



# USAMRDC WRAIR

## WALTER REED ARMY INSTITUTE OF RESEARCH

### MISSION

Discover, design, and develop solutions for military relevant infectious disease and brain health threats through innovative research protecting and optimizing warfighter lethality

### BACKGROUND

Since 1893, the Walter Reed Army Institute of Research has been a leader in solving the most significant threats to Soldier readiness and lethality. WRAIR's research capabilities at its headquarters in Silver Spring, Md., and laboratories around the world work in concert to afford Soldiers the best protection and support possible before, during and after deployment. Though WRAIR's work maintains Soldier health, its products also have important civilian applications, saving countless lives around the world.

WRAIR has operated nearly a dozen expeditionary laboratories, often as formal partnerships between the U.S. Army and local militaries, universities and other institutions. These programs foster U.S.-host nation collaborations in disease surveillance, outbreak response, biomedical research and product development to support Soldier health and global health. WRAIR's modern expeditionary network includes laboratories in Southeast Asia, sub-

Saharan Africa, the Republic of Georgia, and Tacoma, Washington.

WRAIR's mission in the 21st century has been redefined into two research centers of excellence: the Center for Infectious Disease Research and the Center for Military Psychiatry and Neuroscience. CIDR focuses on the prevention, diagnosis and treatment of military-relevant infectious diseases while CMPN scientists innovate new means to improve psychological resilience, harness the link between sleep and performance and understand and overcome blast, concussive and traumatic brain injuries. In 2018, a new center of excellence, the Center for Enabling Capabilities, was established to unite the capabilities that allow WRAIR to quickly and effectively innovate: the Veterinary Services Program, the Clinical Trials Center and the Pilot Bioproduction Facility. WRAIR is built to detect, mitigate and eliminate medical threats to Soldiers allowing them to face any enemy, anywhere in the world.



## KEY THEMES AND MESSAGES

From its founding in 1893 when WRAIR's faculty made medical breakthroughs in the U.S., Cuba, the Philippines and Puerto Rico, the expeditionary research of today's WRAIR now stretches to four continents.

WRAIR's network of countermeasure development, pre-clinical trials and clinical trials capabilities are built to detect, mitigate and eliminate medical threats to Soldiers allowing them to face any enemy, anywhere in the world.

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### EXPEDITIONARY NETWORKS

#### **U.S. Army Medical Directorate—Armed Forces Research Institute of Medical Sciences (USAMD-AFRIMS)**

Headquartered in Bangkok, Thailand, AFRIMS is a joint undertaking between the U.S. and Thai militaries with satellite surveillance and research sites across Southeast Asia. AFRIMS scientists and physicians have developed diagnostics, preventives, and therapeutics against infectious diseases for more than 60 years. Major accomplishments include clinical trials for Japanese encephalitis, hepatitis A and dengue vaccines, contributing to their licensure; participation in the discovery, development or testing of nearly all U.S. Food and Drug Administration-approved antimalarial drugs and leading the world's largest HIV vaccine efficacy trial, demonstrating for the first time that a vaccine can be protective

#### **U.S. Army Medical Research Directorate—Africa (USAMRD-A)**

Based in Nairobi, Kenya, with clinical research centers and field sites across sub-Saharan Africa, USAMRD-A works closely with local institutions, including the Kenya Medical Research Institute, military research facilities and academic laboratories, to address infectious disease threats and conduct disease surveillance, training, research and outbreak response. USAMRD-A has completed or implemented numerous clinical trials for vaccines and therapeutics to protect against malaria or HIV; supported efforts to monitor and combat Zika, Ebola and microbial drug resistance and conducted one of the first and largest community-based HIV cohort studies and completed research in high risk populations that provided critical insight to early HIV infection pathogenesis.

#### **U.S. Army Military Research Directorate—West (USAMRD-W)**

USAMRD-W is located at Joint Base Lewis-McChord in the state of Washington and focuses on improving psychological resilience. USAMRD-W leads applied field studies in deployed, training and home-station environments to identify emerging and existing behavioral health concerns in Service Members. It also guides potential training and intervention efforts to improve psychological health and well-being throughout the Pacific region. USAMRD-W staff have deployed overseas as part of multiple Mental Health Advisory Teams to review the behavioral health burden among U.S. personnel and guide improvements in field resources and implemented a series of studies examining the impact of organizational culture on unit health, well-being and performance.

#### **U.S. Army Military Research Directorate—Georgia (USAMRD-G)**

USAMRD-G was established in 2014 at the Richard M. Lugar Center for Public Health Research in Tbilisi, Georgia, a state-of-the-art, internationally certified Central Reference Laboratory and Repository. USAMRD-G executes its mission of global health security by building scientific and medical capacity; monitoring infectious disease threats and multidrug resistant organisms and using its laboratory facilities to support U.S. and allied forces deployed within U.S. European Command. USAMRD-G has advanced bacteriophages as novel treatment strategies against multidrug resistant bacterial infection, monitored invasive mosquito populations serving as disease vectors to help quantify the risk of transmission to Service Members and continues to establish itself in the region by building capacity and developing local partnerships.

