (R&D) of cutting-edge technologies could therefore revolutionize TCCC and save more lives in combat, especially for soldiers who have incurred truncal penetrating trauma. Two products currently in development have the potential for such application – freeze-dried plasma and spray-dried plasma – and could receive FDA approval within months.^{xx}

Tension Pneumothorax & Airway Obstruction

The second and third leading causes of preventable combat death are tension pneumothorax (TP) and airway obstruction, respectively.^{xxi} While hemorrhage is by far the leading cause of preventable combat death and thus should be the primary focus of any TCCC, pneumothorax/airway conditions are a major concern that needs stabilization before transportation to a medical treatment facility. TP conditions are often incurred as a result of concussion to the lungs from a blast, blunt force trauma to the chest, and/or puncture trauma (e.g., gunshot wound). Current SOPs for field treating TP include applying occlusive bandages (airtight chest seals) and performing needle chest decompression, and for severe airway blockages, creating the nasopharyngeal airway.^{xxii} In conjunction with these SOPs, the introduction of new portable oxygen generators to the battlefield, which can supply “medical grade oxygen in a compact package,” has greatly improved the scope of TCCC.^{xxiii}

AMPUTEES AND SPINAL CORD INJURIES

Due to advances in body armor and combat casualty care technology, US soldiers are surviving injuries at a greater rate than ever before. Soldiers suffering even catastrophic wounds such as double lower extremity amputations are able to survive if given effective TCCC and prompt medical response. An almost greater challenge for the soldier comes in the aftermath of trauma in terms of rehabilitation. Amputees and spinal cord injured patients are often termed as “special patient populations” due to their unique needs in rehabilitation. For these populations, rehabilitation encompasses much more than prosthesis fitting – it entails access to and providing of new state-of-the-art prosthetics and orthotics, physical and occupational therapy designed to increase functionality and independence, and counseling therapy to address any psychological needs resulting from the trauma. The US Army Amputee Patient Care Program, established in December 2001, is one program specifically instituted to rehabilitate amputees returning from combat in the Middle East Theaters. Strong cooperation between the Department of Veterans Affairs (VA) and the DoD has further helped to support patient programs and expand upon research related to care of special patient populations.

CAREN System

One novel approach to rehabilitation of special patient populations is the utilization of the Computer Assisted Rehabilitation Environment (CAREN) system manufactured by Motek Medical. The CAREN system is a highly advanced virtual reality device that “consists of a 6 degrees of freedom (6 DOF) motion base with force plates or instrumented (dual belt) treadmill on top, a real-time motion capture system and a visual projection system with surround sound.”^{xxiv} CAREN users can be immersed in various scenarios that challenge their motion and balance in a safe, controlled environment. In collaboration with the Naval Medical Center San Diego (NMCS D) Physical Therapy Department, the Naval Health Research Center (NHRC) Warfighter Performance Department is a major operator of the CAREN system, and has had much success in application of the system for rehabilitation of amputees and Traumatic Brain Injury (TBI) patients. Due to the enormous challenges involved in rehabilitating soldiers who have lost limbs and/or motor skills in combat, the CAREN system is able to assist in the process by immersing the patients in virtual environments in which they learn to regain balance after simulated falls and recovering range of motion.

TRAUMATIC BRAIN INJURY (TBI)

Definition

Traumatic Brain Injury (TBI) is a very complex condition that researchers are still working to understand and treat. TBI is a result of trauma to the brain either by sudden violent force to the head or a puncture of the skull by an object with direct harm to brain tissue. Disabilities resulting from TBI are wide-ranging and depend on the severity and location of the injury. According to the National Institute of Neurological Disorders and Stroke (NINDS) TBI Information Page^{xxv}, some examples of disabilities include:

- Cognition (thinking, memory, and reasoning)
- Sensory processing (sight, hearing, touch, taste, and smell)
- Communication (expression and understanding)
- Behavior/mental health (depression, anxiety, personality changes, aggression, acting out, and social inappropriateness)

- More serious conditions:
 - Stupor – an unresponsive state in which the individual can be aroused briefly by a strong stimulus, such as sharp pain
 - Coma – individual is totally unconscious, unresponsive, unaware, and unarousable for a brief or extended period of time
 - Vegetative state – individual is unconscious and unaware but continues to have a sleep-wake cycle and periods of alertness
 - Persistent vegetative state (PVS) – individual remains in vegetative state for more than a month

Treatment

After sustaining a TBI, the patient will go through the following treatment cycle:^{xxvi}

1. Acute – Emergency medical care to treat any blood clots, hematomas, edema, etc. that occur as a result of the immediate trauma. This stage is basically intended to stabilize the patient; once stabilized, the patient will move to subacute treatment.
2. Subacute – Evaluate the extent of the injury, any disabilities that have been incurred, and outline a course for treatment and recovery. In this stage, patients with more severe cases will begin their rehabilitation, where their specialized needs can be met (often with treatment by physical therapists, speech therapists, etc.). TBI patients with mild to moderate injuries will likely spend little time in this stage, whereas those with more severe cases may spend years in subacute treatment centers.
3. Chronic – Many TBI patients will need long-term, if not lifelong rehabilitation to cope with chronic symptoms and/or permanent disabilities. Depending on the extent of the injury, rehabilitative treatment can include counseling, physical therapy, occupational therapy, speech therapy, medication, and/or application of and training in using assistive technologies.

