



USARIEM

United States Army Research Institute of Environmental Medicine



*An Overview by
COL Gaston P. Bathalon,
USARIEM Deputy Commander*

Warfighter Health & Performance Since 1961

Unclassified



A photograph of two soldiers in full combat gear, including helmets and camouflage uniforms, in a desert setting. One soldier is in the foreground, crouching and pointing a rifle towards the right. Another soldier is partially visible behind him. The background shows a vast, arid landscape under a clear blue sky.

Our Mission

USARIEM conducts biomedical research to improve and sustain Warfighter performance and health under all conditions.





Our Vision

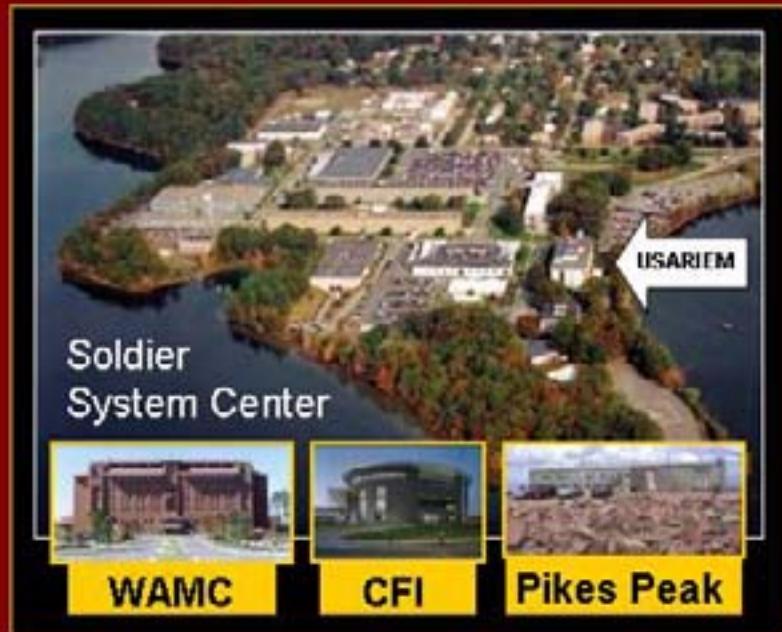
USARIEM will be internationally recognized as the joint center of excellence for Warfighter performance and health research.



Facilities and Personnel

Facilities:

- USARIEM / Womack Army Medical Center (WAMC) Medical Research Facility, Fort Bragg, NC
- USARIEM Maher Memorial Altitude Research Laboratory, Pikes Peak, CO
- Research Director, Center for the Intrepid (CFI), Fort Sam Houston, TX



Number of Personnel

Military	Civilians	Interagency Personnel Agreement	On-site Contractors	TOTAL
57	93	2	32	184



Unique Capabilities

- Doriot Climatic Chambers
- Hypobaric chambers and hypoxia room
- Biophysical chambers / thermal manikins
- Environmental chambers
- Water Immersion Laboratory
- Center for Military Biomechanics Research
- Bone Health Laboratory
- Human Exercise Physiology Laboratory
- Laser and flow cytometers



Organization



Biophysics &
Biomedical
Modeling Division



Military Nutrition
Division



Military Performance
Division



Thermal & Mountain
Medicine Division

Research Support Division

Biophysics & Biomedical Modeling Division (S&T Portfolio)

Develops and validates biomedical models to simulate the effects of heat, cold, high altitude, hydration, nutritional status (metabolic enhancers), and clothing systems and equipment on Warfighter performance.

Core capabilities:

- Clothing biophysics
- Biomedical / predictive modeling
- Physiological modeling



Military Nutrition Division (S&T Portfolio)

Conducts research on nutritional issues affecting Warfighters, and supports the Surgeon General's responsibilities as the Department of Defense executive agent for nutrition. Evaluates new rations and examines the interactions between nutrition, performance and the environment.

Core capabilities:

- Bioenergetics and metabolism
- Healthy weight management
- Combat ration testing

