
2024
ACADEMIA
INDUSTRY
MILITARY
HEALTH R&D SUMMIT
VELOCITY TX
SA Military Medical Industry Day
SAN ANTONIO MILITARY MEDICAL R&D (PART 1)
UNITED STATES ARMY
INSTITUTE OF SURGICAL RESEARCH
59TH MEDICAL WING
DEFENSE HEALTH AGENCY
PRO CURA MILITIS
DEPARTMENT OF DEFENSE
NAVAL MEDICAL RESEARCH UNIT
SAN ANTONIO
CITY OF
SAN ANTONIO
TEXAS

AGENDA

Networking (11:30am - 12:00pm)

Program (12:00pm – 1:00pm)

Introduction to AIM 2024 Health R&D Summit

Patti Geppert, PhD - SAMMI Director VelocityTX

Air Force 59th Medical Wing/Science & Technology Brief

Scott Walter, PhD – Director of Technology Transfer/Transition

US Army Institute for Surgical Research Brief

Sylvain Cardin, PhD – Director of Research

Q&A and Closing

2024

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MMID

Military Medical Industry Day IV

Full-Day Conference
- 335+ Attendees
- 50+ Companies

Three Pre-Event Symposiums
- 75+ Attendees

Focus on private-sector collaboration

BEXARBIO

Pitch Competition

100+ Attendees

48 Applicants
- 13 States
- 1 International

12 advanced to semi-final round

4 finalists selected to present at BexarBio

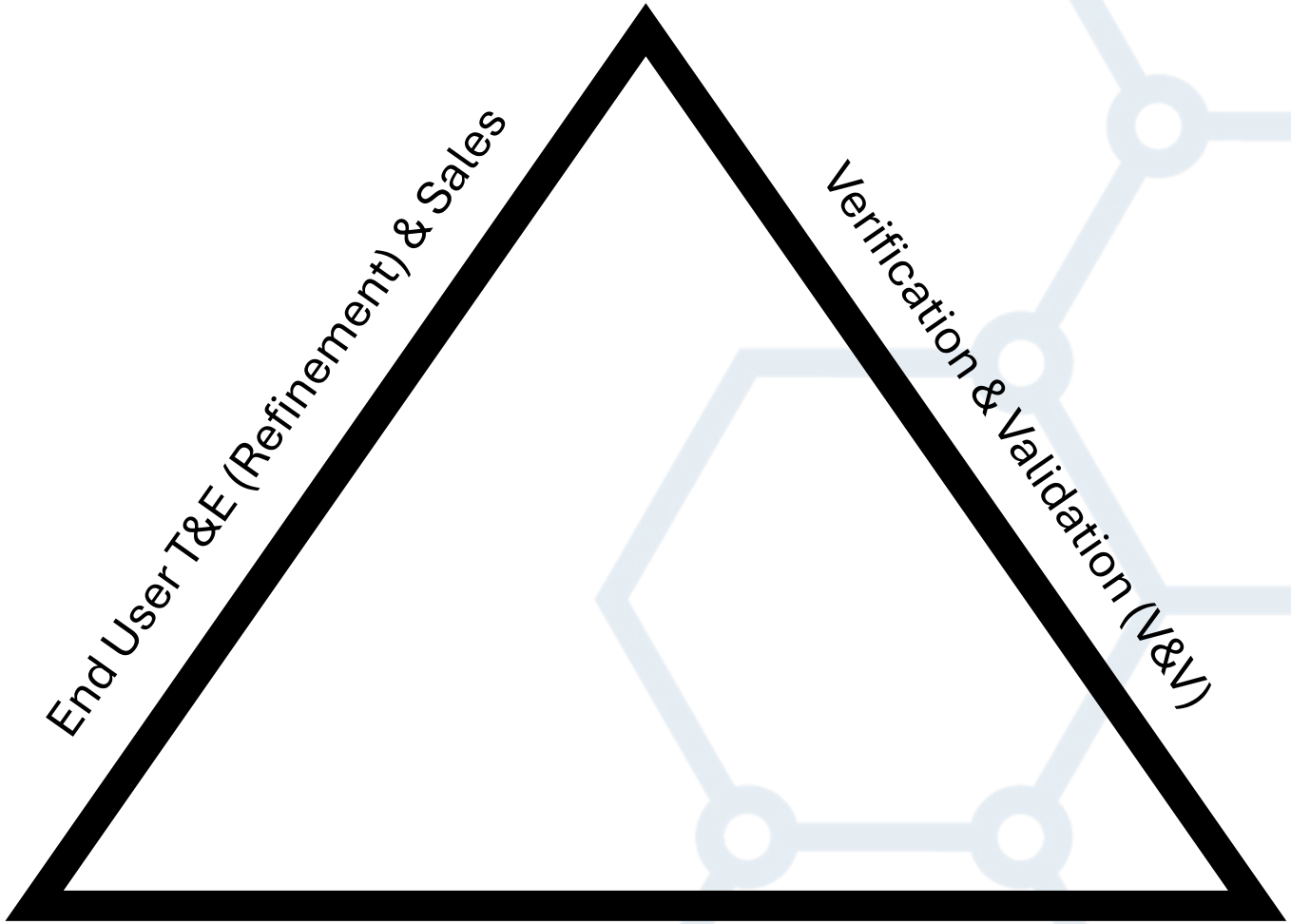
SURF

San Antonio Military Health and University Research Forum

Full-Day Research Forum:
- 300+ Attendees

Researchers from:
- Military
- Academia
- Nonprofit Research Institutes
- Industry

Military End User



Industry

Development, T&E, V&V

Laboratory*/Academia

* AFWERX calls “customers” for SBIR/STTR

LEVERAGING AIM: UNDERSTAND DOD MEDICAL REQUIREMENTS

- Attend podium and poster presentations by researchers
  - 12 one-hour podium sessions
  - 60+ research posters over two days
- Listen to panels on the vision for DoD medical product development and DHA portfolio managers
- Talk to researchers and end-users from Army, Air Force, Navy, BAMC and Veteran's Affairs at 10-minute one-on-one pitch sessions.
  - Sign-up for 10 minute time slots on day of meeting

LEVERAGING AIM: ONE-ON-ONE SESSIONS TOPIC AREAS

- Blood and Shock Resuscitation
- Hemorrhage and Edema Control
- Battlefield Pain Management
- Traumatic Brain Injury Polytrauma Related
- Engineering/Automation Technology
  - Bioengineering
  - 3D printing
- Dental/Maxillofacial Injury and Surgery R&D
- Combat Wound Care
  - Infection/sepsis: diagnosis, treatment, prevention
  - Burns: assessment and treatment
- Military Medical Simulation/Education/Training
- Rehabilitation
- Patient Safety
- Healthcare Operations

2024

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LEVERAGING AIM: LEARN HOW TO COLLABORATE

- Learn how to:
  - collaborate with researchers for product development
  - sell to the DHA and VA
  - find end-users for your medical products
- Learn how to fund your research and product development
  - Grants and contracts
  - Congressional Special Interest
  - Consortium OTA's
  - SBIR/STTR
  - Angel Investors and Venture Capital
- See innovative dual-use medical technology
- Networking

2024

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2024

AIM ACADEMIA INDUSTRY MILITARY HEALTH R&D SUMMIT

SURF BEXARBIO MMID

REGISTER TODAY

Early bird pricing
ends March 31!

bitly

JUNE 24-25, 2024
SAN ANTONIO

HENRY B. GONZALEZ
CONVENTION CENTER

BEXARBIO

PITCH COMPETITION

2024

Interested?
Scan Code to Apply

UPCOMING PRE-MEETING WEBINARS

APRIL 22, 2024

San Antonio Military Medical Research and Development (Part II)

Research and Development Briefs from:

- Naval Medical Research Command- SA
- Brooks Army Medical Center
- Department of Veteran's Affairs

MAY 20, 2024

Mechanisms for Collaboration, Technology Transfer, and Commercialization with the Military

Introduction to military technology transfer mechanisms that will be discussed in detail at the AIM 2024: Health R&D Summit

Scan to go to the
AIM 2024 Pre-Event Webinar Webpage
Registration open soon for future events

2024

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PAST PRE-MEETING WEBINARS (RECORDINGS)

- Regulatory Strategy- Importance of FDA Interactions (2023)
- Licensing Technologies from the Military (2023)
- Mechanisms for Private Sector Collaborations with Military Teams (2023)
- Keys to Collaborating with the Military (2022)
- Military Medical Needs, Requirements and Funding (2022)
- Tales from the Field (2022)

https://www.velocitytx.org/support/sammi/

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OFFICE HOURS AT VELOCITYTX:
US ARMY INSTITUTE FOR SURGICAL RESEARCH

Friday 11:00am – 1:00pm CT

Dual-Use Topic Areas of Interest include:

- Medical AI technologies
- Clinical decision support systems and advanced display technologies
- Advanced physiologic sensors and monitoring
- Medical robotics and automation
- Advanced medical imaging
- Organ support technologies
- Devices for critical care in the battlefield

Contact Patti Geppert for more information: patti@velocitytx.org

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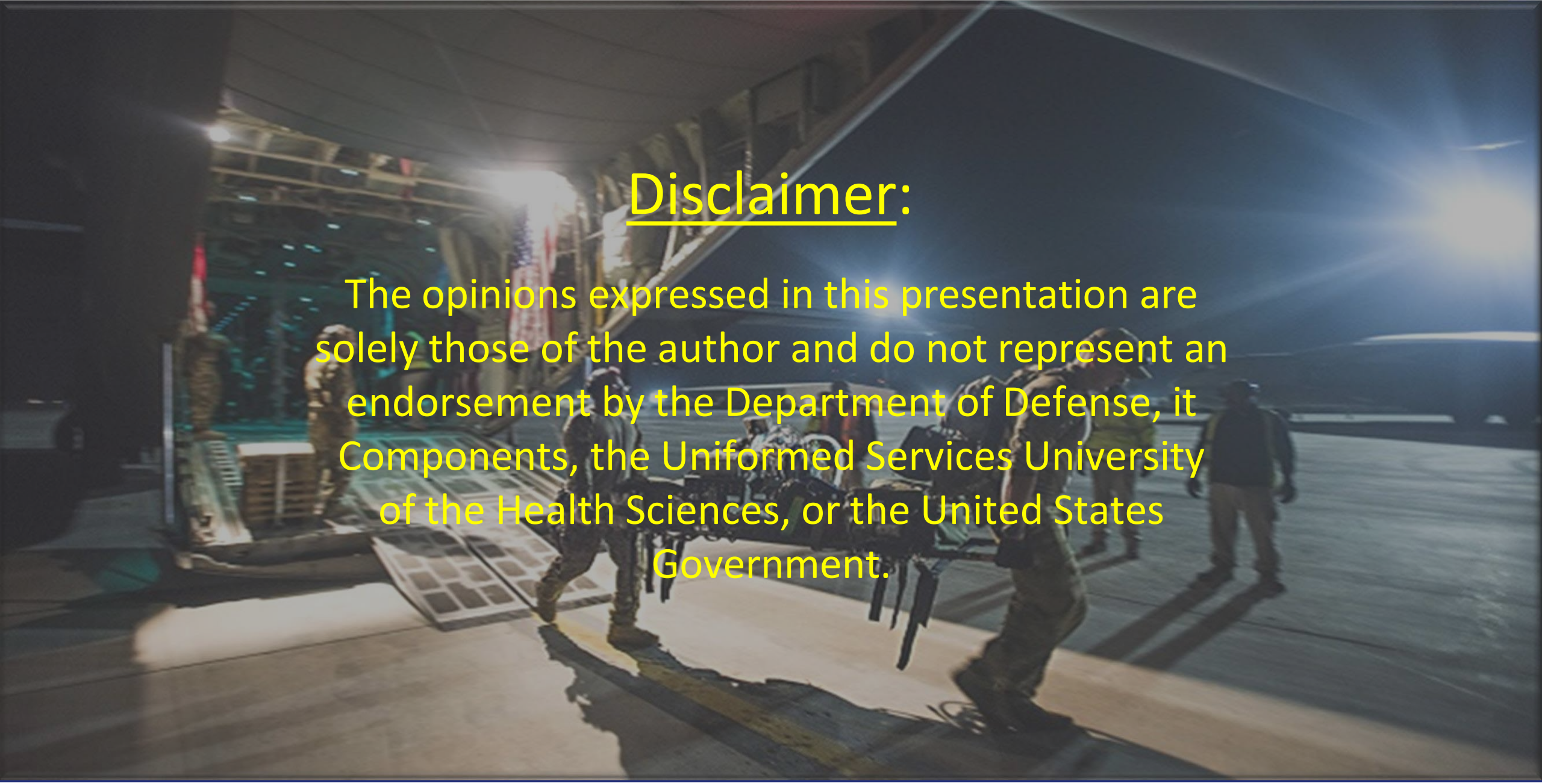
Office of the Chief Scientist
Overview & Introduction

Dr. Scott Walter
Director of Technology Transition & Transfer

18 March 2024



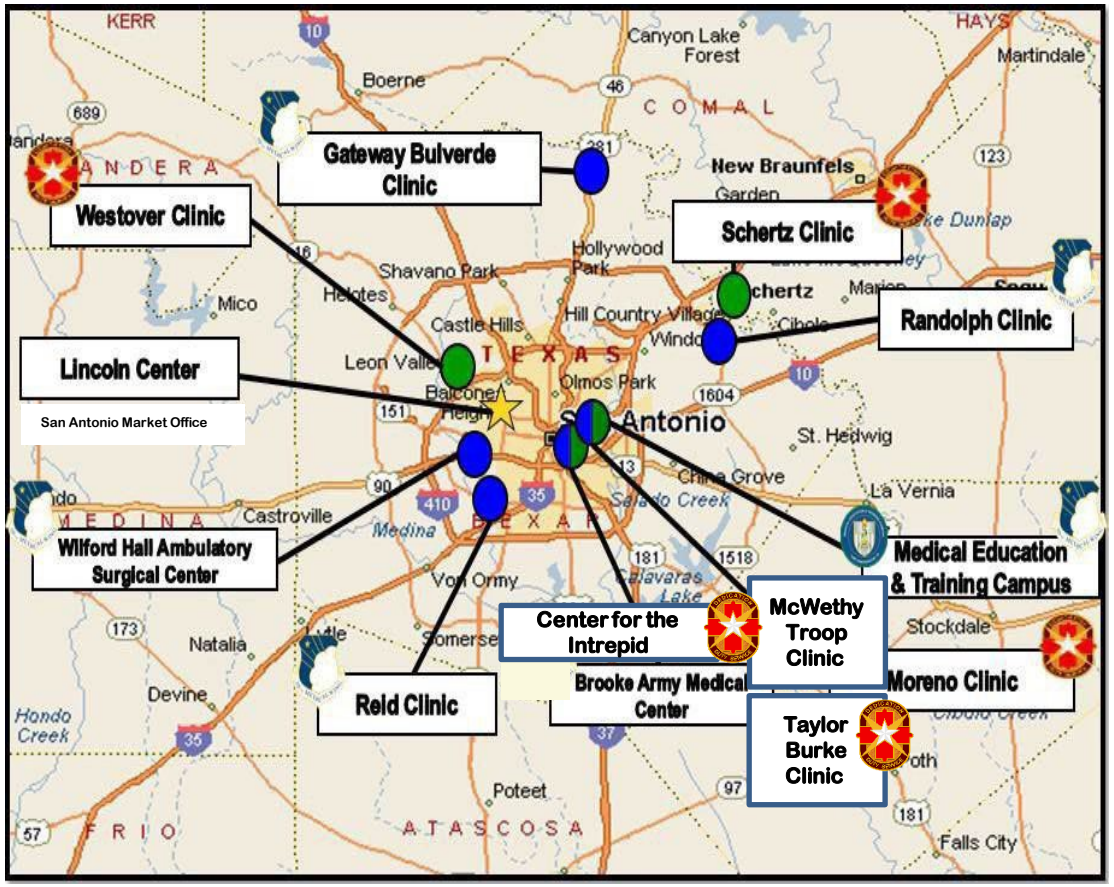
Disclaimer:

The opinions expressed in this presentation are solely those of the author and do not represent an endorsement by the Department of Defense, it Components, the Uniformed Services University of the Health Sciences, or the United States Government.