TBI and the Warfighter

TBI has become a major concern for soldiers operating in the Middle East Theater. Blasts are by far the most common cause of injury in Iraq and Afghanistan^{xxvii} – the use by hostile forces of mines, rocket propelled grenades, roadside bombs, and improvised explosive devices (IEDs) in Iraq and Afghanistan has significantly increased the risk of soldiers incurring a TBI in combat. Not only are soldiers sustaining TBI from blast-related direct head trauma (e.g., flying debris, shrapnel, violent collisions against the ground or objects), but research evidence seems to indicate that proximity to a blast may also cause TBI, as a result of the wave of pressure (“primary wave”) causing overpressurization and axonal injury of the brain.^{xxviii}^{xxix} In response to the TBI ‘epidemic’ among Middle East Theater soldiers, the DoD issued DTM-09-033 (21 June 2010) which outlines a new policy to be enacted in the field that requires an immediate mandatory medical screening and treatment protocol to be followed for soldiers involved in any blast event, even including those who may appear unharmed or state that they feel normal.^{xxx} The directive provides an examination checklist which includes common symptoms of concussion/mild TBI (e.g., headaches, ears ringing, altered consciousness, dizziness), any perceptual change, and recorded distance from blast, as well as mandatory rest periods to be instituted for any soldiers who test positive in any evaluations.^{xxxi} This protocol is not intended

to diagnose moderate to severe TBI cases – which are easier for medics to spot – but rather, to determine any concussion/mild TBI experience that would otherwise go unrealized and provide medical care/rest, similar to a football player sustaining a concussion and being required to sit out for a duration of time. Most soldiers with a concussion/mTBI recover in a few days, but if returned to combat before healing is completed (which occurred often before when cases went undiagnosed), a second concussion “could cause significant damage.”^{xxxii} In addition to precautionary measures taken on the battlefield, all soldiers returning to the US from combat must undergo a TBI screening, in accordance with VHA Directive 2007-13. The VA Polytrauma System has seemed effective in diagnosing and treating soldiers returning with mTBI, despite the complexity of diagnosis factors and the propensity for comorbidity with other conditions such as Post-Traumatic Stress Disorder (PTSD) and somatic injuries.^{xxxiii}

POST-TRAUMATIC STRESS DISORDER (PTSD)

Definition and History

Post-Traumatic Stress Disorder, or PTSD, is an anxiety disorder that can occur after seeing or experiencing a traumatic, usually violent event, such as combat. Like TBI, researchers are still working to uncover more about PTSD because of the wide variance in occurrence, symptoms, and comorbidity with other conditions. PTSD is a rather ‘modern’ condition that has received attention by researchers and psychologists only in the latter half of the 20th century. Prior to then, in WWI, the condition was generally referred to as “shell shock” and was usually attributed to the cowardice of the soldiers, with treatments ranging from periods of rest to electric shock therapy intended to ‘revive the nerves’ of the soldier.^{xxxiv} WWII and the greatly expanded numbers of soldiers returning with “war neurosis” served to shift the perception of the condition toward the understanding that the condition was not based on predisposition (i.e., weak morale) as earlier believed, but rather was based on long-term stress endured during combat; however, despite the passing of legislation such as the National Mental Health Act (1945) and the subsequent expansion of mental health facilities for veterans, the scope of the condition was still not yet realized. It would not be until after the Vietnam War when returning soldiers displayed similar symptoms and a widespread inability to readjust to normalcy that serious action was taken in the form of psychological research. As a result, the condition known today as PTSD, first documented in the 1980 Diagnostic and Statistical Manual of Mental Disorders (DSM-III), was based heavily on theory and findings from the post-Vietnam era.^{xxxv}

Symptoms and Complications

Symptoms greatly vary on a case-by-case basis, but generally fall into similar patterns of behavior. According to the National Institutes of Health, the following are typical symptomatic patterns:^{xxxvi}

