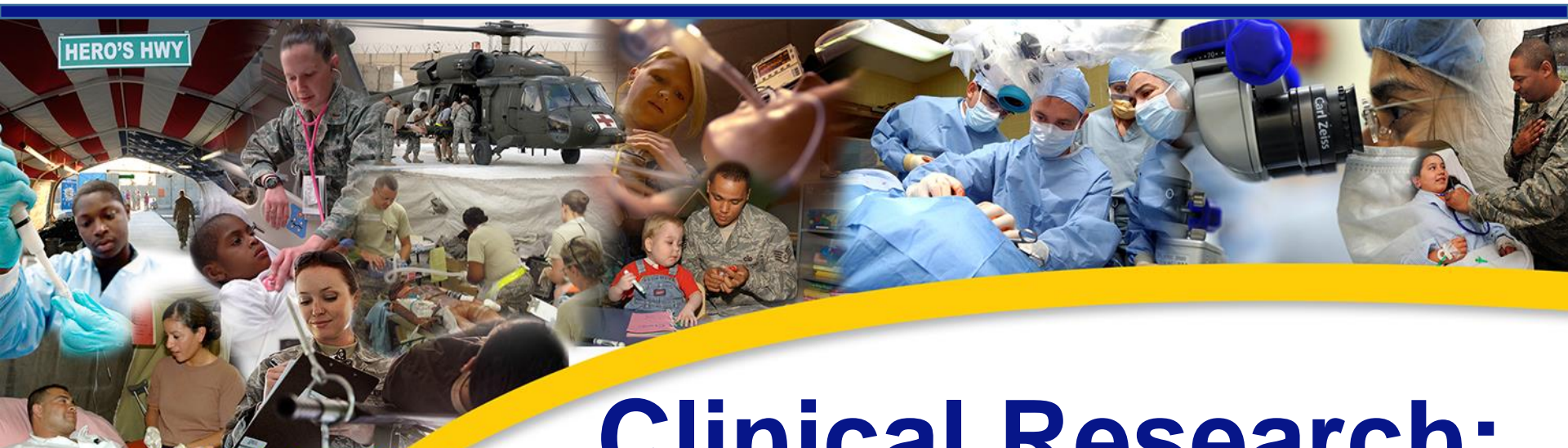




# 59th Medical Wing



## Clinical Research: Driving Innovation

Dr Debra Niemeyer  
Chief Scientist  
10 Oct 2019



Joint Base San Antonio, Texas



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# 2019 Research Fundamentals Course



Warrior Medics – Mission Ready – Patient Focused

**“The opinions expressed on this document are solely those of the author(s) and do not represent an endorsement by or the views of the United States Air Force, the Department of Defense, or the United States Government.”**



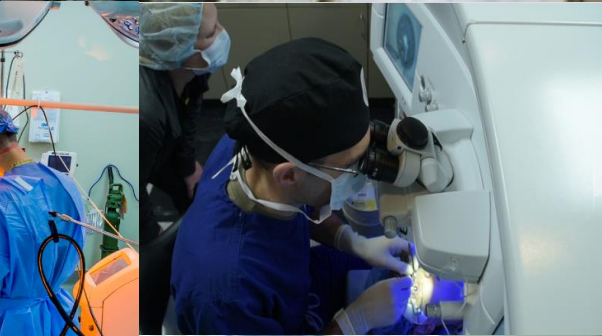
*“Drive innovations in patient care and readiness”*



# Research – Continuum of Casualty Care



# Research – Continuum of In-Garrison Care





# Future Conflict & Requirements

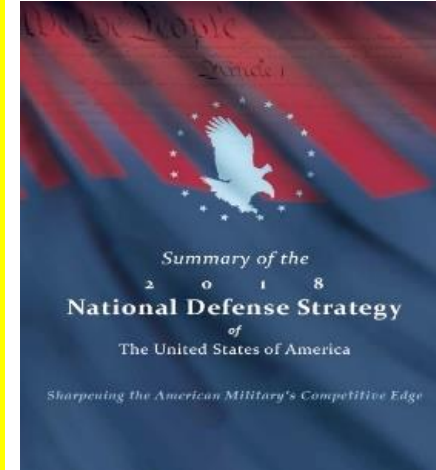
Modernization today = Readiness Tomorrow



Warrior Medics – Mission Ready – Patient Focused

## Future Conflict: Prepare for operations in dense urban environments

- Mass casualty/triage
- Thermobaric weapons
  - Pulmonary trauma/airway management; multiple organ failure; combat burns
- Improvised Explosive Device close-contact weapons
  - Hemorrhage control/shock; neurotrauma; extremity trauma
- Battlefield pain
- Prolonged field care
- Delayed manned evacuation → Unmanned medical evacuation
- Trauma in a Chemical, Biological, Radiological & Nuclear (CBRN) environment



