



# 2014 Command Accomplishments

## U.S. Army Medical Research and Materiel Command



### Combat Casualty Care / Trauma and Acute Care

- Concluded multi-year, multi-site study on Pragmatic Randomized Optimal Platelet and Plasma Ratios, a joint effort between the USAMRMC and the National Heart, Lung and Blood Institute, designed to determine the benefits of using equal amounts of plasma and red blood cells when performing blood transfusions on patients with traumatic injury (CCCRP).
- Supported the identification and preclinical testing of a single-injection four-drug combination (clonidine, buprenorphine, dexamethasone, bupivacaine) to treat acute post-traumatic pain over a long period of time with limited side effects (CDMRP).
- Modified the practical use of the Extracorporeal Membrane Oxygenation Machine to aid wounded Service Members during transport. The ECMO machine, which is essentially a modified heart-lung bypass machine, is now routinely used in transport by a specialized lung team that can manage the patient (CCCRP).
- Established the Military Orthopedic Trauma Registry specifically designed to capture data related to combat extremity injuries such as injury patterns, fractures, characteristics, treatment and complications associated with combat extremity injuries (USAISR/JTS).

- Identified that very low levels of repeated blast overpressure have a negative cumulative effect on the eyes. This data is important because it will lay the groundwork for perfecting a model head form to permit testing of better eye protection for Soldiers to prevent blast overpressure damage (USAISR).
- Provided Department of Defense representative of the White House National Security Council Staff Working Group, developed to build resiliency in the U.S. public in response to multiple casualty events, such as mass shootings or explosions (CCCRP).

### Brain Health

- Funded the evaluation of the Defense Automated Neurobehavioral Assessment tool, a TBI software product designed to help medical providers identify cases of TBI in almost any setting. The phone-based computer application, or app, received U.S. Food and Drug Administration clearance in October 2014 (CCCRP).
- Released new clinical recommendations to help Service Members who have sustained a mild Traumatic Brain Injury, otherwise known as a concussion, to progressively return to their normal activities following their injury. These clinical recommendations are available for military and civilian health care professionals (DCoE/DVBIC).

- Supported and managed the funding and eventual product clearance of the Ahead 100 tool, a headband-shaped device that measures a patient's brain waves. The product, designed to aid in the objective diagnosis of TBI, received clearance from the U.S. Food and Drug Administration in November 2014 (CCCRP).
- Demonstrated the utility of the Military Functional Assessment Program as a tool for determining fitness for duty in Soldiers after a head injury (USAARL).
- Developed an ecologically-valid high-fidelity simulation of blast-induced TBI in the laboratory and demonstrated that a primary blast sensitizes the brain to subsequent injury (WRAIR/MOMRP).
- Partnered with the National Collegiate Athletic Association to manage the Concussion Assessment Research Education consortium on behalf of the DOD. The effort will enroll over 30,000 student athletes from NCAA-member institutions and Military Service Academies to analyze the natural history of concussions and incorporate advanced tools to understand the neurobiopsychosocial basis of concussion injury and recovery (CDMRP).
- Established a collaborative, multi-disciplinary TBI Endpoints Development research team to advance clinically validated endpoints which can support regulatory approvals of TBI diagnostics and therapeutics. Management of this effort will leverage input from Combat Casualty Care, the U.S. Army Medical Materiel Development Activity and the U.S. Food and Drug Administration (CDMRP).
- Supported the entry of "legacy" data from completed psychological health and TBI studies into the Federal Interagency TBI Research informatics system to enhance system utility. FITBIR is a joint DOD and National Institutes of Health-developed platform to share data generated from funded TBI studies, facilitate and enhance collaboration and support the National Research Action Plan (CDMRP).
- Distributed more than 150 individualized program feedback reports to identified psychological health and TBI programs, detailing strengths and opportunities for development; launched monthly program evaluation webinars designed to familiarize program managers with universal program evaluation concepts; redesigned the program evaluation guide to increase its applicability to a broader audience of DOD program administrators; and stood up an operational and secure database that serves as a central repository of collected program information (DCoE).
- Designated the Military Health System TBI Pathway of Care manager for clinical, research, education and training activities through a memorandum issued by the Assistant Secretary of Defense for Health Affairs Sept. 17, 2014 (DCoE/DVBIC).
- Developed and provided a variety of educational resources for health care providers and beneficiaries, including guidance on traumatic brain injury, suicide and sexual assault (DCoE).
- Hosted the 15th annual Brain Awareness Week, a Science, Technology, Engineering and Math-focused event offering hands-on activities for middle-school students, engaging with neuroscientists and researchers on matters related to the study of the brain (NMHM).