Critical National and Local Resource

Significant Medical Innovation, Research, Education and Training System

- Strategic Asset
  - “Home of Military Medicine"
  - 10 MTFs/7 DTFs/$1.2B Budget /14,000 staff/over 250,000 beneficiaries
- 36 GME programs and 24 GAHE programs—over 700 residents
- Contingency/Humanitarian response -- Teams on call 24/7; ~150 Service Members deployed
- 425 inpatient beds and 32 operating rooms for inpatient & ambulatory surgery; provides trauma care to DoD beneficiaries & local community
- Brook Army Medical Center
  - DoD’s most productive inpatient facility
  - DoD’s only Level 1 Trauma Center and Roof top helipad for patient transport
  - DoD’s only Bone Marrow Transplant Unit
  - DoD’s only Burn Center
- Wilford Hall Ambulatory Surgical Center and Clinics
  - DoD’s largest outpatient facility
  - DoD’s largest Blood Donor Center
  - DoD’s first accredited/only re-accredited Human Research Protection Program
  - Long standing accredited Animal Care and Use Program
- DoD’s largest centralized appointment/referral management system



Warrior Medics – Mission Ready – Patient Focused

59MDW: Be the Premier Air Force Readiness Platform

San Antonio Market: Wartime Skills Sustainment

Science & Technology

Readiness, Healthcare, Education, Training, and Research

Vision: *Grow Medical Leaders, Drive Innovations in Patient Care and Readiness*

Mission: *Conduct clinical studies and translational research and apply knowledge gained to enhance performance, protect the force, and advance medical care and capabilities across the global health system*

Chief Scientist
Science and Technology
Providingspecialized capability through…

Video

- *Lead & Support Research*
- *Advance Modernization Efforts*
- *Foster Collaboration*
- *Address End User Needs*
- *Ensure Scientific Excellence*
- *Scientific, Technical, Programmatic, Regulatory Consultation*

ST Organizational Chart

59MDW/CC
(and Human Research Protection Institutional Official)
Maj Gen THOMAS W. HARRELL

-Dental Liaisons: AF-Post Graduate Dental School & Clinics; GDE (Dr Kraig Vandewalle) and Dental Research & Consultative Support (DRCS) (Col Scott Irwin)

-San Antonio Uniform Services Health Education Consortium, GME/GHSE (Dr Mark True)
-Centers (DHA HCoE; Diabetes CoE; Sleep Ctr; Bone Marrow Trnsplnt; Sim Ctrs, Burn Ctr, etc.)

STRATEGY
(Vision, Mission)

MAIN OFFICE EXEC
ASST / MNGR
Ms. Frieda Velasquez

59MDW/ST SR ENLISTED LEADER and NCOIC, Center for Advanced Molecular Detection
MSgt John Tyree

ST

59MDW/ST
CHIEF SCIENTIST
and HRPP AIO
Dr Debra Niemeyer

DEPUTY CHIEF SCIENTIST
Lt Col Tonya White

IMA
Col Vikhyat Bebarta, MC, FS

OPERATIONS
(Execution)

TECH BASE
(Research & Engineering)

ST-Business Operations

DIRECTOR RESEARCH BUSINESS OPERATIONS & ADMINISTRATOR
Mr. Michael Dinkins

Budget, Contracts, Financial, Logistics, Medical Administration

ST-Program Analytics

DIRECTOR PROGRAM ANALYTICS & RESEARCH CELL
Mr. Maurice Edmondson
-Internal/ External Tasks Lead; PAO Interface
-Technical Program Mgmt. & Project Analysis

DIRECTOR, NEURORADIOLOGY & AEROSPACE MEDICINE RESEARCH

Dr. Paul Sherman
Direct/oversee neuroradiology & related research operations; Clinical SME & scientific mentor

STT

STH

STC

ST-T3

STN

DIRECTOR, TRAUMA & CLINICAL CARE RESEARCH, Dr. Robert Gerhardt

Joint Austere Medicine Research

-FRONTLINE ILLNESS & EXPOSURE RECOVERY CARE EFFORTS (FIERCE)
-CLINICAL RESUSCITATION, EMERGENCY SCIENCE, TRIAGE, & TOXICOLOGY (CREST²)
-EN ROUTE CARE RESEARCH CENTER (ECRC)
-Surgical and Technological Advancements for Traumatic Injuries in Combat (STATIC)
-IMPROVEMENTS IN NEUROLOGICAL SENSORY & PERCEPTIBLE RESEARCH (INSPR)
- Clinician Scientist-Investigator Opportunity Network (CSION)

Director, ECRC
En Route Care Research Center

DIRECTOR, DIAGNOSTICS, THERAPEUTICS AND 'OMICS, Dr Carl Brinkley

Joint Integrative Clinical Medicine Research

-Military Family Health and Resilience (Including Psych Health)and Readiness
-Regenerative / Restorative Medicine & Reconstruction (Restor-ICM)
-Disease Injury & Pain Management
-Trainee Health & Fitness
-Research Education Academy ("Grant Camp") / CSION

Director, CAMD
Center for Molecular Detection

DIRECTOR, CLINICAL INVESTIGATIONS & RESEARCH SUPPORT, Dr. Carol Walters

Clinical Investigations Program Lead & DHP RDT&E Support; ACUP IO

-Clinical Research Laboratory
-Clinical Research Operations
-Clinical Research Support

Research & Regulatory Compliance

Clinical Investigations Facility (CIF)
Clinical Investigations Program (CIP)

TECHNICAL DIRECTOR,
Dr Scott Walter

Product Transfer, Transition, Partnerships & Commercialization

-Technology Transfer Focal Point
-FDA Consultation/Support
-Extramural Outreach/Partnerships
-Military Medical Industry Days Lead
-Knowledge & Material Transition
-Advanced Development Lead
-Product Commercialization
-Patenting & Licensing of Intellectual Property (IP)

Office of Research and Technology Applications (ORTA)
2-time Federal Lab Consortium Award Winner

DIRECTOR, NURSING RESEARCH
Lt Col Tonya White

Clinical Research-QI/PI-EBP

-Nursing Research
-Quality Improvement (QI)
-Process Improvement (PI)
-Evidence Based Practice (EBP)
-Consultation

Center for Clinical Inquiry (C2I)

Theater of Operations ↔ Garrison Care

DHA Priorities

1 Great Outcomes — Our most important outcome is a medically ready force

2 Ready Medical Force — Our MTFs sustain team-based currency and proficiency enabling a ready medical force

3 Satisfied Patients — Our patients feel fortunate for MHS care that helps them achieve their goals

4 Fulfilled Staff — Our staff feel joy and purpose working in the MHS

Flexible / Adapt to Doctrinalchanges

Joint Austere Medicine Research Portfolio

Role 1
Point of Injury

Role 2
Mobile Field
Surgical
Teams

Role 3
Hospital

Role 4
OCONUS
Definitive Care

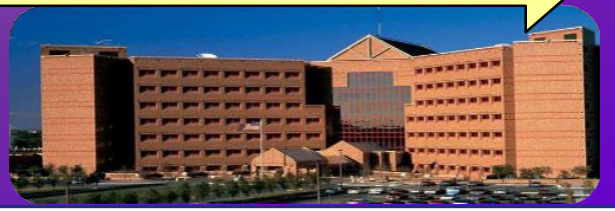
Role 5
US-based MTF
Full Range/
Definitive Care

Post-Acute Care
Dept of Veteran
Affairs

VA Health

Joint Integrative Clinical Medicine ResearchPortfolio

Nursing Research – Evidence Based Practice, Dental Research, Radiological/Aerospace Medicine Research, Clinical Investigations(GME/GAHE/GDE)



Warrior Medics – Mission Ready – Patient Focused

ST Enables Exemplary Care, Global Response

59MDW: Be the Premier Air Force Readiness Platform

San Antonio Market: Wartime Skills Sustainment

- Highly productive Clinical Investigation Program
  - ~350 protocols (JBSA-Lackland)
  - Readiness/Operational Training
  - Regulatory Oversight/Compliance
- Accredited Programs
  - Animal Care and Use Program (AAALAC)
  - Human Research Protection Program (AAHRPP)
- Major Focus Areas Include
  - Clinical Investigations
  - Evidence-Based Practice
  - Trauma Clinical Care
  - Diagnostics/Therapeutics
  - Nursing & Dental Research
  - Technology Transfer/Transition
  - Operational Training
  - Research Education & Training

Representative Research

Austere Medicine & Integrative Clinical Care

San Antonio -- Home of Military Medicine and Critical National Resource for Battlefield Health and Trauma Research





- En Route Care Research Center, ECMO Center and Critical Care Patient Transport
- Regenerative Medicine and Scaffolds; Organ perfusion; Targeted Therapeutic, Monitoring/Diagnostic Strategies
- Biosensing platforms to improve Combat Medic Casualty Management &Triage
- Ocular Trauma Triage Stabilization andTelemedicine
- Non-Opioid Pain Management for Patient-Centered Medical Care
- Directed Energy Models and Clinical Diagnoses, and Interventions
- Cross-Service Readiness Research and Operational Training for Critical Care Medics