## R&D Requirements: Use impact of warfighter to shape capability development

- Prolonged Field Care (Sustain injuries 72 hours with delayed evacuation); Impact of CBRN exposures
- Austere surgical stabilization; Hemorrhage & resuscitation support
- Artificial Intelligence; Autonomous Evacuation
- Automated machinery (closed loop ventilation & other support systems), Remote monitoring & decision aids
- *Modernization: Medical simulation & training technologies*
  - Tele-mentoring & tele-monitoring; Medical sensors & devices
- *Enhanced Regenerative Medicine Capabilities*
- *Incorporating advanced computing (“big data” analytics)*
- *Traumatic Brain Injury Diagnostics & Treatments; Disease diagnostics; Prevention of wound infections*
- *Post Traumatic Stress Disorder (PTSD) Diagnostics & Treatment*
- *Improved Performance (Physiological monitoring, Sleep/Recovery)*

# Critical National and Local Resource



- **Strategic Asset**
  - “Home of Military Medicine”—SA Chamber of Commerce assessed \$4B direct, \$1B indirect economic impact
  - 12 MTFs/\$1.2B Budget /12,000 staff/250,000 beneficiaries
  - 37 GME programs--600 residents, 22 GHSE programs--78 residents
  - Contingency/Humanitarian response--Teams on call 24/7 and ~150 Service Members deployed
  - **Significant Medical Innovation, Research, Education and Training**
- **San Antonio Military Medical Center**
  - DoD’s most productive Inpatient facility
  - DoD’s only CONUS Level 1 Trauma Center
  - DoD’s only Bone Marrow Transplant Unit
  - DoD’s only Burn Center
  - Center for the Intrepid
- **Wilford Hall Ambulatory Surgical Center and Clinics**
  - DoD’s largest Outpatient facility
  - DoD’s largest Blood Donor Center
  - Specialized Centers & Clinics (e.g., Acupuncture, Sleep, Diabetes)
- **DoD’s largest centralized appointment/referral management system**

Patients First, Partners Always

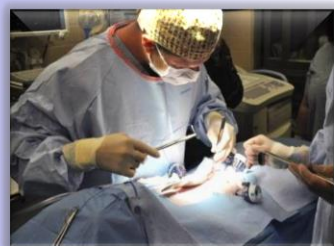




# 59 MDW Science & Technology



## Warrior Medics – Mission Ready – Patient Focused



**Chief Scientist  
Science and Technology**  
*Providing operational  
capability through...*



**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.*

**Lead Research**

**Advance  
Modernization  
Efforts**

**Foster  
Collaboration**

**Address End  
User Needs**

**Maintain  
Scientific  
Excellence**

**S&T Liaison**

**Readiness,  
Healthcare,  
Education and  
Training**

**JBSA Main Office: (210) 292-2097**

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# Research Mission



Warrior Medics – Mission Ready – Patient Focused

- The 59 MDW is the largest of 15 clinical training sites in the USAF.
- Large R&D platform; conduct and supports research across SAMHS and assists many other sites world-wide.
- Productive Clinical Investigation Facility supporting Graduate Health Education and Clinical Research.



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# Research Mission



Warrior Medics – Mission Ready – Patient Focused

- ~400 active protocols on-going at any given time.
- Research Areas – En route Care, ECLS/ECMO, Vascular Injury Management, Genomics/Proteomics, TBI/Psych Health, Maternal Care... and more.
- Requirements based, addressing Capability gaps/Needs.



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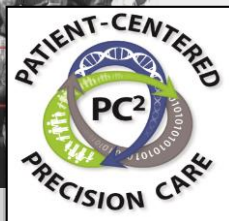
# From Battlefield to Stateside Healthcare



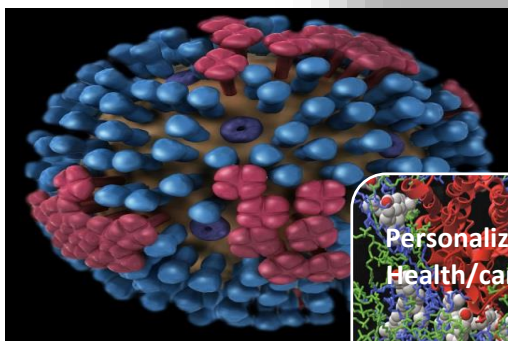
Warrior Medics – Mission Ready – Patient Focused



- 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).



- Ensuring a Ready Force against Obesity, Diabetes, and Cardiovascular Disease. This effort encompasses several studies looking at facets of Type 2 diabetes prevention and care in the MHS.



- A Comprehensive Search for Genetic and Genomic Markers for Resistance to Highly Virulent Biothreat Agents.

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# Representative Partners



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# Nursing Research



Warrior Medics – Mission Ready – Patient Focused

- The 59th Medical Wing Nursing Research Center for Clinical Inquiry (C2I).
- One of four Air Force nursing C2Is dedicated to conducting research and promoting clinical inquiry.
- Two PhD prepared active duty nurse scientists, one civilian EBP nurse consultant and an EBP facilitator.
- Research is strategically focused to address Air Force Nurse Corps, Air Force Major Command, Air Force Medical Service, and Joint MHS capability gaps and requirements.
- Nurse scientists foster military-civilian academic biomedical and psychosocial research partnerships to conduct interdisciplinary and multi-service branch research.





