

Damage Control Resuscitation

Research is focused on the major cause of death on the battlefield: hemorrhage. Accomplishments of this program include the fielding of safe and effective tourniquets and two generations of improved hemostatic dressings. This research area also focuses on studying and reducing the lethal triad of acidosis, hypothermia, and coagulopathy. Much future effort will be on identifying better means to treat noncompressible hemorrhage as well as investigating genetic, genomic, and immunological responses to trauma and hemorrhage.

Extremity Trauma and Regenerative Medicine

Research is focused on defining the injuries being incurred and conducting preclinical studies to determine which therapies have the greatest potential for treatment of infection, soft tissue injury, and bone injury. In addition, the regenerative medicine program is investigating stem cell utilization as a therapy for these types of injuries. This group is also involved in a multi-center consortium for clinical trials and with the Armed Forces Institute of Regenerative Medicine (AFIRM).

Diverse USAISR Staff

To accomplish these research goals, the USAISR employs a diverse workforce of military and civilian surgeons, nurses, pathologists, physiologists, biochemists, microbiologists, veterinarians, dentists, and other technical and administrative personnel.

Army's Greatest Invention Awards

- 2004** — Chitosan Hemostatic Dressing
- 2005** — Combat-Application-Tourniquet™
- 2007** — Damage Control Resuscitation of Severely Injured Soldiers
- 2008** — Combat Gauze for Treating Hemorrhage in Injured Soldiers
- 2009** — Burn Fluid Resuscitation Decision Support System

History

- 1943**—Established as the Surgical Research Unit at Halloran General Hospital, Staten Island, New York. Initially studied antibiotics for treating war wounds and expanded to study innovative surgical techniques and developments.
- 1947**—Moved to Brooke General Hospital, Fort Sam Houston, Texas.
- 1949**—Mission expanded to encompass the study of thermal injury.
- 1950s**—As the Army's "Burn Unit," became a class II activity of the Surgeon General and later assigned to HQ, U.S. Army Medical Research and Development Command. Became premier dialysis research center. Research on plasma extenders, grafting and preservation of blood vessels, and the artificial kidney.
- 1994**—Became a subordinate command of U.S. Army Medical Research and Materiel Command (USAMRMC). Expanded research focus to include battlefield injury and combat casualty care.
- 2003**—USAISR Burn Center implemented mission of caring for war casualties from Iraq and Afghanistan.
- 2010**—Battlefield Health and Trauma (BHT) Research Institute collocated with the USAISR. Established an entity that integrates all services' combat casualty care research missions and functions into a multifaceted synergistic research capability with a clinical foundation.

Optimizing Combat Casualty Care



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U.S. ARMY INSTITUTE OF SURGICAL RESEARCH

Optimizing
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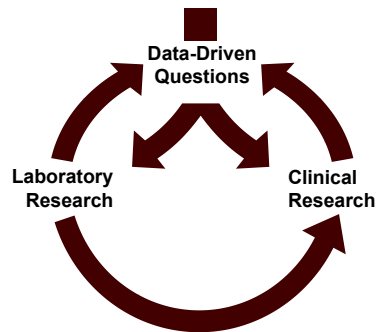
Fort Sam Houston, Texas

USAISR

The USAISR is one of six research laboratories within the U.S. Army Medical Research and Materiel Command (USAMRMC). The institute is the U.S. Army's lead research laboratory for improving the care of combat casualties.

Research Philosophy

Battlefield Medical Problems



Joint Trauma System

JTS is an organized approach to providing improved trauma care across the continuum of the levels of care to trauma patients and provide for the right care to the right casualty at the right location and the right time. A component of the JTS is the Joint Theater Trauma Registry (JTTR). JTTR captures, maintains, and reports all battlefield injury demographics, care, and outcomes into a single database. JTTR implements a capability to collect the continuum of provided care with outcomes at follow-on medical facilities.

Burn Center/Clinical Trials

The clinical trials area has two primary objectives. The first objective is to observe current combat casualties to identify emergent challenges and opportunities for improved care. In particular, as the only DoD burn center, the USAISR is uniquely positioned to observe patterns of injury and implement programs in order to prevent and better treat burn patients. The second is to translate preclinical research from other task areas within the USAISR into a clinical environment for validation. Examples of translational effort include use of test wound care dressings in donor sites and assessment of damage control resuscitation strategies in the Burn Center operating room.

Burn Flight Team

The Burn Flight Team (Special Medical Augmentation Response Team-Burn) provides expert consultation, care, and transport for military burn and trauma casualties worldwide. Since 1952, teams from the Burn Center have provided triage, resuscitation, treatment, and evacuation of thousands of casualties injured in combat and disasters.

Dental and Trauma Research Detachment

The Dental and Trauma Research Detachment (DTRD) is collocated with U.S. Navy and U.S. Air Force dental research units at the newly established Battlefield Health and Trauma (BHT) Research Institute. DTRD is pursuing a full spectrum of research projects from basic science to translational and clinical research to better understand and develop real solutions to mitigate dental disease in service members and optimize treatment of maxillofacial battlefield injuries with the goal of returning them to full function. In fulfilling this mission, the task area focuses its efforts on four major areas of research: Combat Dentistry, Maxillofacial Battlefield Injuries, Biofilm Impaired Wound Healing, and Face Burns and Mitigation of Scars.

Blood and Eye Injuries

The newest research areas are blood and eye injuries. The Blood Research Group focuses on the use of blood and blood products in treating combat casualties. These include freeze-dried plasma and platelets, whole blood and red blood cells. Pathogen identification and inactivation in blood are also being studied. Eye injury research encompasses all areas regarding laser-induced injury and combat trauma to the eye.

Pain Control

The Pain Control group has been investigating pain from battlefield to bedside. Focus is placed on determining the effect of battlefield pain and pain control on short- and long-term outcomes. The use of intranasal ketamine and the use of a virtual reality computer program "Snow World" as an adjunct to opiate-based drugs are two examples of research efforts in this area.

Casualty Care Engineering

This group is focused on improving care on the battlefield through development and better use of technology. Technology in this sense means hardware and software systems that incorporate sensors and processors and includes new vital signs and automated critical care.

Emergency Medical Monitoring

Research is focused on identifying and integrating physiological measures that reflect the complexity of compensatory responses during the early dynamic phases of hemorrhage. The goal is to apply this knowledge to direct the development of new technologies and devices that advance the medical monitoring capabilities of combat medical personnel for triage, diagnosis, and decision-making relative to combat casualty management.