



59th Medical Wing



59MDW Science & Technology Joint Austere Medicine Overview Trauma and Clinical Care Research

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DISCLAIMER



Warrior Medics – Mission Ready – Patient Focused

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Trauma and Clinical Care Research



Warrior Medics – Mission Ready – Patient Focused

Mission

Advance technologies and knowledge for emergent and primary care in austere environments.

Vision

Conduct clinical research to support austere missions by enabling technologies and new knowledge that will empower medical personnel in providing superior patient care that improves the human condition throughout the continuum~ from the point-of-injury, en route, and the CONUS-based hospital environment.

Goals

- 1) Execute clinical research to improve readiness and provider skill sustainment using emerging technologies and applications.
- 2) Investigate innovative strategies to triage, resuscitate, stabilize, and transport the sick and injured.
- 3) Contribute to standardization and implementation of clinical methods, procedures, and practice for care of battlefield and non-battlefield injuries.



Trauma and Clinical Care Research



Warrior Medics – Mission Ready – Patient Focused

FRONTLINE ILLNES & EXPOSERE RECOVERERE CARE EFFORTS (FIERCE)

MEDICAL DIRECTOR: MAJ STEVEN SCHAUER, MC, USA

Focus: Improve early detection methods, treatment, and recovery from communicable illness, and non-battlefield injuries to improve return to duty turnaround times.

CLINICAL RESUSCITATION, EMERGENCY SCIENCE, TRIAGE, & TOXICOLOGEMY (CREST²)

MEDICAL DIRECTOR: LT COL JOSEPH MADDRY, MC, USAF

Focus: Provide advanced triage and resuscitation to trauma and medical casualties in resource limited environments.

ENROUTE CARE RESEARCH CENTER (ECRC)

MEDICAL DIRECTOR: LT COL JOSEPH MADDRY, MC, USAF

Focus: Improve casualty care and survival during evacuation and transport maneuvers.

SURGICAL AND TECHNOLOGICAL ADVANCEMENTS FOR TRAMATIC INJURIES IN COMBAT (STATIC)

MEDICAL DIRECTOR: LT COL VALERIE SAMS, MC, USAF

Focus: Research and development of smart, cyber, and autonomous strategies for therapeutic and technological interventions for patients experiencing pain, cardiopulmonary, and multi-organ failure.

IMPROVEMENTS IN NEROLOGICAL SENSORE & PERCEPTIBLE RESEARCH (INSPR)

MEDICAL DIRECTOR: TO BE NAMED

Focus: Improve identification, diagnosis, and treatment of trauma involving head, neck, and spine injuries, and neurological and sensory injuries as a result of force or directed energy.



Theater Care Paradigm Shift



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Joint Austere Medicine

Post-Acute Care
Dept of Veteran
Affairs

US-based MTF
Full Range/
Definitive Care

OCONUS
Definitive Care

Delayed
Evacuation &
Mass Casualty
Care

Joint Integrative/Clinical Medicine

Small
Specialized
Scoop and Run
Teams

Point of Injury



VAHealth



Program Highlights: FIERCE



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FRONTLINE ILLNESS & EXPOSURE RECOVERY CARE EFFORTS (FIERCE)

MEDICAL DIRECTOR: MAJ STEVEN SCHAUER, MC, USA

Focus: Improve early detection methods, treatment, and recovery from communicable illness, and non-battlefield injuries to improve return to duty turnaround times.

Competencies:

- Clinical research on medical devices for establishing airways
- Novel training and skills emergency skills sustainment
- Advanced sensor development
- Value-based care research
- Machine learning and artificial intelligence for ultrasound
- Research and development of autonomous medical support systems
- Multicenter clinical trials





Program Highlights: FIERCE



Warrior Medics – Mission Ready – Patient Focused

FRONTLINE ILLNESS & EXPOSURE RECOVERY CARE EFFORTS (FIERCE)

MEDICAL DIRECTOR: MAJ STEVEN SCHAUER, MC, USA

Focus: Improve early detection methods, treatment, and recovery from communicable illness, and non-battlefield injuries to improve return to duty turnaround times.