# GDE & Dental Research



Warrior Medics – Mission Ready – Patient Focused



DRCS



Dunn Dental Clinic



59DTS / AF Post Graduate  
School & Clinics

- The 59 Dental Training Squadron (DTS) is the flagship for dental education in the AFMS; Dental research in the 59 DTS is primarily conducted by residents and their teaching staff as part of the educational training process.
  - Five dental residency programs (Orthodontics, Prosthodontics, Advanced Education in General Dentistry, Periodontics, and Endodontics) require the completion of a research project as partial fulfillment of a M.Sc. Degree through USUHS or UTHSC.
  - Oral Surgery residency requires research scholarly activity.
- The USAF Dental Research and Consultative Service (DRCS) provides evaluations, investigations, and research to enhance strategic goals of Better Care and Best Value in the AFMS and AF Dental Corps.



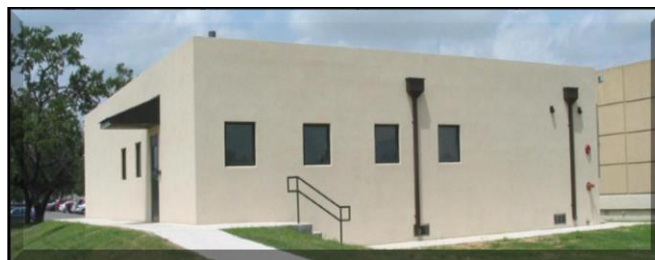
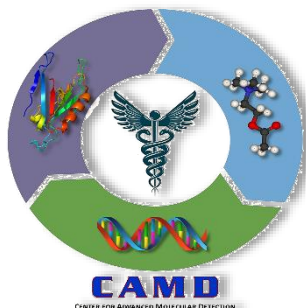
# Center for Advanced Molecular Detection



Warrior Medics – Mission Ready – Patient Focused



- The Center for Advanced Molecular Detection (CAMD) conducts biomedical assessments and research to address critical capability gaps.
- Two Major Focus Areas:
  - Clinical Molecular Research
  - Advanced Engineering Research & Development
- Respiratory Pathogen Rapid Detection & Analysis Research
  - New and re-emerging pathogens; prevalence/persistence.
  - Trainee (~120,000 in San Antonio/yr), Warfighter, Beneficiary.



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# Clinical Investigation and Research Support



Warrior Medics – Mission Ready – Patient Focused



- **59th Clinical Investigations and Research Support (CIRS) provides centralized administrative, technical, and scientific support and regulatory oversight and guidance to researchers in the development, performance and dissemination of clinical investigations.**
- **CIRS manages the CIP, and supports readiness and certification training requirements for residents, fellows, nurses, allied healthcare professionals and providers.**

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# En Route Care Research Center



Warrior Medics – Mission Ready – Patient Focused



- The En Route Care Research Center (ECRC) conducts translational research across the continuum of care from POI to Level 5 facilities to advance knowledge and improve treatment of injury and disease.
- A collaborative effort between the 59MDW, USAISR, NAMRU-SA; ERC portfolio managed in coordination with 711<sup>th</sup> Human Performance Wing, Joint Program Committees, and other sites.

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# Trauma & Regenerative Medicine Research Platforms



Warrior Medics – Mission Ready – Patient Focused



Tri-Service Research Laboratory



Brooks City-Base



Battlefield Health & Trauma Research Institute



CIRS JBSA-Lackland

- Trauma Clinical Care and Regenerative/Restorative Research programs innovate Techniques and Technologies, Pre-hospital and Hospital interventions for Warrior injury care and Rehabilitation to advance Best Practice.
  - Multiple Service, DoD, other Gov't, Coalition, Academic and Industry partners.
  - Research managed in coordinated with the 711HPW, Joint Program Committees and Armed Forces Institute of Regenerative Medicine (AFIRM).

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# Collaboration & Innovation



Warrior Medics – Mission Ready – Patient Focused

## Success through Collaboration and Innovation...

We Are Here to Support You!  
210-292-2097

**Endovascular Skills for Resuscitative Surgery (ESTARS)**

**Trauma Specific Vascular Injury Shunt**

**Joint Immune Modulation Program New Resuscitation Adjunctives**

**Biomarker for Injury Burden/Patient EVAC**

**Surgical Laser Assessment**

**CCATT Equipment Assessment**

**Life Saving Interventions & En Route Care**

**Extracorporeal Membrane Oxygenation (ECMO)**

**(REBOA) Resuscitative Endovascular Balloon Occlusion of the Aorta**

**CCATT Pilot Unit; PIU**

**Diabetes Group Lifestyle Balance**

**Wounded Warrior Care, Military & Family Resilience, Substance Abuse**

**Disease Genetic Analysis & Pharmacogenomics (T2D, CVD)**

**Specimen/Data Repositories**

**Regen/Restorative Medicine Research; Auto- & Allo-Transplantation**

**Busiest CI Facility supporting largest AFMS Clinical Training Site, DoD GHSE Programs & Translational Research**

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# Questions



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