Warrior Medics – Mission Ready – Patient Focused

Representative Local Lab Research Locations

1 Clinical Investigation Research Support

2 Center for Advanced Molecular Detection (CAMD)

3 Wilford Hall Ambulatory Surgical Center (WHASC) Eye Center, Sleep Center, Sim Center

4 59DTS / AF Post Graduate School & Clinics

5 USAF Dental Evaluation & Consultative Service (DECS)

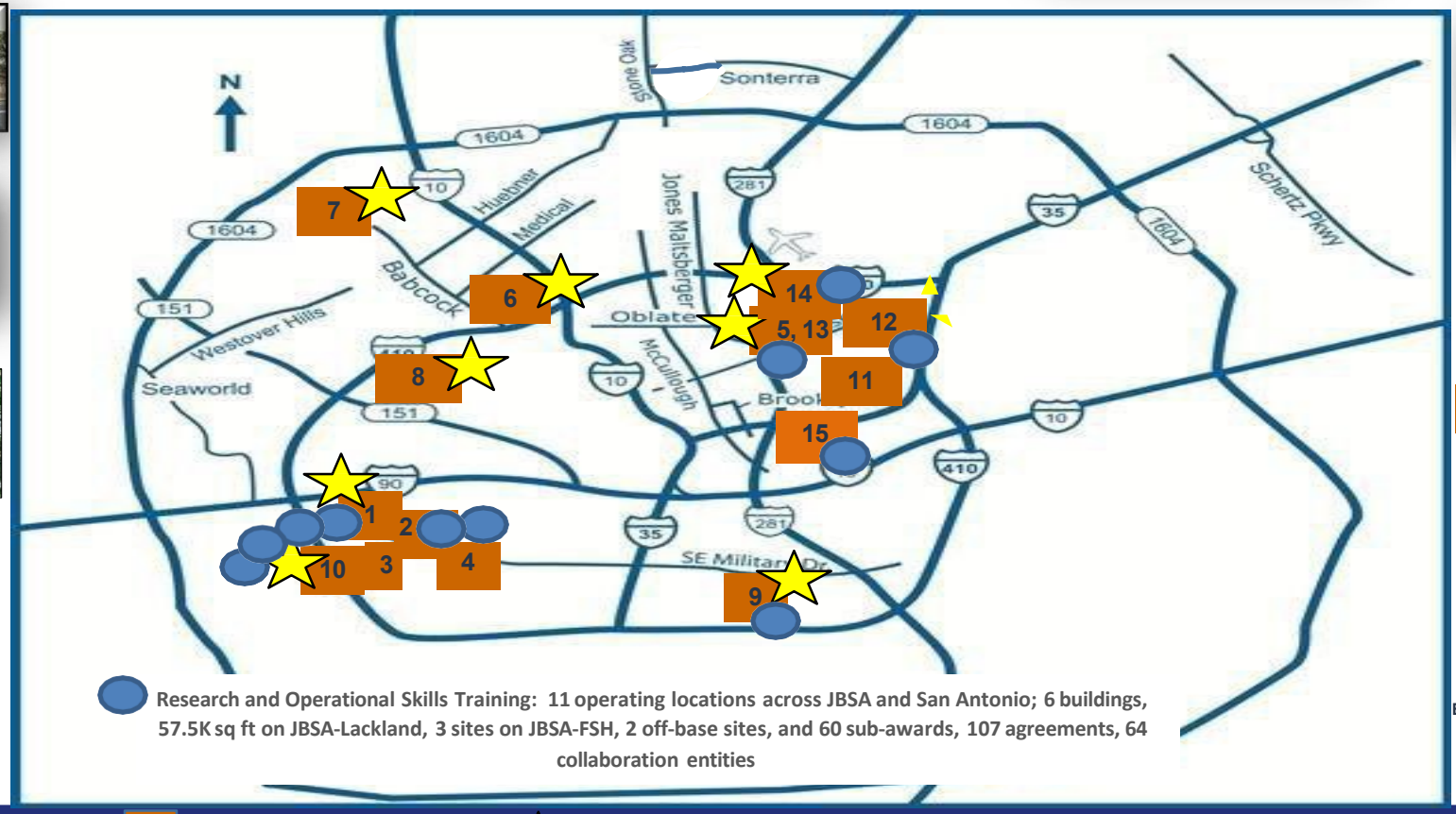
14 Tri-Service Research Laboratory

13 Battlefield Health & Trauma Research Institute

12 BAMC Dept of Clinical Investigations

11 Audie L. Murphy VA Hospital

10 DHA Hearing Center of Excellence



Research and Operational Skills Training: 11 operating locations across JBSA and San Antonio; 6 buildings, 57.5K sq ft on JBSA-Lackland, 3 sites on JBSA-FSH, 2 off-base sites, and 60 sub-awards, 107 agreements, 64 collaboration entities

6 UT Health Science Center San Antonio

7 UT San Antonio Depts and Laboratory Animal Resources Center

8 Texas Biomedical Research Institute

9 Bridge Preclinical Test SVS/Geneva Foundation Univ. of the Incarnate Word

15 VelocityTx Downtown San Antonio

= Wet Laboratory Facilities ★ = ResearchFacilities

Warrior Medics – Mission Ready – Patient Focused

Representative Research Education & Training Activities

Research Fundamentals Course

Training for GHSE resident/fellows and research staff in:

- Submission processes, regulatory, and ethical requirements
- Post approval monitoring and eIRB
- Statistics, database research/big data
- Requirements-driven research & tech transfer
- Funding, resources for assistance

ROI: Annual 2-day course provides a roadmap to research project approval and completion; networking forum to promote mentorship and collaboration. Supports AAHRPP accreditation, patient safety/HROs.

POC: Ms. Rachel Montez

Research Education Academy (REA)

- Provides basic & intermediate level research training to residents, fellows, & staff
- Research Grant writing intensive
- REA Scheduled Courses (Q2 & Q3) – pilot launched Sep 2019
- Mobile Refresher Courses (On Demand)
- Faculty drawn from 59 MDW/ST staff & individual lecturers

ROI: Improved grant-writing, establishment of collaborations and Project management; improves quality of submissions to Increase awards/funding to address warfighter & beneficiary care needs.

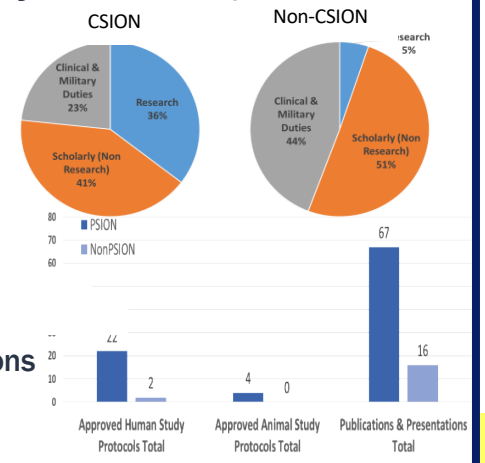
POC: Dr. Carl Brinkley and Dr. Victor Sylvia

Clinician-Scientist Investigator Opportunity Network (CSION)

Enhance mid-career clinicians' participation in research to Address military relevant needs.

Program goals:

- **Grow medical leaders**
- **Promote retention**
- **Increase clinician input into research**
- **Advance/strengthen medical research**



ROI: Cultivates requirements-driven research. Graduates are expected to remain engaged with and make recommendations for program improvement & nominate future participants.

POC: Col Joe Maddry, Dr AJ Burdette, Dr Melissa Clemons

Evidence-Based Practice (EBP) Course

An evidence-based practice is any practice that relies on scientific evidence for guidance and decision-making.

59MDW Evidence-Based Practice Education

- Center for Clinical Inquiry (C2I) course
- 59MDW Newcomers' Orientation
- One Day EBP Overview Course 2 times per year
- Included in Gateway Academycurricula

ROI: Enculturate EBP within 59MDW. Promote participation of EBP councils and development of prioritizedinitiatives.

POC: Lt Col Tonya White and Mr LanceMcGinnis

Warrior Medics – Mission Ready – Patient Focused

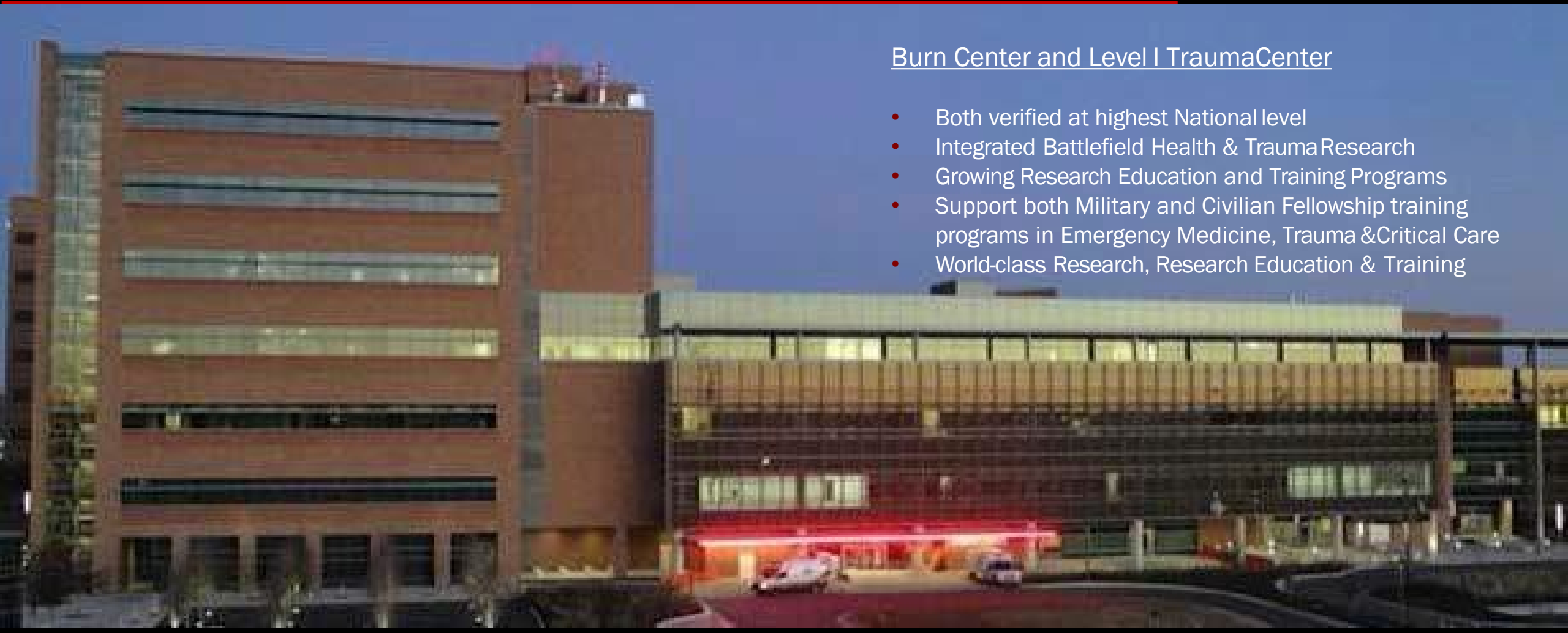
Other Research Ed & Training Opportunities