- Reliving – Flashback episodes, recurring memories, repeated dreams, physical reactions to similar situations/events
- Avoidance – Emotional numbing, carelessness, general apathy, social detachment and isolation, depression, inability to remember important aspects of the traumatic event (coinciding with post-traumatic amnesia)
- Arousal – Difficulty concentrating, exaggerated response to startling events, hypervigilance, irritability or anger, sleeping difficulties, sense of guilt (“survivor guilt”)

Diagnosis of TBI is often complicated by PTSD, because post-concussive symptoms greatly overlap with symptoms of PTSD (e.g., headaches, post-traumatic amnesia, concentration problems) and both conditions rely on retrospective self-reporting to indicate such.^{xxxvii} Controversy still surrounds the coexistence of the two conditions – some believe it may be more useful to combine the two conditions into a single syndrome such as the proposed “Combat-Related Brain Injury and Stress Syndrome,”^{xxxviii} while others continue to research the extent of misdiagnoses and capacity for TBI/PTSD comorbidity.^{xxxix}

Treatment

Because of the inherent psychological stresses, soldiers returning with even mild forms of PTSD are predisposed to complications with alcohol and/or drug abuse, depression, anxiety, and episodes of anger and violence, including suicide. Thus, treatment of PTSD generally involves extensive psychiatric therapy and medication management. According to the VA National Center for PTSD, some counseling therapy may include the following, all of which are proven to be effective methods of treating PTSD:^{xl}

- Cognitive Therapy – Helps the soldier understand and change thoughts about the trauma and aftermath.
- Exposure Therapy – Helps the soldier to lessen the fear associated with the trauma by learning to control traumatic thoughts and feelings.
- Eye Movement Desensitization and Reprocessing (EMDR) – A technique employed during counseling whereby the therapist will shift the focus of the soldier onto other stimuli, which can help change reactions to trauma.
- Group Therapy – Coping with trauma through empathic relationships with others who share similar backgrounds and stories.
- Medication – Selective serotonin reuptake inhibitors (SSRIs) can be administered as an effective antidepressant medication (e.g., Celexa, Prozac, Paxil, Zoloft).

7. Point(s) of Contact –

Questions of a technical or business nature should be submitted in writing to the NMLC Grants Officer via email at NMLC-Research@med.navy.mil. Please cite the BAA number and area of interest pertaining to your question in the subject line.

Amendments will be posted to one or more of the following web pages:

- Federal Business Opportunities (FEDBIZOPPS) Webpage – <https://www.fbo.gov/>
- Grants.gov Webpage – <http://www.grants.gov/>
- NMLC Research Webpage - <http://www.nmlc.med.navy.mil/DBU-RnG.asp>

8. Funds Available and Anticipated Number of Awards –

Funding has not been set aside specifically for this announcement and the number of awards is indeterminate. Selection of research projects is based on the evaluation of the proposal, programmatic review and the availability of funds.

9. Instrument Type(s) –

The Government reserves the right to fund all, some, or none of the proposals submitted. Offerors that are not responsive to NMLC requests for information in a timely manner, defined as meeting government deadlines established and communicated with the request, may be removed from award consideration.

The Government reserves the right to award the instrument best suited to the nature of the research. The Government may elect to make awards in the form of grants and cooperative agreements, with the possibility of awarding contracts as appropriate.

The Government may also provide financial support (if funds are available) for conferences or symposia that benefit explored areas of interest or mission objectives. This support will be provided through a conference grant.

10. Catalog of Federal Domestic Assistance (CFDA) Number –

12.340

11. Catalog of Federal Domestic Assistance (CFDA) Title –

Naval Medical Research and Development

12. Other Information –

Work funded under this BAA may include basic research, applied research, and some advanced research. With regard to restrictions on the conduct or outcome of work funded under this BAA, NMLC will follow the guidance on and definition of “contracted fundamental research” as provided in the Under Secretary of Defense (Acquisition, Technology, and Logistics) Memorandum of 24 May 2010.

As defined therein the definition of “contracted fundamental research” in a DoD contractual context, includes [research performed under] grants and contracts that are (a) funded by Research, Development, Test, and Evaluation Budget Category 6.1 (Basic Research), whether performed by universities or industry or (b) funded by Budget Category 6.2 (Applied Research) and performed on campus at a university. The research shall not be considered fundamental in those rare and exceptional circumstances where the applied research effort presents a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense, and where agreement or restrictions have been recorded in the contract or grant.