## Burn Care

- Received FDA 510(k) clearance for the Burn Resuscitation Decision Support System-Clinical that was developed for use by burn personnel to manage and optimize fluid resuscitation of severely burned patients (USAISR).
- Demonstrated that a previously published augmented renal clearance risk scoring system accurately predicts lower plasma antibiotic levels and faster antibiotic clearance in trauma patients. This finding underscores the need for real-time antimicrobial monitoring to provide the most advanced personalized trauma care for patients. It also illuminates a technology gap for rapid point-of-care drug level assessment which is vital in establishing personalized medicine as the standard-of-care for all patients (USAISR).
- Implemented DOD's only sustainable Extracorporeal Life Support Program with the successful treatment of more than 12 patients with refractory pulmonary failure (USAISR).

## Flight Medicine

- Developed new standards for the measurement of the hearing protection of devices designed to protect against impulse noise, including a novel Acoustic Test Fixture which was developed for the realistic measurement of the impulse noise (USAARL).
- Collaborated with the NASA Langley Research Center in a full-scale crash test of a surplus CH-46 helicopter which, for the first time, measured in a full-scale crash the dynamic loads transmitted through a patient litter (USAARL).
- Developed new guidelines for face-form angle limits and prismatic effects for protective eyewear for pilots (USAARL).



# Ebola: Preparing and Responding

- Led Army medicine's efforts in the evaluation of several promising Ebola virus medical countermeasures in animal models, including the ZMapp therapeutic and the VSV vaccine. Currently testing another Ebola vaccine candidate in collaboration with the U.S. Agency for International Development in Uganda (USAMRIID WRAIR MHRP).
- Provided domestic and deploying medical providers with a process for accessing safe and effective medications to treat infectious diseases that have not yet been licensed for use in the U.S., including malaria and non-Ebola viral hemorrhagic fevers (USAMMDA).
- Trained more than 4,000 Department of Defense personnel in the proper wearing of personal protective equipment to ensure that no deploying Soldier or civilian lacked the necessary training to protect themselves against the dangerous virus (USAMRIID).
- Provided personnel, training and diagnostic laboratory support to the Liberian Institute for Biomedical Research on a continuous rotational basis (USAMRIID).
- Worked with clinicians in stateside military treatment facilities and abroad to synch Force Health Protection guidance with expert clinical practice guidelines (USAMMDA).
- Collaborated with the DOD Medical Countermeasure Systems and clinical infectious diseases experts to devise a strategy for how to manage high risk Ebola virus exposures among our Service Members (USAMMDA).
- Developed the real-time PCR assay—the gold standard diagnostic test for the Ebola virus—and pre-positioned it for use under a Food and Drug Administration emergency use authorization (USAMRIID).
- Provided National Reference Laboratory diagnostic testing for the Ebola virus when the Centers for Disease Control and Prevention closed for a safety stand-down. Analyzed more than 2,000 patient samples, performed more than 5,000 assays for the outbreak and provided all of the testing and evaluation supporting the more than 10,000 diagnostic assay kits used to detect the Ebola virus from patient samples in Liberia, Sierra Leone, and the U.S. (USAMRIID).
- Delivered seven Unit Deployment Packages, valued at \$1.15 million, containing forward surgical teams, area support medical companies, preventive medicine detachments and veterinary detachments in support of the U.S. AFRICOM and Operation United Assistance (USAMMA).
- Served as the Theater Lead Agent for medical materiel in support of the U.S. AFRICOM (USAMMCE).
- Supported Operation United Assistance with medical supplies to Western Africa (USAMMCE). Served as the supply chain integrators for medical logistics support to combatant commands (6th MLMC).
- Received worldwide recognition when Time magazine named the "Ebola fighters" as their 2014 Persons of Year on Dec. 10, highlighting the work of Army Medicine (USAMRMC).