- Annual Technology Transfer (T2) Training
- Technology Transition Training
- Enhanced T3 training to CSION members
- Intellectual Property (IP), patent, licensing training
- Grantsmanship Course (semi-annually)
- Grantsmanship Training (as requested)
- Conducting an Effective Literature Search
- Developing A Good Research Question
- Study Design and Statistical Planning
- Clinical Investigation Research Training
- EIRB Training
- Protocol development orientation (human subjects research; animal research)
- Regulatory requirements for research (human subjects and/or animal)
- Research vs. Not Research – Process Improvement Function (as requested)

Major Programs/Capabilities

- Dental Education, Research and Consultation
  - USAF Post Graduate Dental School and Clinics, JBSA-Lackland
  - Dental Research and Consultation Service, JBSA-Fort Sam Houston
  - Testing of Devices & Materials; Virtual CAD-CAM 3D Implants Printing
- Nursing Research / Center of Clinical Inquiry
  - MTF Chief Nurses consultation; Research and Evidence Based Practice
- Joint Austere Medicine Research / En Route Care Research Center
  - Improve Combat Medical Skills, Tools/technologies available and Methods to save Warfighter Lives & Limbs
- Joint Integrated Clinical Medicine / Center for Molecular Detection
  - Molecular Diagnostics for Disease Surveillance, Research for Precision Medicine, Trainee Health/Healthcare
- Radiological and Aerospace Medicine Research
  - Hypobaric/High Altitude effects on the Brain; Hyperbaric studies; Space Medicine
- Technology Transfer and Transition
  - Research agreements, IP/Patents/Licensing, SIBRs/STTRs, Industry collaborations/focal point
- Clinical Investigations and Research Support
  - Clinical Investigations Program, Operational Readiness and Certification Training

Wartime Skills SustainmentPlatform



Burn Center and Level I TraumaCenter

- Both verified at highest National level
- Integrated Battlefield Health & Trauma Research
- Growing Research Education and Training Programs
- Support both Military and Civilian Fellowship training programs in Emergency Medicine, Trauma &Critical Care
- World-class Research, Research Education & Training

"Grow Medical Leaders, Drive Innovations in Patient Care and Readiness"

Fielding Military Medical Products/Capabilities:

Combat Casualty Critical Care and Long-Range Transport ECMO

Sep 2010: Comprehensive Adult Extracorporeal Support Program for Combat Casualty Care

PI: Lt Col Jeremy Cannon, USAF, MC

Research supported by the 59 MDW/ST in collaboration with Brooke Army Medical Center (BAMC) and U.S. Army Institute of Surgical Research launched development of a comprehensive team of military medical experts to provide extracorporeal support to adult patients in the BAMC catchment area for combat casualties who exceed conventional transport capabilities.

- Clinical evidence supported ECMO
- Technological advances improved safety
- AF and CCC transport role, experience

Niemeyer, D, ST Update: Disruptive Innovation and Warrior Care Advancements, Part I; Cannon J, Adult Extracorporeal Program, 17 Jun 2010

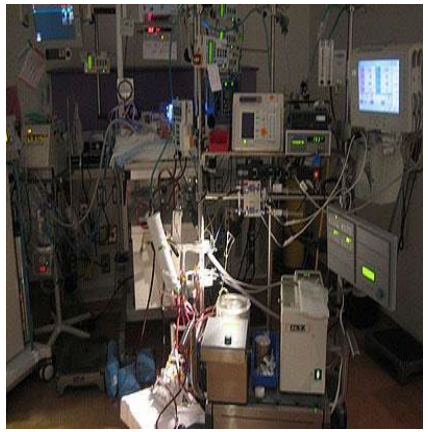


FIGURE 2. (left) Modern transport ECMO equipment is compact and lightweight which facilitates its use during aeromedical transport. (right) A transport-ready ECMO system.

"Advances in ECMO equipment design have enabled the development of compact circuits, which have now been used for aeromedical evacuation of combat casualties. The addition of ECMO to our complement of advanced en route care greatly expands the depth and range of our combat casualty critical care capabilities."

Allan PF, Osborn EC, Bloom BB, Wanek S, Cannon JW: The introduction of extracorporeal membrane oxygenation to aeromedical evacuation. Mil Med 2011; 176; 932-37

Army, Air Force team achieves historic trans-Atlantic medical mission, July 17, 2013; Army, Air Force team achieves historic trans-Atlantic medical mission > Joint Base San Antonio > News (jbsa.mil)

BAMC Adult ECMO Center - AF-Army-Civilian teams impacted ~300 lives over the last 10+ years. "(The) goal is to maximize survival of patients who have a high chance of dying from heart or lung failure."
AF Col Terry Lonergan, 959th Medical Group adult ECMO program deputy director, Feb 25, 2022
59th MDW: Life-saving ECMO program hits milestone > Joint Base San Antonio > News (jbsa.mil).

How to Work with the 59th Medical Wing Office of S&T:

- To learn more about us, visit our website at: https://wilfordhall.tricare.mil/About-Us/Research-and-Education/59-MDW-Chief-Scientists-Office-Science-and-Technology
- Submit general inquiries via email to Usaf.jbsa.59-mdw.mbx-.59-mdw-ST@health.mil, or call us at (210) 292-2097
- To engage the 59 MDW's Office of Research and Technical Applications (ORTA), visit their webpage at https://wilfordhall.tricare.mil/About-Us/Research-and-Education/59-MDW-Chief-Scientists-Office-Science-and-Technology and/or email the 59 MDW ORTA team at: usaf.jbsa.59-mdw.mbx.59-mdw-st-orta@health.mil
- To submit a medical technology to the 59 MDW for R&D evaluation and consideration of collaborating (such as AFWERX Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs), please email your proposal to the 59 MDW Tech Transition team at: Usaf.jbsa.59-mdw.mbx.59-mdw-ST@health.mil <mailto:Usaf.jbsa.59-mdw.mbx.59-mdw-ST@health.mil> (include in the subject line of your email the statement "New Medical Technology for R&D Collaboration Consideration" so that your proposal is properly routed and evaluated

59th Medical Wing

Warrior Medics – Mission Ready – Patient Focused

Optimizing Combat Casualty Care at the U.S. Army Institute of Surgical Research

Medical Strategic Leadership Program

Dr. Sylvain Cardin Ph.D.
Director of Research
Chief Scientific Officer
USAISR

Agenda

- Overview of the U.S. Army Institute of Surgical Research
- Impact of LSCO / MDO on Combat Casualty Care
- The USAISR Approach to Combat Casualty Care Research
- USAISR Current Combat Casualty Care Research Projects

U.S. Army Institute of Surgical Research

Mission

Optimizing Combat Casualty Care

Vision

The world's premier research organization delivering transformative advances in combat casualty care.