Pursuant to DoD policy, research performed under grants and contracts that are (a) funded by Budget Category 6.2 (Applied Research) and NOT performed on-campus at a university or (b) funded by Budget Category 6.3 (Advanced Research) does not meet the definition of “contracted fundamental research.” In conformance with the USD(AT&L) guidance and National Security Decision Direction 189, NMLC will place no restriction on the conduct or reporting of unclassified “contracted fundamental research,” except as otherwise required by statute, regulation, or Executive Order. For certain research projects, it may be possible that although the research being performed by the prime contractor is restricted research, a subcontractor

may be conducting “contracted fundamental research.” In those cases, it is the **prime contractor’s responsibility** in the proposal to identify and describe the subcontracted unclassified research and include a statement confirming that the work has been scoped, negotiated, and determined to be fundamental research according to the prime contractor and research performer.

Normally fundamental research is awarded under grants with universities and under contracts with industry. Non-fundamental research is normally awarded under contracts and may require restrictions during the conduct of the research and DoD pre-publication review of such research results due to subject matter sensitivity. Potential Offerors should consult with the NMLC Grant’s Officer to determine whether the proposed effort would constitute basic research, applied research or advanced research.

Federal Acquisition Regulation (FAR) Part 35 restricts the use of the Broad Agency Announcement (BAAs), such as this, to the acquisition of basic and applied research and that portion of advanced technology development not related to the development of a specific system or hardware procurement. Contracts, grants, and cooperative agreements made under BAAs are for scientific study and experimentation directed towards advancing the state of the art and increasing knowledge or understanding.

THIS ANNOUNCEMENT **IS NOT** FOR THE ACQUISITION OF TECHNICAL, ENGINEERING, AND OTHER TYPES OF SUPPORT SERVICES.

II. AWARD INFORMATION

The amount and period of performance of each selected proposal may vary depending on the research area and the technical approach to be pursued by the selected offeror. The period of performance of the project should begin within 6 to 12 months of the submission date of the White Paper. There is no funding limitation in the BAA. Requested funding support should be reasonable and appropriate based on the scope of the project.

The DoD Appropriations Act of 2011 (P.L. 112-10, Div. A) does not carry a limitation applied to reimbursements of indirect costs under grants, cooperative agreements, contracts, or similar arrangements through use of fiscal year 2011, basic research (6.1) funds.

In the case of funded proposals for the production and testing of prototypes, NMLC may during the award period add an award line item or option for the provision of advanced component development or for the delivery of additional prototype units.

III. ELIGIBILITY INFORMATION

All responsible sources from academia and industry may submit proposals under this BAA. Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals. However, no portion of this BAA will be set aside for HBCU and MI participation.

Federally Funded Research & Development Centers (FFRDCs), including Department of Energy National Laboratories, are not eligible to receive awards under this BAA. However, teaming arrangements between FFRDCs and eligible principal bidders are allowed so long as

they are permitted under the sponsoring agreement between the Government and the specific FFRDC.

Navy laboratories and warfare centers as well as other Department of Defense and civilian agency laboratories are also not eligible to receive awards under this BAA and should not directly submit either white papers or full proposals in response to this BAA. If any such organization is interested in one or more of the programs described herein, the organization should contact the NMLC Grant's Officer to discuss its area of interest. As with FFRDCs, these types of federal organizations may team with other responsible sources from academia and industry that are submitting proposals under this BAA.

Teams are also encouraged and may submit proposals in any and all areas. However, offerors must be willing to cooperate and exchange software, data and other information in an integrated program with other contractors, as well as with system integrators, selected by NMLC.

Some topics may cover export controlled technologies. Research in these areas is limited to "U.S. persons" as defined in the International Traffic in Arms Regulations (ITAR) – 22 CFR § 120.1 et seq.

For Grant and Cooperative Agreement applications:

The Federal Funding Accountability and Transparency Act of 2006 (Public Law 109-282), as amended by Section 6202 of Public Law 110-252, requires that all agencies establish requirements for recipients reporting information on subawards and executive total compensation as codified in 2 CFR 33.110. Any company, non-profit agency or university that applies for financial assistance (either grants or cooperative agreements) as either a prime or sub-recipient under this BAA must provide information in its proposal that describes the necessary processes and systems in place to comply with the reporting requirements identified in 2 CFR 33.220. An entity is **exempt** from this requirement **UNLESS** in the preceding fiscal year it received: a) 80 percent or more of its annual gross revenue in Federal contracts (and subcontracts), loans, grants (and subgrants), and cooperative agreements; b) \$25 million or more in annual gross revenue from Federal contracts (and subcontracts), loans, grants (and subgrants), and cooperative agreements; and c) the public does not have access to information about the compensation of the senior executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 or section 6104 of the Internal Revenue Code of 1986.

IV. APPLICATION AND SUBMISSION INFORMATION

See separate Application Instructions document.

V. EVALUATION INFORMATION

1. Evaluation Criteria –

Award decisions will be based on a competitive selection of proposals resulting from a scientific and cost review. Evaluations will be conducted using the following evaluation criteria. Criteria 1 through 4 are significantly more important than Criterion 5, and Criteria 1 through 4 are of equal value.