## Behavioral Health

- Published the first functional-impairment scale developed specifically for a working military population. This achievement led to the incorporation of a short version of this scale into the MEDCOM-wide (soon to be DOD-wide) Behavioral Health Data Platform (WRAIR/MOMRP).
- Produced a patentable molecular signature that can characterize individual aspects of post-traumatic stress disorder and identified the eight specific dysfunctional issues embodied in the "gold standard" clinician-administered PTSD survey based on DSM-IV and DSM-5 (USACEHR).

## Readiness & Environmental Medicine

- Demonstrated the efficacy of a calcium and vitamin D fortified snack product for the optimization of bone health during Army basic combat training in a randomized, placebo-controlled trial. This product is ready to transition and units such as the Marine Corps, Parris Island, want to incorporate calcium and vitamin D supplementation into recruit preparation standard operating procedures (USARIEM).

- Transitioned two Android OS software decision aids, including the Altitude Readiness Management System and the Soldier Water Estimation Tool, to the U.S. Army Medical Materiel Development Activity's Medical Support Systems Program Management Office and Program Executive Office Soldier, PM Nett Warrior. The ARMS app provides guidance to mitigate the impact of high altitudes. The SWET app provides estimates of hydration requirements tailored to the environment, uniform and work rate of the Soldier, providing preventative medicine guidance to prevent environmental injury and sustain optimal performance (USARIEM).
- Reported Permethrin exposure from fabric-treated military uniforms under different wear-time scenarios in military populations. This work identified the likely absorbed concentration of Permethrin, a common synthetic chemical widely used as an insecticide, in military personnel wearing the treated uniforms and is the first study to contribute to developing wear guidelines for special populations, such as pregnant women (USARIEM).
- Developed, patented and licensed to private industry, a core temperature estimation algorithm for embedded use in physiological status monitoring systems. Formalized a technology transition agreement to develop a tactically acceptable real-time physiological status monitoring system as well as a Cold Weather Ensemble Decision Aid, a mission planning tool for estimating cold weather clothing needs based on mission and activity (USARIEM).
- Began clinical trials for first-of-its-kind, pharmaceutical-grade, anti-plaque chewing gum for humans developed at the Dental and Trauma Research Detachment. The active ingredient known as KSL-W is a novel anti-microbial peptide that kills bacteria and is designed to prevent the development of dental plaque and may reduce gingivitis, tooth decay, and periodontal diseases (USAISR).
- Transitioned the Probability of Survival Decision Aid to the U.S. Coast Guard for mandated use during search and rescue operations. The PSDA was also transitioned internationally under the Coast Guard's software system for predicting survival in marine environments (USARIEM).
- Completed over \$6 million in laboratory upgrades to create a 4,100 square foot systems biology laboratory, a 2,600 square foot rodent vivarium and a supporting freight elevator (USACEHR).

## Biodefense

- Assumed partial occupancy of the newly constructed MRICD replacement facility on Nov. 19, 2014. This marks the largest physical change since the establishment of the current facility a half-century ago (USAMRICD).
- Hosted the 19th Biennial Medical Defense Bioscience Review conference titled "Advances in Medical Chemical Defense." More than 300 scientists from government, academic and commercial organizations within the United States and seven other countries convened to survey the latest research to develop medical countermeasures to protect against the effects of chemical warfare agents and biological neurotoxins (USAMRICD).

- Presented research progress updates at the National Institutes of Health, National Institute of Neurological Disorders and Stroke, Countermeasures Against Chemical Threats annual meeting. Twenty-seven scientists and command staff briefed Counter-ACT program administrators on various aspects of executing an approximately \$10 million effort across 15 research projects (USAMRICD).