## TRAINING OPPORTUNITIES

WRAIR is proud to support the U.S. Army's mission to develop a more scientifically and technologically literate citizenry with a range of science education and professional development programs. WRAIR leverages its world-class scientists and facilities to offer a collaborative, cohesive portfolio of opportunities that effectively engage students of all proficiency levels, interests, social, and economic backgrounds in meaningful, real-world STEM experiences as well as paid internships and fellowships with Army-sponsored mentors.

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### **Accredited Training Programs:**

*U.S. Army Laboratory Animal Medicine Residency Training Program.* Select U.S. Army Veterinary Corps Officers assigned to WRAIR complete a 2-3 year clinical and didactic training program approved by the American College of Laboratory Animal Medicine (ACLAM).

*Clinical Pharmacology Fellowship.* This is a two-year accredited fellowship is available to active-duty Army physicians who are board eligible/certified in a primary specialty and active duty Army PhDs/PharmDs (71A, 71B, or 67E) who have a doctoral degree in one of the life or medical sciences from an accredited academic institution in the United States, Canada, or non-U.S. degree equivalent.

### **Community Outreach Programs:**

*Gains in the Education of Mathematics and Science (GEMS):* GEMS is a one week hands-on program available throughout the summer for rising 7th through 12th graders aimed at involving and engaging young people with STEM early in their academic careers. The program uses a multi-disciplinary educational curriculum with age-appropriate, hands-on activities in a teaching laboratory. Students may choose either a biomedical or engineering focus.

*Science and Engineering Apprenticeship Program (SEAP):* Since 1981, the WRAIR has accepted academically advanced high school students to participate in hands-on research experiences in research laboratories under the direction of scientists-mentors during the summer. SEAP students gain valuable scientific experience and present their research at the end of the program.

*Near-Peer Mentor (NPM):* NPMs are undergraduate or recent post-baccalaureate students who intern as teachers and mentors to the GEMS students. Near-peer mentorship develops participants as researchers and educators, improving academic knowledge, written and

oral communication skills, and other professional and collaborative skills.

*College Qualified Leaders (CQL) Program:* CQL provides undergraduate students seeking summer internships opportunities to participate in research at WRAIR while being mentored by experienced Army researchers. A wide range of opportunities are available, especially in the areas of infectious disease and brain health research. The 10-12 week internship concludes with submitting an abstract and a public poster presentation.

### **Other Training Programs:**

*Oak Ridge Institute of Science Education (ORISE) Fellowships:* ORISE fellowships at WRAIR are opportunities for members of the STEM academic community (undergraduate and graduate students, recent graduates, postdocs, and university faculty members) to work alongside and be mentored by Army scientists. With flexible, renewable appointments, ORISE provides recent graduates with research opportunities to help prepare motivated students for a career in STEM while providing them with laboratory knowledge to use in pursuit of an advanced degree.

*National Research Council (NRC) Fellowships:* NRC fellowships at WRAIR are post-doctoral opportunities for members of the STEM academic community to work alongside and be mentored by Army scientists. NRC Research Associates are able to advance their careers by conducting research full time in the largest biomedical laboratory in the Department of Defense. WRAIR's laboratories overseas are also research sites for selected fellows.

## CONTACT WRAIR

Website: [www.wrair.army.mil](http://www.wrair.army.mil)

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## ACCOMPLISHMENTS

### WRAIR has developed or validated:

- New vaccines against hepatitis A and B, adenovirus, influenza virus, Japanese encephalitis virus (new recombinant vaccine in 2009), meningococcal infection and rubella (German measles)
- A Zika vaccine within 9.5 months of the first confirmed cases in the United States
- All FDA-approved malaria prevention drugs
- Battlemind training to manage combat stress, now part of Comprehensive Soldier and Family Fitness (CSF2) training.
- Mindfulness-based attention training to improve resilience
- iCOVER training to allow peer-to-peer treatment of acute stress reactions
- The Controlled Human Malaria Infection model where volunteers are safely exposed to a curable strain of malaria to test malaria countermeasures
- Tools to improve and sustain unit and small team cohesion
- Mental Health Advisory Teams to assess Service Member mental health status and behavioral care delivery system in deployed settings
- BH Pulse, a toolkit for assessing a unit's behavioral health compared to other units
- 2B-Alert, sleep optimization software to assess in real-time Soldier fatigue and provide recommendations to improve performance
- The first HIV vaccine to show any efficacy

### WRAIR has identified:

- Heterosexual transmission of HIV
- Protein markers of traumatic brain injury (TBI) to enable the eventual production of a field-ready biomedical device capable of identifying TBI in Service Members
- Drug candidates to address moderate and severe TBI
- That a thoracic Kevlar vest protects the brain in air shock tube exposures
- That blast exposure without secondary impact can induce brain injury
- That sleep is "banked" - extended nighttime sleep protects against performance deficits in a subsequent week of sleep restriction