



**USU  
CENTERS  
2019  
ANNUAL  
REPORT**

*DELIVERING  
INNOVATIVE SOLUTIONS  
TO THE MILITARY HEALTH  
SYSTEM TODAY*

# DELIVERING INNOVATIVE SOLUTIONS TO THE MILITARY HEALTH SYSTEM TODAY

## Major health requirements and challenges facing the force and alignment of USU Centers

Combat Casualty Care	 SC2i Uniformed Services University	 CRSR Uniformed Services University	 CNRM Uniformed Services University	 DVCIPM Uniformed Services University	 IDCRP Uniformed Services University
Warfighter Readiness, Resilience and Human Performance	 CHAMP Uniformed Services University	 TSCOHS Uniformed Services University	 TSNRP Uniformed Services University	 CRSR Uniformed Services University	 IDCRP Uniformed Services University
Traumatic Brain Injury, Post Traumatic Stress and Suicide Prevention	 CDP Uniformed Services University	 CSTS Uniformed Services University	 CNRM Uniformed Services University	 CRSR Uniformed Services University	
Emerging & Infectious Diseases	 IDCRP Uniformed Services University	 CGHE Uniformed Services University			
Disaster Medicine and Global Health	 NCDMPH Uniformed Services University	 CGHE Uniformed Services University	 AFRRI Uniformed Services University	 CRSR Uniformed Services University	
Precision Medicine	 CHIRP Uniformed Services University	 SC2i Uniformed Services University	 MCCRP USU WALTER REED SURGERY		
Cancer Care	 MCCRP USU WALTER REED SURGERY	 CHIRP Uniformed Services University			

# USU



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## Foreword

The Centers of the Uniformed Services University (USU) featured in this report align their investment and expertise to the research, education, and public service missions of the university, as well as to the requirements of the Military Health System (MHS) and the broader Department of Defense (DOD). These Centers undertake a diversity of research, training and education efforts in order to deliver an array of knowledge and materiel products that close identified gaps in the MHS.

This year marks the second anniversary of the USU Council of Center Directors, a committee established to highlight the work of the Centers and to improve collaboration and create efficiency among this diverse group of investments. The Council has also completed an 18-month study resulting in a first-of-its-kind policy to formalize a framework to define a Center and provide a pathway by which to more consistently and effectively manage efforts in various topic areas.

Always mindful of an imperative to develop solutions, and as a means to press this goal, this 2019 report features recent deliverables from the Centers. As one can see in this report, the mission space of the Uniformed Services University is broad and ranges from global health engagement to the development of radiation countermeasures and identification of, and treatments for, infectious diseases; from simulation-based training to more effective ways to enhance warfighter performance and resilience; from the innovation of critical-care decision support tools to improvements in diagnosing and mitigating traumatic brain injury, post-traumatic stress and the risk of suicide; from dental and nursing research to the human genome.

The Uniformed Services University serves as the leadership academy for military health. It is also the academic hub that supports and advances military medicine and the health of U.S. forces around the globe. The USU Centers play a vital role in these missions. They are always at the ready to tackle new challenges and priorities of the DOD. We hope that you enjoy this year's report. We encourage you to take time to learn more about our university or even visit one or more of our Centers in the near future!

**Todd E. Rasmussen, MD, Colonel, USAF Medical Corps**

Professor & Associate Dean for Clinical Research  
Chair, Council of Center Directors  
The Uniformed Services University of the Health Sciences

# Armed Forces Radiobiology Research Institute

[www.usuhs.edu/afri](http://www.usuhs.edu/afri)

## AFRRI



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**Director:**

CAPT John Gilstad, MD, MC USN

## Mission

The Armed Forces Radiobiology Research Institute conducts research and development activities and provides education, training and advisory assistance to the Department of Defense related to the health effects of radiation exposure, especially in support of military operations.

## Overview

The Armed Forces Radiobiology Research Institute (AFRRI) focuses on scientific work that will improve combat readiness and health service support in case of radiological/nuclear exposure or in a contaminated operations scenario. In addition, AFRRI's unique radiation facilities support federal interagency development of diagnostics and therapeutics for radiation injury and radiation incident response.