- 1) Overall scientific and technical merits of the proposal;
- 2) Potential Naval relevance and contributions of the effort to the agency's specific mission;
- 3) The offeror's capabilities, related experience, facilities, techniques or unique combinations of these which are integral factors for achieving the proposal objectives;
- 4) The qualifications, capabilities and experience of the proposed Principal Investigator (PI), team leader and key personnel who are critical in achieving the proposal objectives;
- 5) The realism and reasonableness of the proposed costs and availability of funds.

The degree of importance of cost will increase with the degree of equality of the proposals in relation to the other factors on which selection is to be based, or when the cost is so significantly high as to diminish the value of the proposal's technical superiority to the Government.

The Government will evaluate options for award purposes by adding the total cost for all options to the total cost for the basic requirement. Evaluation of options will not obligate the Government to exercise the options during performance of award.

2. Evaluation Panel –

Technical and cost proposals submitted under this BAA will be protected from unauthorized disclosure in accordance with FAR 3.104-4 and 15.207. The NAVMEDRSCHDEVCTR-Frederick Program Officer and other Government scientific experts will perform the evaluation of technical proposals. Restrictive notices notwithstanding, one or more support contractors may be utilized as subject-matter-expert technical consultants. However, proposal selection and award decisions are solely the responsibility of Government personnel. Each support contractor's employee having access to technical and cost proposals submitted in response to this BAA will be required to sign a non-disclosure statement prior to receipt of any proposal submissions.

VI. AWARD ADMINISTRATION INFORMATION

1. Administrative Requirements –

North American Industry Classification System (NAICS) code – The NAICS code for this announcement is "541712" with a small business size standard of "500 employees".

Central Contractor Registration: All Offerors submitting proposals or applications must:

- (a) Be registered in the Central Contractor Registration (CCR) prior to submission;
- (b) Maintain an active CCR registration with current information at all times during which it has an active Federal award or an application under consideration by any agency;
- (c) Provide its DUNS number in each application or proposal it submits to the agency.

Grants and Cooperative Agreement Certification Requirements:

Grant and Cooperative Agreement awards greater than \$100,000, under Section 845, require a certification of compliance with a national policy mandate concerning lobbying. Grant and Cooperative Agreement applicants shall provide this certification by electronic submission of SF424 (R&R) as a part of the electronic proposal submitted via Grants.gov (complete Block 17).

The following certification applies to each applicant seeking federal assistance funds exceeding \$100,000:

CERTIFICATION REGARDING LOBBYING ACTIVITIES

(1) No Federal appropriated funds have been paid or will be paid by or on behalf of the applicant, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the Federal contract, grant, loan, or cooperative agreement, the applicant shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The applicant shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, title 31, U.S.C. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

2. Funding –

Funding may be provided incrementally during the life of the award. Under cost-reimbursement type awards, payments are made in response to monthly vouchers or invoices submitted by the awardee. Under grants and cooperative agreements, advance payments are normally made periodically, in accordance with the negotiated payment schedule included in the award document.

3. Government Obligation –

Only a warranted Contracting/Grants Officer may obligate the Government to the expenditure of funds for awards under this BAA. The Government does not fund preparation of proposals or support research that is inferred from discussions with technical program officers.

4. Maximum Obligation –

The Naval Medical Logistics Command does not modify awards to provide additional funds for such purposes as reimbursement for unrecovered indirect/facilities and administrative costs resulting from the establishment of final negotiated rates or for increases in salaries, fringe benefits, and other costs

VII. OTHER INFORMATION

1. Government Property/Government Furnished Equipment (GFE) and Facilities

Government research facilities and operational military units are available and should be considered as potential government-furnished equipment/facilities. These facilities and resources are of high value and some are in constant demand by multiple programs. It is unlikely that all facilities would be used for any one specific program. The use of these facilities and resources will be negotiated as the program unfolds. Offerors should indicate in the Technical and Cost Proposal which of these facilities are critical for the project's success.

2. Security Classification

In order to facilitate intra-program collaboration and technology transfer, the Government will attempt to enable technology developers to work at the unclassified level to the maximum extent possible. If access to classified material will be required at any point during performance, the Offeror must clearly identify such need in the Technical and Cost Proposal.

Note - Normally, work under a grant does not require access to classified material.

3. Use of Animals and Human Subjects in Research

Proposals that intend to use award funds for studies that involve human subjects must address the involvement of human subjects and protections from research risk related to their participation in the proposed research project. Compliance with the applicable provisions concerning living organisms in paragraph *((a) For human subjects) is required. Research involving human subjects* will not be awarded or begin and no funds expended until all approvals have been obtained.