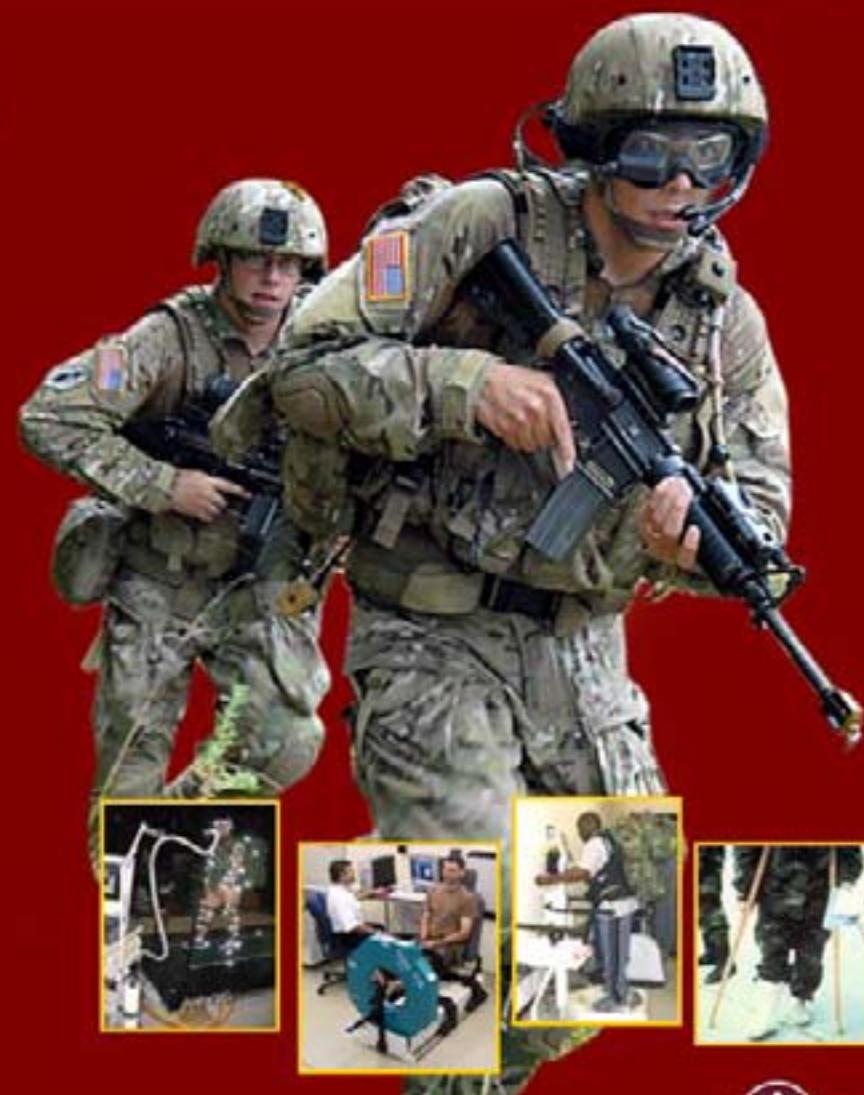


Military Performance Division (S&T Portfolio)

Conducts research to optimize or prevent Warfighter performance (physical, cognitive, behavioral and psychomotor) during military tasks, due to physical overload, nutritional deprivation, environmental and operational stresses, and musculoskeletal injuries.

Core capabilities:

- Physical performance optimization
- Injury reduction / bone health
- Military biomechanics research
- Cognitive performance, decision-making and judgement



Thermal & Mountain Medicine Division (S&T Portfolio)

Conducts biomedical research to sustain/enhance performance (physical/cognitive) and minimize medical problems during military operations at environmental extremes of heat, cold and high terrestrial altitude.

Core capabilities:

- Cold stress physiology
- Heat stress physiology
- High altitude physiology
- Environmental illness
(cold & heat injury and mountain sickness)
- Hydration



Research Support Division

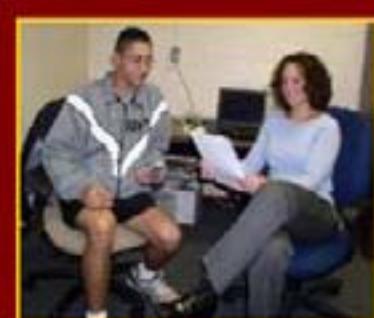
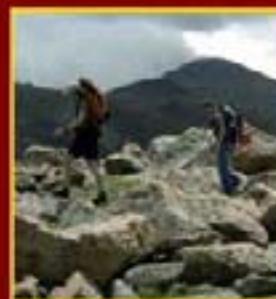
■ Human and Animal Protections Programs

- Medical and veterinary
- Regulatory compliance
- Institutional Review Board
- Credentials
- Quality assurance



■ Human Research Volunteers

- Soldiers
- Civilian



■ Facilities management ■ Information management ■ Logistics ■ Personnel ■ Resource management (budget) ■ Technical transfer/marketing/public affairs