AFRRI's scientific portfolio and other activities adhere to the following parameters:

- Retain requirements identified by the Department of Defense (DoD) components in support of current and future military operations.
- Evaluate the individual and collective performance of deployed service members in radiological and nuclear environments.
- Consider present and projected risks to the United States and its military services, including risks to operations, weapons, and defense systems.

- Include advanced education and training in the field of radiobiology, including the biological effects from nuclear and radiological weapons, to meet the internal requirements of the Uniformed Services University of the Health Sciences, military departments, other DoD components and, as necessary, other organizations.
- Include analysis, study, and consultation on the impact of the biological effects of ionizing radiation on the organizational efficiency of military departments and their members.
- Include cooperative research with military departments on aspects of operational and medical support, considerations related to nuclear weapons effects, and the radiobiological hazards of space operations.

Include cooperative research and other enterprises with other federal agencies involved in homeland security and emergency medical preparedness, consistent with the mission of AFRRI and applicable authorities.

## Recent Deliverables

### Generated Additional Technical Data for Next-Generation Radiation Biodosimetry Platforms for both the DoD and Strategic National Stockpile

Data and algorithm development support laboratory tools for multi-parametric dose assessment integrating clinical signs and symptoms, hematologic, proteomic, and cytogenetic markers, as well as hematologic and proteomic assays for point-of-care testing. These diagnostic platforms are intended to cover a broad dynamic range ( $\leq 2$  Gy  $\geq 10$  Gy) of absorbed doses of neutrons and photons (e.g., X- and gamma-rays).

### Generated a Promising New Approach for Decorporation and Chelating Agents to Treat Internal Radionuclide Contamination

Synthesized and characterized molecularly imprinted polymers as metal sequestering agents using metal templates (cesium, strontium, cobalt and uranium) considered likely contamination threats from fallout or radiological dispersal devices. Demonstrated that ionic radius is the key component contributing to binding specificity of the synthesized molecularly imprinted polymers.

### Advanced Understanding of Radiation Injury Physiology in the Mini-Pig as an Alternative to the Non-Human Primate

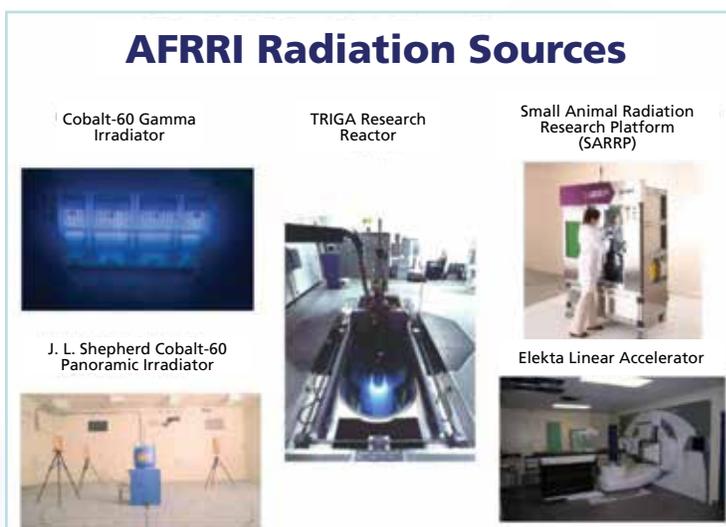
Demonstrated that hematopoietic damage alone is insufficient to explain mortality from ionizing radiation in the dose range that causes the hematologic subsyndrome of acute radiation syndrome (H-ARS). Instead, H-ARS involves the simultaneous presence of bone marrow aplasia, inflammation and vasculature damage. These findings have implications for drug development for H-ARS and interactions with trauma and burns.

### Generated Data Supporting Regulatory Approval of Ciprofloxacin for Use with Cytokines in the Treatment of ARS

Demonstrated the pleiotropic activity of ciprofloxacin to enhance the radiotherapeutic efficacy of pegylated G-CSF by more than doubling the survival rate of test animals.