For any proposal for research involving human subjects, the Offeror must submit or indicate an intention to submit prior to award: documentation of approval from an Institutional Review Board (IRB); IRB-approved research protocol; IRB-approved informed consent form; proof of completed human research training (e.g., training certificate or institutional verification of training); an application for a DoD-Navy Addendum to the Offeror's DHHS-issued Federalwide Assurance (FWA) or the Offeror's DoD-Navy Addendum. In the event that an exemption criterion under 32 CFR.219.101 (b) is claimed, provide documentation of the determination by the Institutional Review Board (IRB) Chair, IRB vice Chair, designated IRB administrator or official of the human research protection program including the category of exemption and short rationale statement. This documentation must be submitted to a DON Human Research Protection Official by way of the Grants Officer. Information about assurance applications and forms can be obtained by contacting ONR_343_contact@navy.mil. If the research is determined by the IRB to be greater than minimal risk, the Offeror also must provide the name and contact information for the independent research monitor. DON HRPP guidance for human subject research is located at <http://www.med.navy.mil/bumed/humanresearch/>.

Similarly, for any proposals that intend to use award funds for studies involving animal use, the Offeror must address the involvement of animals in the proposed research project. Compliance with the applicable provisions concerning live organisms in paragraph *((b) For animals)* is required. Research involving animals will not be awarded or begin and no funds expended until all approvals have been obtained. The Department of the Navy reserves the right to conduct a post award site visit to the facility where animal work will take place.

If animals are to be utilized in the research effort proposed, the Offeror must complete a DoD Animal Use Protocol with supporting documentation (copies of AALAC accreditation if applicable or equivalent host country standards and/or NIH assurance, IACUC approval, research literature database searches within 6 months, and the most recent USDA inspection reports) prior to award. For assistance with submission of animal research related documentation, contact BUMED Veterinary Affairs at (301) 619-9241.

(a) For human subjects:

(1) Common Federal Policy for the Protection of Human Subjects codified by the Department of Health and Human Services (DHHS) at 45 CFR 46 Part A, and implemented by the Department of Defense at 32 CFR 219. This includes both a Federal-wide Assurance (FWA) administered by DHHS and a DoD-Navy Addendum. Information about assurance applications and forms can be obtained by contacting ONR_343_contact@navy.mil.

(2) DoD Instruction 3216.02 and applicable DON Component policies.

(3) 10 U.S.C. 980, Limitation on use of humans as experimental subjects.

(4) Food and Drug Administration policies and regulations, when applicable.

(b) For animals:

(1) Rules on animal acquisition, transport, care, handling, and use in (i) 9 CFR Parts 1-4, Department of Agriculture rules that implement the Laboratory Animal Welfare Act of 1966 (7 U.S.C 2131-2159, as amended); and (ii) the "Guide for the Care and Use of Laboratory Animals," 1996, published by the National Academy Press, Washington DC. This includes animal use assurance and accreditation.

(2) DoD Instruction 3216.01 and applicable DON Component policies.

(3) Prohibitions on the purchase or use of dogs and cats for certain medical training purposes, in Section 8019 (10 U.S.C. 2241 note) of the Department of Defense Appropriations Act, 1991 (Pub.Law 101-511).

(4) Rules of the Department of Interior (50 CFR Parts 10-14, 17-18, 23) and Commerce (50 CFR Parts 216-227) and other applicable regulations implementing laws and conventions on the taking possession, transport, purchase, sale, export or import of wildlife and plants, including the Endangered Species Act of 1973 (16 U.S.C. 1531-1543); Marine Mammal Protection Act (16 U.S.C. 1361-1384); Lacey Act (18 U.S.C. 42); and Convention International Trade in Endangered Species of Wild Fauna and Flora.

(5) Applicable rules and regulations regarding the use of harmful or dangerous viruses and other similar agents at 21 U.S.C. 154 and 9 CFR 117; and regarding import and exportation,

shipment and quarantine at 5 U.S.C. 301; 21 U.S.C. 111-113, 114a, 115-117, 120-126, and 151-158; 9 CFR 71-97 and 122; 42 U.S.C. 216 and 264-272 and 42 CFR 71-72.

(c) If a contract is awarded, the following DFARS clauses will be included:

252.235-7002 ANIMAL WELFARE (DEC 2011)

252.235-7004 PROTECTION OF HUMAN SUBJECTS (JUL 2009)

4. Research Involving Recombinant DNA Molecules

Proposals which call for experiments using recombinant DNA molecules and/or organisms and viruses containing recombinant DNA molecules must include documentation of compliance with the National Institutes of Health "Guidelines for Research Involving Recombinant DNA Molecules", of July 5, 1994 (59 FR 34496), amended August 5, 1994 (59 FR 40170), amended April 27, 1995 (60 FR 20726), and such later revision of those guidelines as may be published in the Federal Register.