Training future medical care providers:

- Emergency Medicine residents
- SAMMC EMS Fellows
- Pediatrics residents
- Internal Medicine residents

Representative Projects:

- Iview vs Glidescope comparison for endotracheal intubation
- Novel shape polymer foam for hemorrhage control
- A prospective trial of low-dose, high frequency on site training to improve trauma field care in austere settings
- Multicenter implementation trial of targeted normoxia to define O₂ requirements for combat casualty care





Program Highlights: CREST²



Warrior Medics – Mission Ready – Patient Focused

CLINICAL RESUSCITATION, EMERGENCY SCIENCE, TRIAGE, & TOXICOLOGY (CREST²)

MEDICAL DIRECTOR: LT COL JOSEPH MADDRY, MC, USAF

Focus: Provide advanced triage and resuscitation to trauma and medical casualties in resource limited environments.

Competencies:

- Extracorporeal life support training techniques and course development
- Large animal models for hemorrhage and resuscitation therapeutic evaluation and fluid requirements
- Medical toxicology and antidote evaluation





Program Highlights: CREST²



Warrior Medics – Mission Ready – Patient Focused

CLINICAL RESUSCITATION, EMERGENCY SCIENCE, TRIAGE, & TOXICOLOGY (CREST²)

MEDICAL DIRECTOR: LT COL JOSEPH MADDRY, MC, USAF

Focus: Provide advanced triage and resuscitation to trauma and medical casualties in resource limited environments.

Representative projects:

- Hydroxocobalamin for neuroprotection and survival in a hemorrhagic swine model traumatic brain ischemia
- Combat-relevant injuries amenable to ECLS (Preclinical and clinical hemorrhage, blast, TBI, pneumonectomy, liver injuries, renal failure)
- (E-CATCH) "En route Care: Advancing Trauma Care through Handoffs (E-CATCH) – a prospective trial to improve handoffs, patient safety, and anticipate the need for life-saving medical interventions





Program Highlights: ECRC



Warrior Medics – Mission Ready – Patient Focused

EN ROUTE CARE RESEARCH CENTER (ECRC)

MEDICAL DIRECTOR: LT COL JOSEPH MADDRY, MC, USAF

Focus: Improve casualty care and survival during evacuation and transport maneuvers.

Competencies:

- Clinical en route care
- Research and development of en route medical technologies
- Impact of transport on clinical outcomes for complex and non complex injuries
- Impacts of altitude during patient care including ECLS systems
- Clinical guideline improvements, document monitoring, patient hand-off and decision support





Program Highlights: ECRC



Warrior Medics – Mission Ready – Patient Focused

EN ROUTE CARE RESEARCH CENTER (ECRC)

MEDICAL DIRECTOR: LT COL JOSEPH MADDRY, MC, USAF

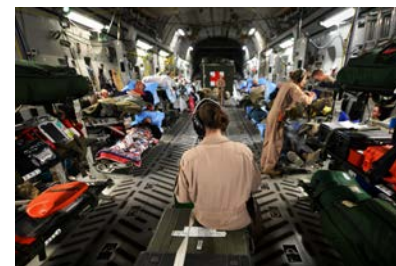
Focus: Improve casualty care and survival during evacuation and transport maneuvers.

Training future medical care providers:

- Emergency Medicine Residents
- SAMMC EMS Fellows
- Pulmonology Fellows
- Pediatrics

Representative Projects:

- Influence of Time to Transport on Clinical Outcomes Following Evacuation from Theater
- A Comparison of Mechanical Ventilation Methods in Transport of Critically Injured and Ill Patients by CCATT
- Patients Amenable to Unmanned Aerial Vehicle Evacuation
- A Retrospective Comparison of Burn Casualties Transported by the US Army Burn Flight Team (BFT) and US Air Force Critical Care Air Transport Teams (CCATT)





Program Highlights: **STATIC**



Warrior Medics – Mission Ready – Patient Focused

S**URGICAL AND T**ECHNOLOGICAL A**DVANCEMENTS FOR T**RAUMATIC I**NJURIES IN C**OMBAT (STATIC)************

MEDICAL DIRECTOR: LT COL VALERIE SAMS, MC, USAF

Focus: Research and development of smart, cyber, and autonomous strategies for therapeutic and technological interventions for patients experiencing pain, cardiopulmonary, and multi-organ failure.