U.S. Army Institute of Surgical Research

- 1 of 7 research institutes within the U.S. Army Medical Research and Development Command and part of Army Futures Command (Austin, TX)
- The Army's premier research organization focused exclusively on improving the delivery of combat casualty care
- Home of the only Department of Defense Burn Center
- **<u>Unique synergy between laboratory scientists and clinical researchers</u>**

A Long History of Research - Clinical Collaboration

Established as Surgical Research Unit at Halloran General Hospital, Staten Island, New York 1943 – 1947 (Staff 12)

Moved to Brooke Army Medical Center – 1947

Renamed U.S. Army Institute of Surgical Research - 1970

Evolving Mission

- Antibiotics in Wound Care (1943)
- Innovative Surgical Techniques (1947)
- Thermal Injury (1949)
- Full Spectrum Combat Casualty Care (1996)

U.S. Army Institute of Surgical Research at Brooke Army Medical Center 1996 to Present (Staff >700)

USAISR 2 Main Directorates

Research Directorate

Burn Center

USAISR Research Directorate

Conducts research to develop knowledge and materiel products that improve the delivery of medical care on the battlefield.

- Driving force in combat casualty care advances since 1949
- 5 Combat Casualty Care Research Teams (CRT) focused on physiologic processes of trauma
- Addresses the most important needs of the Army for combat trauma solutions in the prolonged acute care environment
- Strong partnership with the military's **Joint Trauma System** which tracks all combat casualties

USAISR Burn Center Directorate

- 2nd Burn center established in the U.S. in 1949
- 1 of 70 American Burn Association verified burn centers in the world
- At the epicenter of burn research since its inception
- Treats both military and civilian patients
- South Texas regional burn center
- Highest acuity of critical care patients in the military
- Training center for deploying units and students, residents and fellows
- Burn Flight Team
- Cared for major burns from all military conflicts since WWII

Burn Flight Team

- Established in 1952
- Specialty burn care while in-flight
- Three Teams of 5 BICU members
  - Burn Surgeon
  - Two Critical Care Nurses
  - LVN
  - Respiratory Therapist
- Deploy within hours of notification
- More than 100 overseas missions since 2003
- “ANYTIME, ANYWHERE”

Burn Center Community Outreach

- Aims to prevent injuries
- Host events to educate local community
  - Health Fairs
  - Community Events
- Host events to educate local community
- Burn Strong
  - Partnership with SAFD
  - Firefighters, Paramedic and EMT training
  - Basics of Advanced Burn Care and Trauma Life Support Care

BURN STRONG

Product Development

Hemostatic Dressings

TXA

CAT Tourniquet

LTOWB

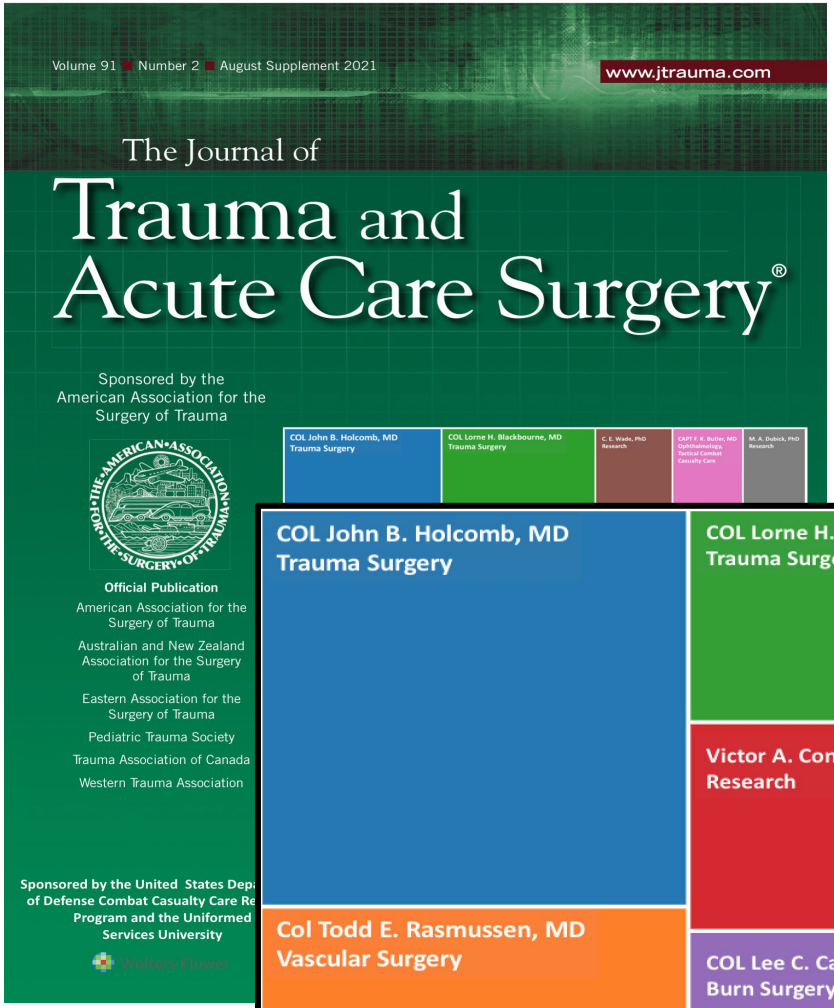
Cold Platelets

French FDP

Our research has led to development of life-saving, combat casualty care products provided to the Warfighters. Some include:

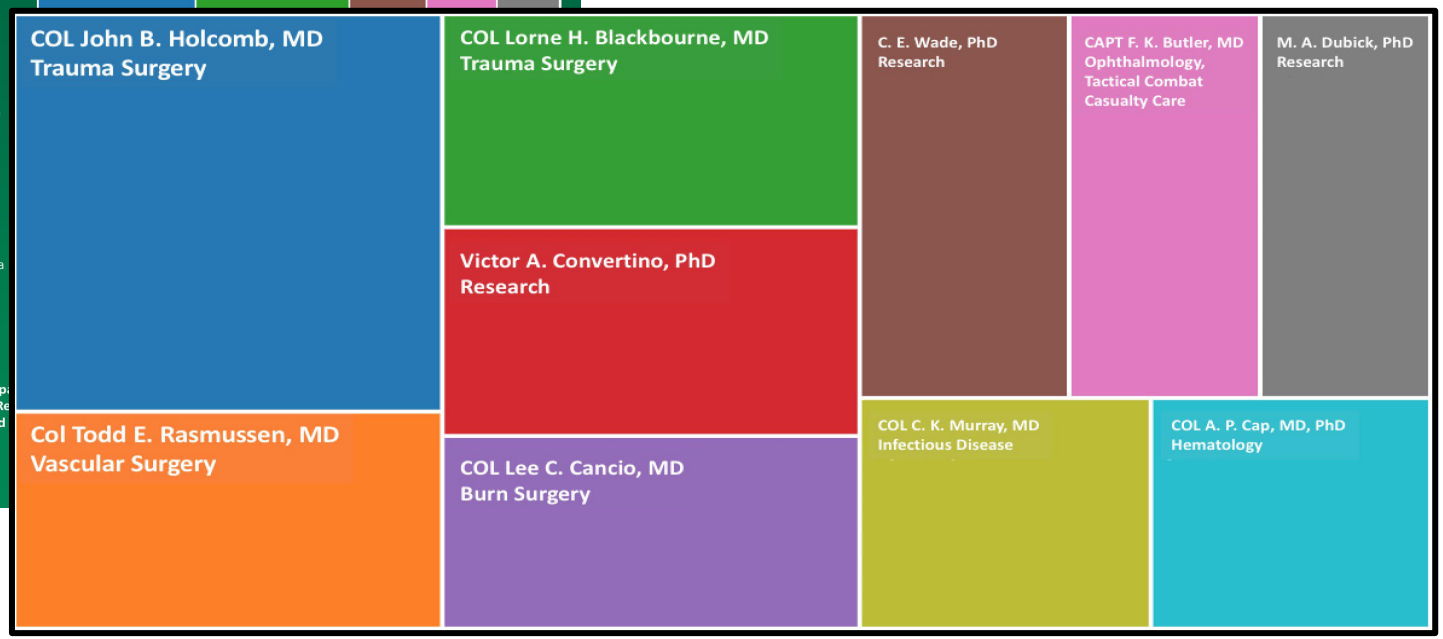
- Combat Application Tourniquet
- Cold Platelet Resuscitation
- Low Titer Type O Whole Blood
- Damage Control Resuscitation
- Combat Gauze Dressing
- Burn Navigator System
- Freeze-Dried Plasma
- Compensatory Reserve Measurement
- In-flight Life Support and Continuous Renal Replacement Therapies (CRRT)