5. Organizational Conflicts of Interest

All Offerors and proposed subcontractors must affirm whether they are providing scientific, engineering, and technical assistance (SETA) or similar support to any NAVMEDRSCHDEVCTR-Frederick technical office(s) through an active contract or subcontract. All affirmations must state which office(s) the offeror supports and identify the prime contract numbers. Affirmations shall be furnished at the time of proposal submission. All facts relevant to the existence or potential existence of organizational conflicts of interest (FAR 9.5) must be disclosed. The disclosure shall include a description of the action the offeror has taken or proposes to take to avoid, neutralize, or mitigate such conflict. In accordance with FAR 9.505 and without prior approval, a contractor cannot simultaneously be a SETA and a research and development performer. Proposals that fail to fully disclose potential conflicts of interests or do not have acceptable plans to mitigate identified conflicts will be rejected without technical evaluation and withdrawn from further consideration for award. If a prospective offeror believes that any conflict of interest exists or may exist (whether organizational or otherwise), the offeror should promptly raise the issue with NMLC by sending his/her contact information and a summary of the potential conflict by e-mail to the Business Point of Contact in Section I, item 7 above, before time and effort are expended in preparing a proposal and mitigation plan. If, in the sole opinion of the Contracting Officer after full consideration of the circumstances, any conflict situation cannot be effectively avoided or mitigated, the proposal may be rejected without technical evaluation and withdrawn from further consideration for award under this BAA.

6. Project Meetings and Reviews

Individual program reviews between the NAVMEDRSCHDEVCTR-Frederick sponsor and the performer may be held as necessary. Program status reviews may also be held to provide a forum for reviews of the latest results from experiments and any other incremental progress towards the major demonstrations. These meetings will be held at various sites throughout the country. For costing purposes, offerors should assume that 40% of these meetings will be at or near the client's site and 60% at other contractor or government facilities. Interim meetings are likely, but these will be accomplished via video telephone conferences, telephone conferences, or via web-based collaboration tools.

7. Executive Compensation and First-Tier Subcontract Reporting (Applies only to Contracts)

Section 2(d) of the Federal Funding Accountability and Transparency Act of 2006 (Pub. L. No. 109-282), as amended by section 6202 of the Government Funding Transparency Act of 2008 (Pub. L. 110-252), requires the Contractor to report information on subcontract awards. The law requires all reported information be made public; therefore, the Contractor is responsible for notifying its subcontractors that the required information will be made public.

Unless otherwise directed by the Contracting Officer, by the end of the month following the month of award of a first-tier subcontract with a value of \$25,000 or more, (and any modifications to these subcontracts that change previously reported data), the Contractor shall report the following information at <http://www.fsrs.gov> for each first-tier subcontract:

- (a) Unique identifier (DUNS Number) for the subcontractor receiving the award and for the subcontractor's parent company, if the subcontractor has one.
- (b) Name of the subcontractor.
- (c) Amount of the subcontract award.
- (d) Date of the subcontract award.
- (e) A description of the products or services (including construction) being provided under the subcontract, including the overall purpose and expected outcomes or results of the subcontract.
- (f) Subcontract number (the subcontract number assigned by the Contractor).
- (g) Subcontractor's physical address including street address, city, state, and country. Also include the nine-digit zip code and congressional district.
- (h) Subcontractor's primary performance location including street address, city, state, and country. Also include the nine-digit zip code and congressional district.
- (i) The prime contract number, and order number if applicable.
- (j) Awarding agency name and code.
- (k) Funding agency name and code.
- (l) Government contracting office code.
- (m) Treasury account symbol (TAS) as reported in Federal Procurement Data System.
- (n) The applicable North American Industry Classification System (NAICS) code.

By the end of the month following the month of a contract award, and annually thereafter, the Contractor shall report the names and total compensation of each of the five most highly compensated executives for the Contractor's preceding completed fiscal year at <http://www.ccr.gov>, if –

- (a) In the Contractor's preceding fiscal year, the Contractor received –
 - (i) 80 percent or more of its annual gross revenues from Federal contracts (and subcontracts), loans, grants (and subgrants) and cooperative agreements; and
 - (ii) \$25,000,000 or more in annual gross revenues from Federal contracts (and subcontracts), loans, grants (and subgrants) and cooperative agreements; and
- (b) The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at <http://www.sec.gov/answers/execomp.htm>).