## Infectious Disease

- Achieved FDA 510K Clearance of the Leishmania Rapid Diagnostic Device, a hand-held "dipstick" device for the rapid diagnosis of cutaneous leishmaniasis. This device allows expeditious implementation of treatments, which can reduce the severity of scarring, reduce lost duty time and improve health care and morale for U.S. military personnel in numerous areas of operations (USAMMDA).
- Supported a Full-Rate Production contract for Adenovirus Vaccine Type 4 and Type 7 Vaccine, Live, Oral which will provide uninterrupted delivery of vaccines to all military basic training facilities through December 2019 (USAMMDA).
- Completed the Chikungunya Arthropod Vector Rapid Detection Device development and laboratory evaluation, making the device commercially available for purchase. The device provides field surveillance capability of Chikungunya disease in mosquito vectors, enhancing vector control operations and thus reducing incidence of disease (WRAIR/MIDRP).
- Demonstrated the effectiveness of a small-molecule drug in protecting nonhuman primates from the lethal Marburg virus and published the study results online Mar. 2 in the journal Nature (USAMRIID).
- Supported 1,016 facilities in Kenya, Tanzania and Nigeria in the provision of HIV treatment, supporting more than 180,000 patients who are on Anti-Retroviral Therapy, and counseling and testing more than 1.4 million women (WRAIR).

## Acquisition, Materiel & Logistics

- Communicated and tracked 1,119 Medical Materiel Quality Control messages to more than 8,000 Joint stakeholders; requisitioned 1.7 million doses of influenza vaccine valued at \$20.2 million to more than 110 locations globally; monitored 2,200 shipments of anthrax, smallpox and adenovirus vaccines totaling \$46.2 million; with more than 99 percent delivered without any loss due to temperature changes (USAMMA).
- Fielded 7,500 pieces of medical equipment and 2,386 medical sets in support of modernization, equipping and reset missions. Procured and fielded more than \$77 million in medical materiel set kits, outfits and medical equipment, enhancing and sustaining readiness (USAMMA).

- Completed the Modular Lightweight Load-Carrying Equipment Medic Bag collaborating with the Program Executive Office Soldier, Project Manager Soldier Protection and Individual Equipment, and shipped more than 500 bags to Afghanistan. The new bag is lighter, lower profile, compatible with the Soldier's body armor and modular with a tiered approach to treatment (USAMMDA).
- Completed the Individual First Aid Kit Generation 2 as a collaborative effort with PEO Soldier, PM SPIE, as part of a rapid fielding initiative and procured 134,580 kits for fielding to deploying units. The bag is now less bulky to prevent snagging on vehicle doors and hatches during emergency egress and includes a second Combat Application Tourniquet along with a chest seal, eye shield and a combat casualty care card (USAMMDA).
- Executed \$74 million in foreign military sales to more than 15 countries, including 22 thousand packages of flu vaccine for the Afghan National Army and the Afghan National Police (USAMMA).
- Completed 325 medical equipment sets for ground ambulance used by the Afghanistan Army and National Police, in support of multinational effort (USAMMCE).

### Forensics and Toxicology Science

- Developed a new next generation sequencing method for obtaining DNA results from chemically modified specimens which will potentially help in the identification of approximately 800 sets of remains from the Korean War, all of which were previously unidentifiable using existing DNA testing methods (AFMES).
- Trained Navy sexual assault prevention and response officers to support fleet leadership and increase the Navy's ability to combat sexual assault (AFMES).
- Instituted testing for synthetic drugs and expanded detection of prescription drugs in the Navy's urinalysis program to address an increase in wrongful prescription drug use (AFMES).

### Cancer Research

- Supported the discovery that much of the damage that ultraviolet radiation does to skin occurs hours after sun exposure, highlighting the potential for post-exposure protectants to block skin carcinogenesis (CDMRP).
- Supported the development of a multi-pronged approach to lower polyamine levels in neuroblastoma, a lethal childhood cancer, preclinical models, leading to the initiation of a Phase 1 clinical trial of polyamine-targeting drugs in combination with conventional chemotherapy in children with relapsed neuroblastoma (CDMRP).
- Supported the discovery that inhibition of focal adhesion kinase, a protein involved in cell migration, reduces the viability and survival of lung cancer cells, leading to the initiation of a multicenter Phase 2 clinical trial of defactinib, a potent inhibitor of FAK, to treat K-RAS-mutated non-small cell lung cancer patients (CDMRP).

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