Competencies:

- Large and small polytrauma animal models
- Immunomodulation of trauma
- Extracorporeal life support research
- Virtual reality in far forward environment to supplement pain management measures
- Test and evaluation of surgical devices
- Evaluation of arterial shunts in a controlled hemorrhage swine (*Sus scrofa*) model (GME project)
- Wound infection control; ISO testing for FDA clearance





Program Highlights: **STATIC**



Warrior Medics – Mission Ready – Patient Focused

SRGICAL AND TECHNOLOGICAL ADVANCEMENTS FOR TRAUMATIC INJURIES IN COMBAT (STATIC)

MEDICAL DIRECTOR: LT COL VALERIE SAMS, MC, USAF

Focus: Research and development of smart, cyber, and autonomous strategies for therapeutic and technological interventions for patients experiencing pain, cardiopulmonary, and multi-organ failure.

Training future medical care providers:

- 7 trauma critical care fellows (slots for 8 total- 4 AF and 4 Army, 2 each per year for 2 years).
- 1 dedicated general surgery resident per year and 2-3 working on projects along with medical students

Representative Projects:

- Use of Hypertonic Saline After Damage Control Laparotomy to Improve Early Primary Facial Closure
- 4 residents , 1 medical student
- Extracorporeal Life Support (ECLS) projects
- 2 General Surgery Residents
(1 per year, plus 1 medical student and 1 PA student)

Past specialty training:

- Nephrology fellow
- 2 Pulmonary critical care fellows
- Anesthesia resident





Program Highlights: INSPR



Warrior Medics – Mission Ready – Patient Focused

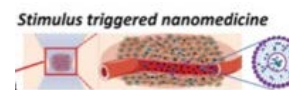
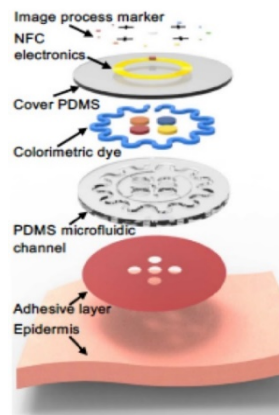
IMPROVEMENTS IN NEUROLOGICAL SENSORY & PERCEPTIBLE RESEARCH (INSPR)

MEDICAL DIRECTOR: TO BE NAMED

Focus: Improve identification, diagnosis, and treatment of trauma involving head, neck, and spine injuries, and neurological and sensory injuries as a result of force or directed energy.

Competencies:

- Large and small restorative and regenerative animal models
- Neuroregeneration
- Targeted therapeutic, monitoring/diagnostic strategies
- Regenerative medicine and scaffolds; organ perfusion
- Stem cell therapies
- Directed energy models and clinical diagnoses, and interventions
- Biosensors for triage





Program Highlights: INSPR



Warrior Medics – Mission Ready – Patient Focused

IMPROVEMENTS IN NEUROLOGICAL SENSORY & PERCEPTIBLE RESEARCH (INSPR)

MEDICAL DIRECTOR: TO BE NAMED

Focus: Improve identification, diagnosis, and treatment of trauma involving head, neck, and spine injuries, and neurological and sensory injuries as a result of force or directed energy.

Training future medical care providers:

- 5 residents from University of Texas Health San Antonio General Surgery Program

Specialty training:

- ENT Mentorship beyond fellowship
- ORISE- 4 participants

Representative Projects:

- Development of Prototype Soft Epidermal Biosystems with Advanced Sensing Capabilities for Warfighters in Triage Settings
- Regenerative Medicine
 - Limb Salvage, Nerve Regeneration, and Scaffold Systems
- Prolonged Field Care
 - Tissue Salvage and Preservation, Bone Regeneration & Negative Pressure Wound Therapy (NPWT) Sponges



Initiation of PSION:



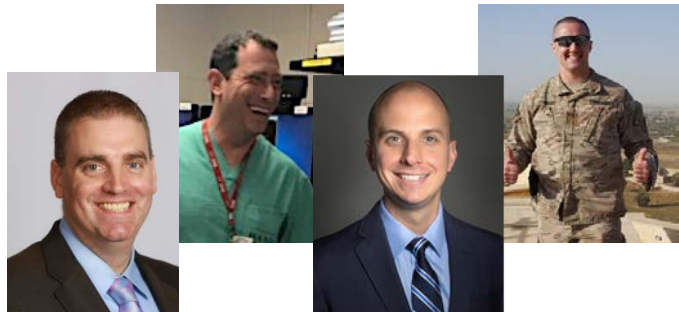
Provider-Scientist Investigator Opportunity Network