Unless otherwise directed by the Contracting Officer, by the end of the month following the month of a first-tier subcontract with a value of \$25,000 or more, and annually thereafter, the Contractor shall report the names and total compensation of each of the five most highly compensated executives for each first-tier subcontractor for the subcontractor's preceding completed fiscal year at <http://www.fsr.gov>, if –

- (a) In the subcontractor's preceding fiscal year, the subcontractor received –
 - (i) 80 percent or more of its annual gross revenues from Federal contracts (and subcontracts), loans, grants (and subgrants) and cooperative agreements; and
 - (ii) \$25,000,000 or more in annual gross revenues from Federal contracts (and subcontracts), loans, grants (and subgrants) and cooperative agreements; and
- (b) The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at <http://www.sec.gov/answers/execomp.htm>).

If the Contractor in the previous tax year had gross income, from all sources, under \$300,000, the Contractor is exempt from the requirement to report subcontractor awards. Likewise, if a subcontractor in the previous tax year had gross income from all sources under \$300,000, the Contractor does not need to report awards to that subcontractor.

8. NMLC Assistance Agreement Terms & Conditions

The following terms and conditions (T&Cs) apply to assistance agreement awards made by NMLC:

- (a) T&Cs for Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations
- (b) T&Cs for For-Profit Organizations
- (c) T&Cs for Foreign Institutions

These T&Cs are located at <http://www.nmlc.med.navy.mil/DBU-RnG.asp>.

Endnotes

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ⁱⁱⁱ M. Tefvik Dorak, “Epidemiology of Infectious Diseases,” <http://www.dorak.info/epi/epiinf.ppt>.

^{iv} Ibid.

^v WHO, “Global Infectious Disease Surveillance.”
<http://www.who.int/mediacentre/factsheets/fs200/en/index.html>.

^{vi} US National Cancer Institute’s Surveillance Epidemiology and End Results (SEER), “Estimated cancer prevalence in the United States, 2007,” American Cancer Society, <http://www.cancer.org/Cancer/CancerBasics/cancer-prevalence>.

^{vii} American Cancer Society, *Cancer Facts & Figures 2009*. Atlanta, GA. 2009.

^{viii} Kangmin Zhu, Susan S. Devesa, et al, “Cancer Incidence in the US Military Population: Comparison with Rates from the SEER Program.” *Cancer Epidemiology, Biomarkers & Prevention*. 2009; 18: 1740-1745.

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^x Centers for Disease Control and Prevention. “National diabetes fact sheet: national estimates and general information on diabetes and prediabetes in the United States, 2011.” Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, 2011.

^{xi} DoD Instruction 6130.03, “Medical Standards for Appointment, Enlistment, or Induction in the Military Services,” 28 April 2010.

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http://www.usatoday.com/news/military/2010-02-09-treatment-army-alcohol_N.htm.

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<http://www.military.com/news/article/casey-says-army-suicide-rate-slowing.html>.

^{xvi} Michael Hoffman, “Guard, Reserve suicide rate sees big spike.” *ArmyTimes*, 19 January 2011.
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^{xvii} Rowan Scarborough, “Women in submarines face health issues,” *Washington Times*, 5 April 2010.
<http://www.washingtontimes.com/news/2010/apr/05/navy-faces-health-issues-for-women-in-submarines/print/>.

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- ^{xix} "DoD Conference Addresses Battlefield Bleeding," *US Medicine*, October 2010.
- ^{xx} Ibid.
- ^{xxi} "Tactical Combat Casualty Care in Special Operations," *Military Medicine Supplement*, August 1996.
- ^{xxii} USA TCCC lesson.
- ^{xxiii} "DoD Conference."
- ^{xxiv} Motek Medical, "CAREN system: medical and research system for human balance and locomotion." Product description. <http://www.motekmedical.com/CAREN-factsheetDoc2.pdf>.
- ^{xxv} National Institute of Neurological Disorders and Stroke, "NINDS Traumatic Brain Injury Information Page." <http://www.ninds.nih.gov/disorders/tbi/tbi.htm>.
- ^{xxvi} Brain and Spinal Cord.org, "Rehabilitation and Treatment for TBI," <http://www.brainandspinalcord.org/Treatment-rehab-tbi/index.html>.
- ^{xxvii} Stephen Mernoff and Stephen Correia, "Military Blast Injury in Iraq and Afghanistan: The Veterans Health Administration's Polytrauma System of Care." <http://www.rimed.org/medhealthri/2010-01/2010-01-16.pdf>.
- ^{xxviii} N.M. Elsayed, "Toxicology of Blast Overpressure," *Toxicology*, 121, 1-15, 1997
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- ^{xxxii} Gregg Zoroya, "Pentagon focuses on brain trauma," *USA Today*. http://www.usatoday.com/news/military/2010-03-01-traumatic-brain-injury_N.htm.
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