### Advanced the Technology Readiness Level for Multiple Candidate Radiation Countermeasures

AFRRI prioritizes the evaluation and development of countermeasure candidates through an Intramural Screening Program, coordinated through the Joint Program Committee on Radiation Health Effects with an industry-based prioritization process at the National Strategic Research Institute at the University of Nebraska.



The types of radiation produced from the AFRRI sources are: mixed-fields of reactor neutrons and gamma rays, cobalt-60 gamma rays, cesium-137 gamma rays, high energy electron and bremsstrahlung radiation, and x-rays in the 60-320 kVp range respectively. A major part of AFRRI's uniqueness stems from the combined availability of radiation sources and dedicated multidisciplinary teams of radiobiologists, physicists, engineers, and technicians. Cobalt-60 gamma irradiator provides researchers large uniform gamma-ray fields with a wide array of exposure configurations. Co-60 panoramic irradiator (Low-level radiation (LLR)) exposure facility delivers chronic cobalt-60 radiation doses to biological samples. Nuclear reactor is a TRIGA (Training, Research, Instruction General Atomic) 1 MW nuclear reactor, capable of generating pulses of up to 2,500 megawatts and runs at a steady state of 1 megawatt mixed field (gamma/neutron). SARRP (Small Animal Radiation Research Platform) incorporates CT (computerized tomography) imaging with precise radiation delivery to enable researchers to pinpoint an exact anatomical target and confidently deliver 0.5 mm beams to that point. This small animal irradiator can then deliver single or multiple beams of radiation to the target with the upmost accuracy, matching the clinical techniques used in oncology departments. Elekta linear accelerator generates high-energy photons and electrons to simulate matching the clinical techniques used in oncology departments.

# Center for Deployment Psychology

[www.deploymentpsych.org](http://www.deploymentpsych.org)

## CDP



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**Director:**

David Riggs, PhD

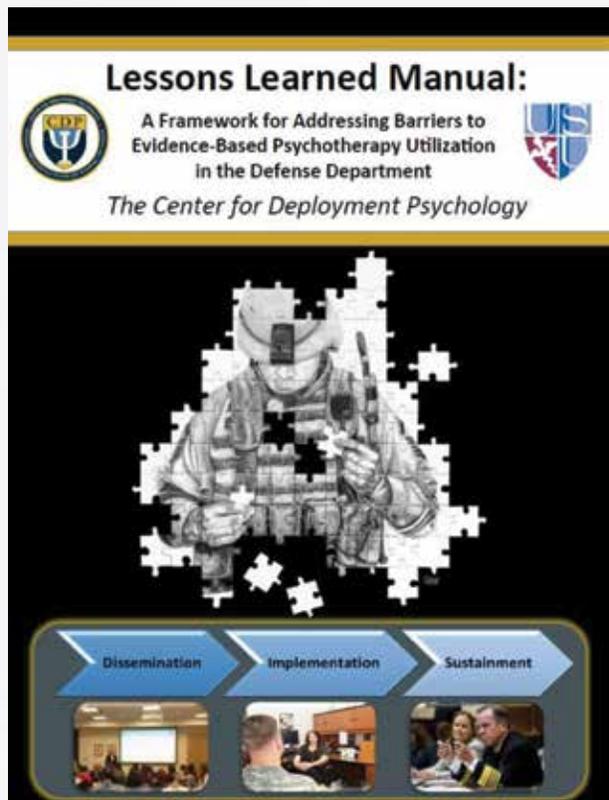
## Mission/Vision

**Mission:** Our mission is to lead the development of a community of culturally mindful and clinically competent providers through the delivery of high-quality training and education, the convening of experts, and the dissemination of research-based treatment and the latest topics in military behavioral health.

**Vision:** Our vision is a future in which all service members, veterans and their families receive quality behavioral health care that meets their unique needs.