Responding to Current & Future Training/Deployment Problems

Current Core Competencies

- Hot, cold and high terrestrial altitude environments
- Acclimatization, performance and environmental injury
- Heat exchange and clothing biophysics
- Predictive modeling and physiological monitoring
- Warfighter performance (physical and cognitive)
- Nutrition and metabolism
- Injury epidemiology
- Biomechanics
- Bone health



MOMRP Research Priorities – Strategic Focus

Priority 1

Injury Prevention



PHYSICAL THREATS

- Blast Overpressure
- Blunt Body Trauma
- Traumatic Brain Injury
- Musculoskeletal and Training Injury

USAARL/USARIEM

Priority 2

Psychological Health and Resilience



PSYCHOLOGICAL THREATS

- PTSD
- Suicide
- Family Separation
- Stigma/Barriers to Care
- Mild Traumatic Brain Injury (Concussion)

WRAIR/NHRC

Priority 3

Mission Reset and Recovery



PHYSIOLOGICAL THREATS

- Sleep Loss/Disruption
- Fatigue and Burnout
- Work Overload
- Loss of Situational Awareness
- Inadequate Nutrition

WRAIR/USARIEM

Priority 4

Environmental Health and Well-Being

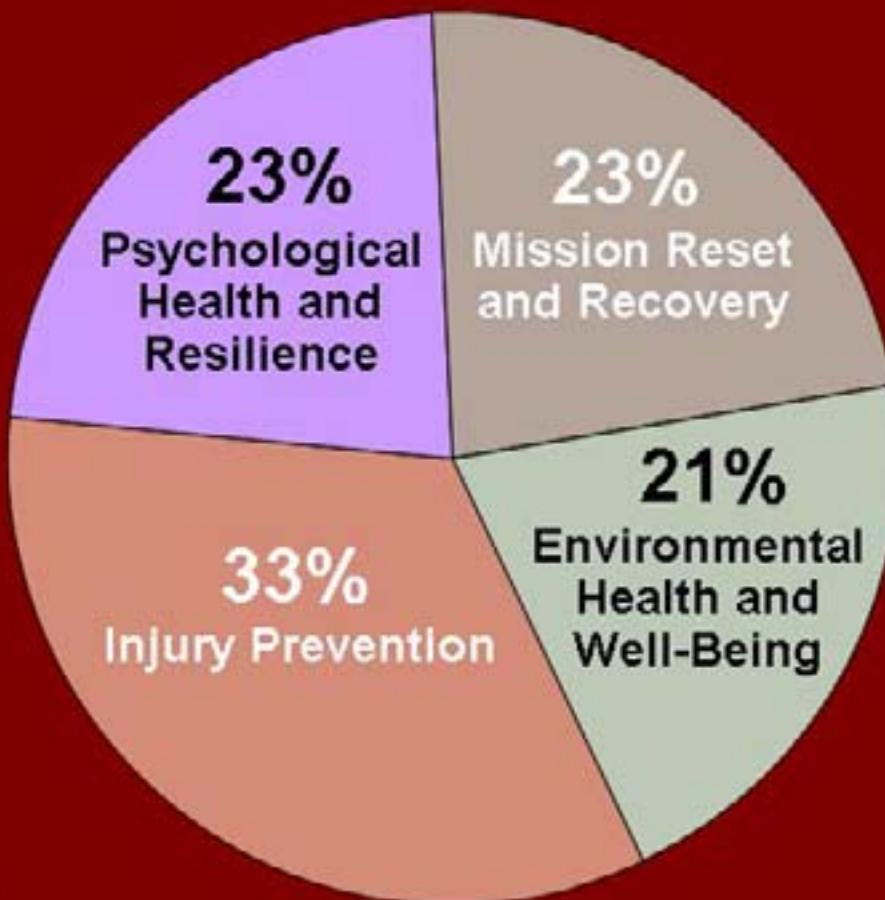


ENVIRONMENTAL THREATS

- Toxic Industrial Chemicals and Materials
- Heat/Cold/Altitude
- Dust and Air Pollution

USARIEM/USACEHR

MOMRP Program Area Funding Distribution Strategic Focus



USARIEM
~\$13M



Major Partnerships/Collaborations

Academia

- American College of Sports Medicine
- Applied Physics Lab (Johns Hopkins)
- Boston University
- Brown University
- Dartmouth College
- Framingham State University
- Institute of Soldier Nanotechnologies (MIT)
- Iowa State University
- Kent State University
- Louisiana State University / Pennington Biomedical Research Center
- Massachusetts General Hospital
- Massachusetts Institute of Technology
- North Carolina State University
- Tufts University
- University of Colorado Health Science Center
- University of Massachusetts
- University of Montana
- University of Nebraska Medical Center
- USAF Academy
- Worcester Polytechnic Institute