Thought Leaders in Combat Casualty Care Research

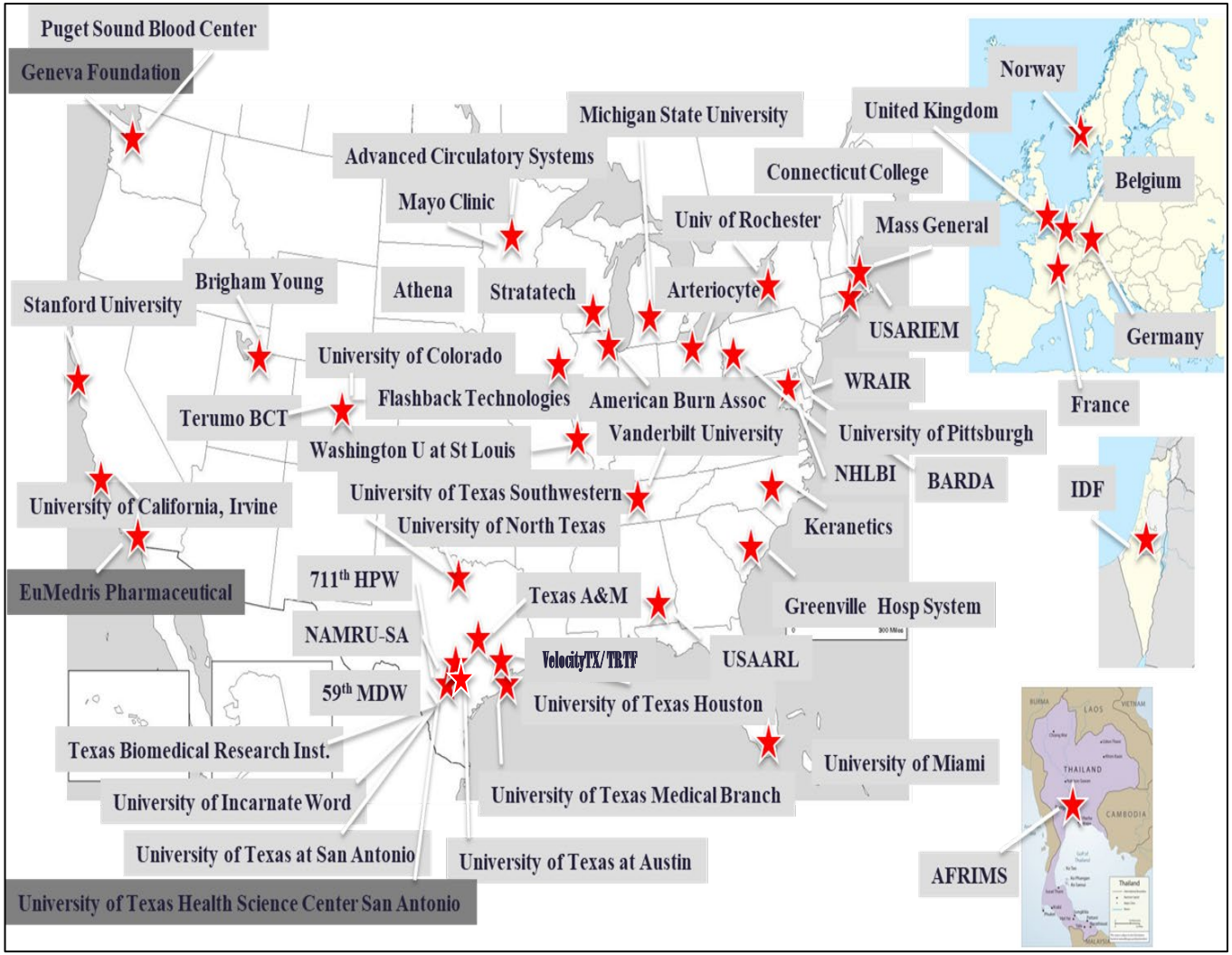


High-impact contributions to the combat casualty care literature:

- 8 of the top 10 contributing authors
- 1,768 Manuscripts from 2001-2021
- USAISR research has informed numerous Clinical Practice Guidelines



Partners / Collaborations



230+ active formal partnerships across the world

- Industry
- Academia
- Government
- International

Changing Adversaries → Changing Battlefield Medical Challenges

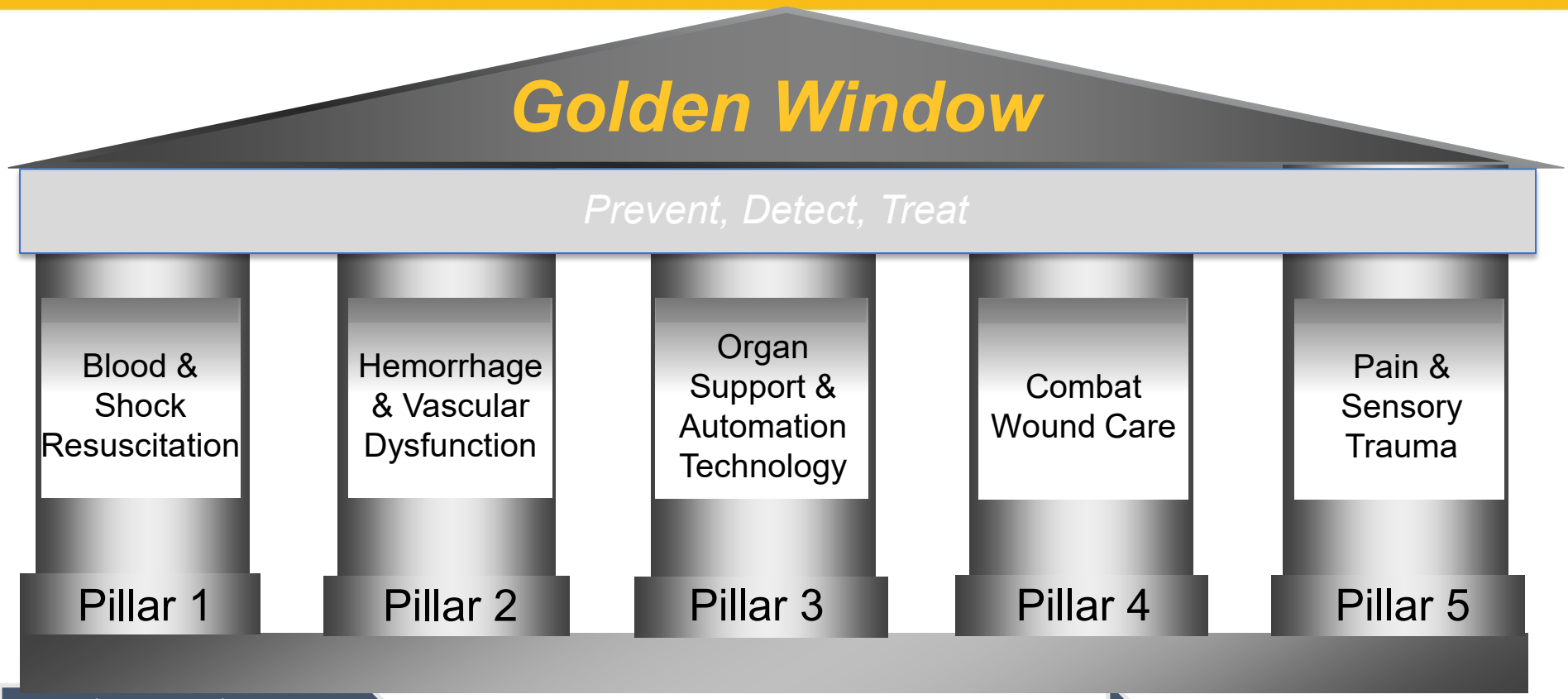
Afghanistan / Iraq:
Improvised explosive devices
Small arms, mortars, RPGs →

Low casualty density, rapid evacuation to surgery

Russia / China:
Sophisticated / lethal weapons, contested air →

High casualty density, delayed evacuation to surgery

Fundamental Challenges of Prolonged Care: the 5 Pillars



Acute (0-1 hours)

Blood / Airway Loss

→ ↓ DO2 →↓ ATP → ↓ pH → ↑ K+

→ Cell death

→ Endothelial dysfunction

→ Coagulopathy

Intermediate (2-6 hours)

