aceso

Austere environments Consortium
for Enhanced Sepsis Outcomes

OUR MISSION

Improve survival for patients with sepsis
in austere settings through development of
host-based diagnostic and prognostic assays
and evidence-based clinical management.

ABOUT US

The Austere environments Consortium for Enhanced Sepsis Outcomes (ACESO) is an international team of investigators headquartered at the Naval Medical Research Center (NMRC) and comprised of DoD, non-profit, and academic partners. ACESO is dedicated to improving survival of patients with severe infections in resource-constrained environments. Founded in 2013, ACESO implements a coordinated program of research aimed at improving, early recognition, diagnosis, and effective treatment of sepsis from all causes in austere environments. Particular attention focuses on infections that currently have no specific therapies or present unique risks to the US military or global health security.

ACESO GOALS

Clinical Management

- Evidence-based guidelines for clinical care.
- Continuous monitoring and treatment adaptation.
- Pathogen-agnostic, employable in far-forward facilities.
- Precision medicine tools for severe infections.
- Deep learning for continuous algorithm refinement.

Sepsis biology and host biomarkers

- Discover host biomarkers of sepsis pathophysiology.
- Develop sepsis classifiers for mortality, severity and infecting pathogen class.
- Systems biology approach with integrated multi-omics data.
- Sepsis profiling for response-to-treatment prediction.
- Develop field-deployable point-of-care diagnostic devices for far-forward use.
- Biomarker-based patient stratification for targeted therapies.

Clinical Trials Capabilities

- Biosurveillance of current and emerging infectious diseases.
- Insight into long-term health effects of severe infections.
- Platform to conduct regulated clinical trials for diagnostics and therapeutics.
- Strengthen research and clinical capabilities in resource-limited settings.
- Operational logistics in austere settings globally including trained personnel, supply chain and mobile deployment features.
- Maintain compliant clinical data capture systems.

Why we should care about Sepsis

Sepsis is defined as a dysregulated host response to infection. It is the primary cause of death from infection and, historically, the most common cause of death for combat casualties after the first 24 hours. An estimated 15-20 million sepsis cases occur worldwide annually, approximately half of which result in death. Enhanced supportive care strategies improve sepsis survival in highly-resourced Western settings, but those strategies have yet to be adapted for the resources and epidemiology of austere environments in tropical and developing regions.

ACESO Sites

Maryland
ACESO HQ

N Carolina
Duke University

Ghana
JWARG

Liberia
JWARG

Uganda
JMEDICC

Cambodia

Darwin, Australia

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Biomarkers: Rapid Advances

ACESO aims to identify elements of human host's response to an infection that could provide information on the infectious etiology or predict the clinical course.

We are evaluating transcriptomic, proteomic, and metabolomic profiles of severely ill patients in order to:

- Differentiate bacterial vs. viral infections vs. non-infectious causes
- Predict disease severity and risk of death
- Evaluate response to treatment and identify early treatments failures

Once identified, these host-based markers will be transitioned to point-of-care assays that could be used in austere settings.

JMEDICC
Joint Mobile Emerging Disease Intervention Clinical Capability
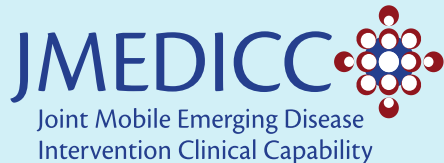
- JMEDICC is a new collaboration led jointly by ACESO/NMRC, Joint Program Executive Office – Chemical and Biological Defense (JPEO-CBD), United States Army Medical Research Institute of Infectious Diseases (USAMRIID), and the Walter Reed Army Institute of Research/US Military HIV Research Program (MHRP) to provide real-time clinical trial response for Ebola/Marburg disease outbreaks.

- JMEDICC is developing clinical trials in a Western Uganda Regional Referral Hospital to develop a framework in accordance with both US and Host Nation regulatory and safety guidelines in order to initiate baseline clinical research protocols to study clinical characteristics and appropriate management of sepsis. JMEDICC is working concurrently with industry sponsors, FDA, Ugandan government, and other relevant organizations to develop Investigational New Drug Protocols for clinical trials of candidate therapeutics. In addition, JMEDICC will establish corresponding mobile capability integrated with the Ugandan National Task Force to deploy to outbreak sites. JMEDICC's vision is create a clinical research center of excellence able to deploy clinical trial capability into Ebola/Marburg outbreak settings in Uganda and in the region.

JOINT WEST AFRICA RESEARCH GROUP
JWARG

JWARG is a joint Army-Navy collaboration aiming to strengthen clinical research capacities in West Africa to address the gaps identified during the West African Ebola outbreak and advance DoD readiness for emerging infectious disease threats. The JWARG implementation leads are ACESO/NMRC and MHRP/WRAIR, with close collaboration with Walter Reed Program-Nigeria, ACESO, Naval Medical Research Unit 3-Ghana Detachment, the African Center for Excellence for Genomics of Infectious Diseases (ACEGID) in Nigeria, Liberian Institute for Biomedical Research (LIBR), and other military, non-profit and academic institutions. ACESO has established clinical research sites in partnership with the Komfo Anokye Teaching Hospital (KATH) in Ghana and Phebe Hospital in Liberia. JWARG's initiatives are focused on clinical management of tropical diseases, strengthening host-country lab and clinical capabilities, biosurveillance and medical countermeasure development.

CARB

As a critical component of the National Action Plan for Combating Antibiotic-Resistant Bacteria (CARB), the Department of Defense (DoD) is pursuing an active portfolio of research to counter the emerging threat of antimicrobial resistance (AMR). ACESO is pursuing a set of two linked and tiered activities with high potential for disruptive advances in countering AMR. (1) ACESO is actively characterizing AMR via advanced molecular methods in clinically relevant pathogens in Southeast Asia and West Africa through an observational study. (2) Systems biology approach integrating AMR data with host biomarker signals that can be used for early recognition and appropriate clinical management of severe infections.

Medical Surveillance of US Marines in Darwin, Australia

ACESO is conducting a study to characterize the risk of melioidosis, a severe disease caused by infection with the bacterium *Burkholderia pseudomallei*, to Marine Rotational Force Darwin (MRF-D). With the goal of protecting the Warfighter through continuous medical surveillance and development of new screening tools, this program will have a direct impact on force health protection and inform medical countermeasure development.

ACESO Collaborators

U.S. NAMRU-2 PHNOM PENH • CAMBODIA · MUWRP Makerere University Walter Reed Project · MHRP U.S. MILITARY HIV RESEARCH PROGRAM · KATH Komfo Anokye Teaching Hospital-Kumasi · menzies school of health research · Duke UNIVERSITY · GEORGE MASON UNIVERSITY · NAVAL MEDICAL RESEARCH CENTER U.S. NAVY · WAKE FOREST UNIVERSITY · THE LIBERIAN INSTITUTE FOR BIOMEDICAL RESEARCH · UNIVERSITY OF NEVADA RENO 1874