Government

- Air Force Research Laboratory
- Alaska Air National Guard
- Army Research Laboratory
- Battle Lab
- Defense Advanced Research Projects Agency
- Future Force Warrior Program Office
- Communications and Electronics Command
- Food and Drug Administration
- MEDCOM:
 - AMEDD Center & School
 - DDEAMC, Fort Gordon
 - Guthrie Ambulatory Health Care Clinic, Fort Drum, NY
 - Keller Army Community Hospital, West Point
 - USACHPPM
 - Walter Reed Army Medical Center
 - Womack Army Medical Center
- Natick Soldier Research, Development, and Engineering Center
- NATO/TTCP Panels
- Natick Soldier Systems Center
- Naval Air Systems Command
- Naval Health Research Center
- PEO Soldier
- USATC Fort Jackson
- USAF Hum Sys Ctr
- USAMRMC:
 - TATRC
 - USAISR
 - USAMRIID
 - WRAIR
- US Department of Agriculture:
 - Forest Service
 - Grand Forks Human Nutrition Research Center

Industry

- Aware, Inc.
- Center for Integration of Medicine and Innovative Technology
- Designturn, Inc.
- Foster-Miller, Inc.
- GlaxoSmithKline
- Hanoun Medical
- Hidalgo Limited
- Hyperion Biotechnology, Inc.
- MEDicept, Inc.
- Respiration, Inc. / Mini-Mitter, Inc.
- Odic, Inc.
- Precision Control Design, Inc.
- SAIC
- SARCOS Research Corporation
- Unilever Foods North America
- Vivometrics, Inc.





THE WHITE HOUSE

PRESIDENT GEORGE W. BUSH



<http://www.whitehouse.gov/news/releases/2007/11/20071108-8.html>

http://www.huffingtonpost.com/2007/11/09/in-pictures-president-bu_n_71991.html



Army boss calls Natick Soldier Center "a national treasure"

Casey said the Natick center is most important because of what it will bring to future conflicts.



"We need to invest in our armed forces to insure we have the armed forces this country needs for the 21st century."

- GEN Casey, CSA

USARIEM Research Products



Health Hazard Assessment

USARIEM coordinates with the Center for Health Promotion and Preventive Medicine (CHPPM) for thermal and hypoxic conditions.

Materiel Development Support

USARIEM recommends product improvements for clothing, equipment, nutrition and pharmaceuticals by providing design specifications to improve individual Warfighter equipment and rations.



Monitoring Strategies & Predictive Algorithms

USARIEM has developed strategies for personal status monitoring and a variety of algorithms to prevent and detect Warfighter performance decrements.

Performance Optimization Doctrine

USARIEM produces training policy and guidelines that provide recommendations to enhance Warfighter capabilities and reduce health risks.

Preventive Medicine & Planning Doctrine

USARIEM produces preventive medicine guidelines to minimize Warfighter injuries and reduce lost duty time and medical costs.

Who Uses this Research?



Commanders & Preventive Medicine Officers (e.g., TRADOC, FORSCOM, SOCOM, CHPPM)

Example: Rapid physical train-up with simultaneous injury reduction

Example: Environmental Extreme Operational Guidance



Materiel Developers (e.g., NSC, PEO-Soldier)

Example: Performance enhancing ration components

Example: Thermal & Physical Strain reduction by uniform / personal equipment



Combat Developers and others

(e.g., Infantry School, AMEDD C & S, MOUT/Dismounted Battle labs)

Example: Warfighter Physiological Status Monitor-Initial Capability

Example: Soldier Performance Prediction Models

*We don't make the Soldier's equipment, we help
make the Soldier & their equipment better...*

Gap Issues

■ Mission:

- Educate, inform, market USARIEM capabilities, products, and expertise
- Ensure laboratory skills/capabilities are in line with Army transformation
- OP tempo decreases availability of Soldier research volunteer pool

■ Workforce:

- Recruitment and retention of future scientists/leaders:
- Documenting workload (Manpower Survey scheduled):
 - Military authorizations (i.e., shortage of 71B, physiologists, authorizations)

■ Aging infrastructure – “new USARIEM” unfunded military construction project



Proposed USARIEM laboratory

Our Research Touches Every Warfighter, Every Day



*Responding to the new and
changing needs of a
nation at war.*



Current, Relevant & Scientifically Valid



We don't make the Soldier's equipment, we help make the Soldier & their equipment better.



Opinions, interpretations, conclusions, and recommendations contained herein are those of the author and are not necessarily endorsed by the U.S. Army.