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Program Characteristics

- Highly-Selective and Competitive
- Open to **ALL** Services
- Research Focused on Service-Specific and Joint Gaps
- Encourages Partnership, Collaboration, and Communication Across the Military Health Systems Enterprise

INAUGURAL CLASS:
 MAJ GREGORY DION (ENT)
 LTC DAVID KAUVAR (VASCULAR)
 MAJ STEVEN SCHAUER (EM)
 MAJ ANDREW SHEEAN (ORTHO)



Program Goals

- Promotes Retention
- Grows Medical Leaders
- Advances and Strengthens **Military** Clinical Research

PSION LEADERSHIP:
 LT COL JOE MADDRY (DIRECTOR)
 DR AMBER MALLORY (DEPUTY)
 DR VIC CONVERTINO (SR SCIENTIST)
 DR DEB NIEMEYER (SR CONSULTANT/SPONSOR)
 COL ERIK WEITZEL (PAST DIRECTOR)



Translational Preclinical Research to Clinical Trials

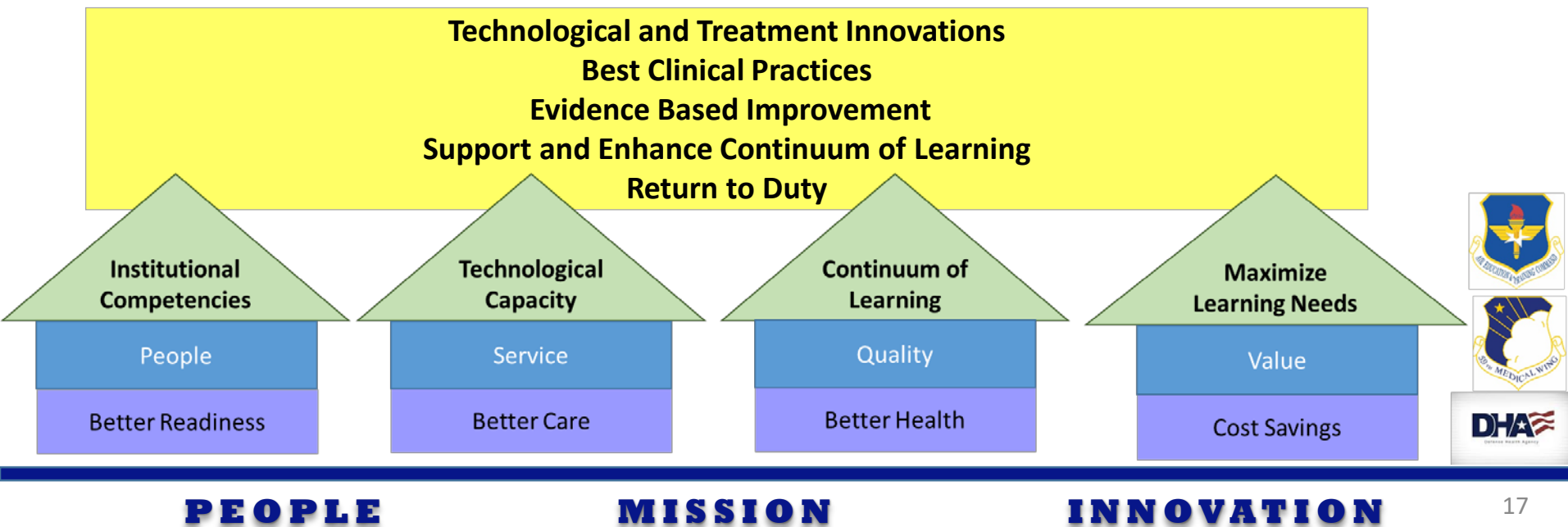


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Key Factor for Success:

Partnership enrichment with universities, hospitals, and foundations to magnify access to mature materiel solutions and nurture healthcare training opportunities

- Blood/resuscitation products (Hematology)
- Wound infection prevention (Infectious Disease)
- Telemonitoring, telemedicine, telementoring (Communications/IT)
- Vascular access (Vascular Surgery/Cardiovascular)
- Autonomous intervention for care (Bioengineering)
- Epidemiology Pt Eval Outcomes (Public Health)
- Trauma and non-trauma patient care training (GME/CEU)





QUESTIONS



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PEOPLE

MISSION

INNOVATION