Vascular dysfunction / edema / thrombosis

→ Organ failure: brain, heart, kidney, lung

Wound contamination & colonization

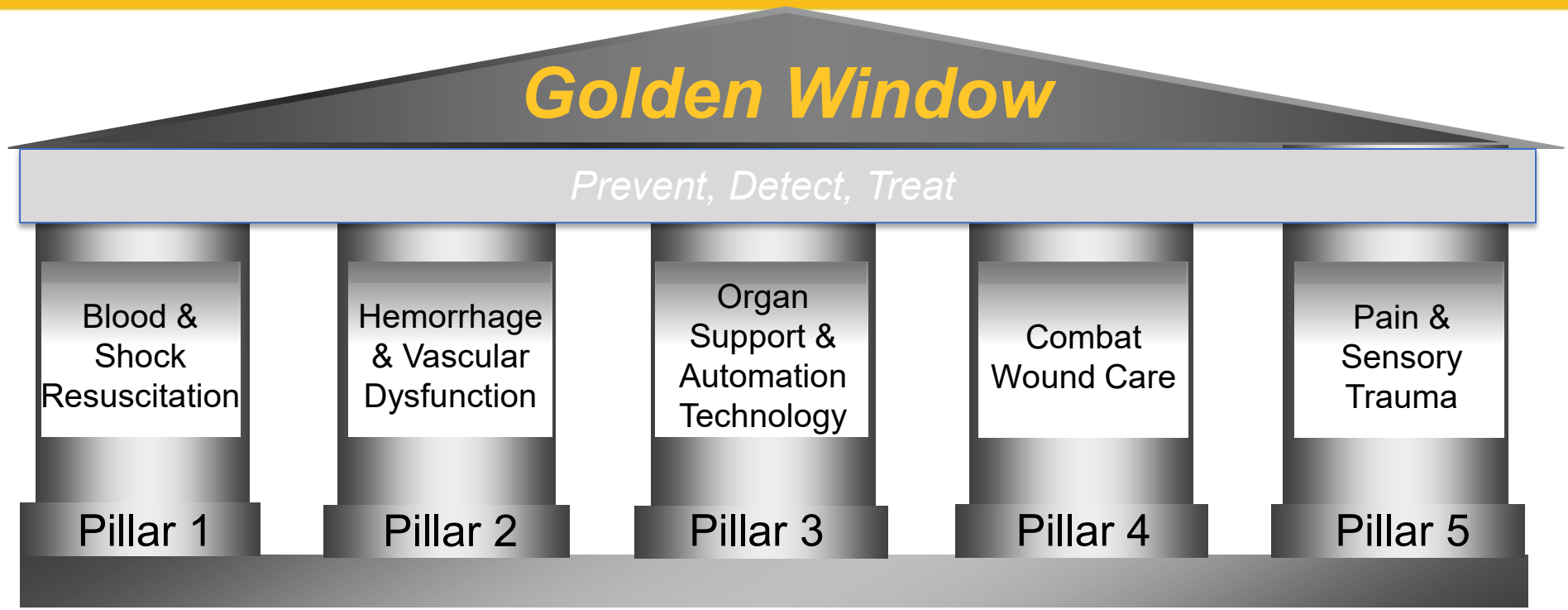
Delayed (6-24 hours)

Inflammatory second hit

Progression of organ failure

Wound progression, thrombosis & infection

Clinical Problems of Associated with the 5 Pillars



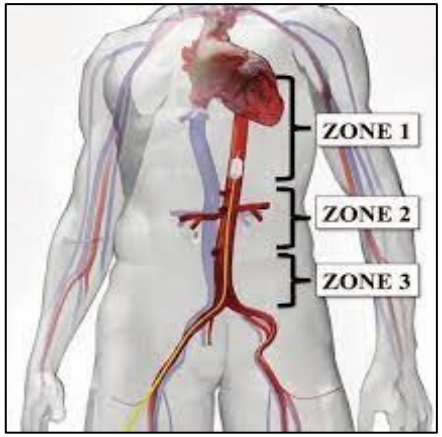
Pillar 1	Pillar 2	Pillar 3	Pillar 4	Pillar 5
• Inadequate blood supply vs. demand • Excessive "Shock dose"/ oxygen debt → irreversible shock	• Non-compressible hemorrhage • Endotheliopathy, coagulopathy, thrombosis → organ failure, bleeding • Compartment syndrome	• ARDS, blast lung, inhalation injury, ECMO • Renal failure • Cardiac ischemic injury, contusion • Technology support to all CRTs	• Contaminated wounds • Complex soft tissue / long bone injury • Burns	• Pre-hospital pain management • Post-operative pain management w/ delayed evacuation

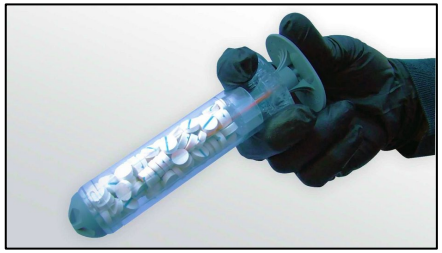
Current Research Efforts (Selected)

Pillar 1: Blood and Shock Resuscitation

- Anti-shock drug (metabolic optimization – e.g., HIF activation with PHDi)
- Engineered dried whole blood alternatives
- Next generation extended shelf-life platelets and whole blood
- Improved blood transport container system / support for drone delivery of blood products

Current Research Efforts (Selected)

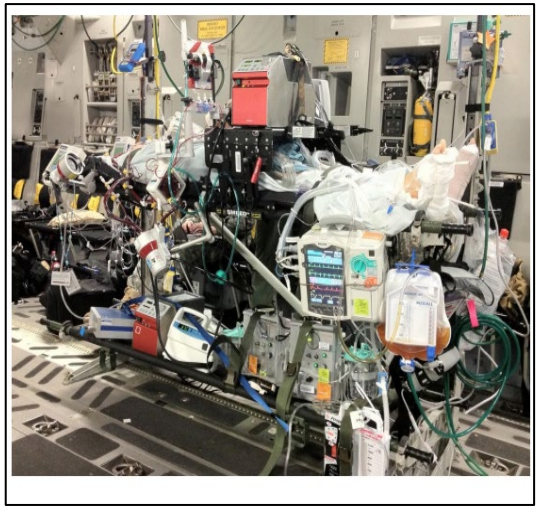




Pillar 2: Hemorrhage and Vascular Dysfunction

- Non-compressible hemorrhage control / expanded REBOA capability
- Use of hemostatic foams
- Microvascular stabilization
- Resuscitation with Enteral Fluids

Current Research Efforts (Selected)



Pillar 3: Organ Support and Automation Technology

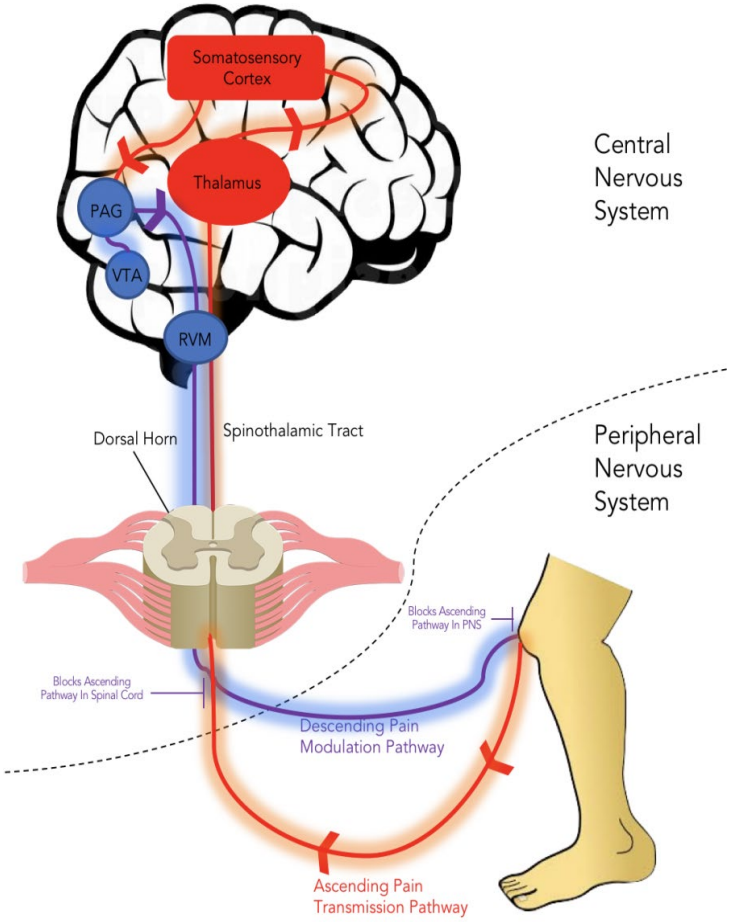
- Clinical decision support system and compensatory reserve measurement for medics
- Next generation smart tourniquets
- Heparin-free Extra-Corporeal Life Support (ECLS)
- Ultra Sound-guided/semi-automated vascular access to enable multi-organ support in forward-deployed environment
- Robotic surgical assistance & unmanned evacuation platform

Current Research Efforts (Selected)

Pillar 4: Combat Wound Care

- Non-surgical debridement of severe burn wounds
- Far-forward treatments to prevent burn progression and scarification
- Exoskeleton (external fixation/traction) for lower extremity injuries
- Pathogen agnostic wound care

Current Research Efforts (Selected)



Pillar 5: Pain and Sensory Trauma

- Assessing the efficacy of novel pain compounds
- Ultra Sound-guided/semi-automated local/regional anesthesia
- Combination non-opioid therapy for acute pain
- Penetrating ocular injury model – temporary corneal repair

Conclusion

- The anticipated future battlefield poses new challenges for combat casualty care
- The USAISR's 5 Pillar Model organizes around the physiology of trauma
- Focuses on a team approach and transformational advances
- Goal of transforming combat casualty care in future conflicts like we have over the past 20 years

Questions?