## Overview

In 2006, the Center for Deployment Psychology (CDP) was launched with congressional funding to fill a crucial gap in readiness of behavioral health providers to support service members with deployment-related psychological health problems and to prepare active duty providers to deploy in support of military missions. As the needs of our military personnel have changed, our organization has evolved to meet those needs. By offering ongoing education for health care professionals, collaborating with other organizations, and leading the effort to understand military behavioral health, CDP aims to ensure that service members, veterans and families receive the care they need. Since the Center's establishment, CDP has trained over 40,000 providers on topics including military culture, evidence-based psychotherapies, and clinical issues such as depression among service members and veterans. CDP has created extensive educational opportunities that are specifically designed to build skills and understanding among behavioral health professionals to allow them to improve the quality of care.



## Recent Deliverables

### Lessons Learned Manual and Associated Clinic Optimization Toolkit

The Lessons Learned Manual identifies barriers to utilizing Department of Veterans Affairs (VA)/Department of Defense (DoD) recommended evidence-based practices (EBPs) throughout the DoD and makes suggestions for addressing systemic barriers, as well as barriers to disseminating, implementing and sustaining EBP practices in the Military Health System. The associated clinic optimization toolkit contains resources and tools for DoD clinics to utilize to address the identified barriers and to assist with EBP utilization.

### Military Culture Course: Core Competencies for Health Care Providers

Developed in collaboration with the VA, this four module, eight-hour continuing education training course helps health care providers better understand the influence of military culture upon health-related behaviors and to assist providers with appropriately planning treatment to help service members or veterans reach their personal, career and military Mission priorities (<https://deploymentpsych.org/military-culture-course-modules>). This project was part of the President's Caring for Veterans Initiative. More than 5,000 individuals have accessed the course since its rollout in 2014.

### The Summer Institute: Preparing for a Career in the Armed Forces

This five-day course is designed for doctoral students in clinical or counseling psychology who are interested in joining the U.S. military and serving military patients. The training curriculum includes topics on military culture and deployment; roles and activities unique to military psychologists; key assessments utilized in military clinics; common clinical conditions experienced by military members; an overview of assessment and treatment of post-traumatic stress disorder with military patients; and unique ethical challenges faced by military psychologists. CDP has held five iterations and trained a total of 152 participants. Additionally, 44 of 49 Summer Institute graduates who reported internship matches to CDP matched to a military or military-related internship site.

### The Military Internship Behavioral Health Psychologist Program and the Military Training Resource Library

The Military Internship Behavioral Health Psychologist (MIBHP) program embeds psychologists in the 10 military treatment facilities with APA-accredited psychology internship programs to provide support to the clinical psychology training program. These MIBHPs offer didactic trainings, clinical supervision, and mentorship to psychology interns. They often serve as assistant training directors at their sites directly influencing future behavioral health leaders. In order to improve access to quality care in the community, MIBHPs interact with their local communities by providing training on a variety of topics including military culture, combat stress, evidence-based psychotherapies, ethics and suicide prevention. The military Training Resource Library (TRL) is a didactics library developed by CDP to augment its support of the DoD's psychology internship training programs. The TRL's infrastructure and process maximizes visibility of resources for conducting didactics across geographically dispersed military clinical psychology internship sites.



### Star Behavioral Health Providers Program

In 2011, CDP partnered with the Military Family Research Institute at Purdue University to create the Star Behavioral Health Providers (SBHP) program. With a focus on National Guard and Reserve members as well as people residing some distance from military treatment facilities, SBHP aims to improve the quality of and access to behavioral health care. Through SBHP, civilian clinicians are trained in understanding and treating members of the military at continuing education workshops for free or at minimal cost. The SBHP system involves a two-pronged approach: provide civilian behavioral health providers with training and establish and maintain a registry of SBHP-trained behavioral health providers that service members, family members, military leaders and others can use to find nearby clinicians with specialized training.

# Center for Global Health Engagement

[www.usuhs.edu/cghe](http://www.usuhs.edu/cghe)

## CGHE



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**Director:**

CAPT Danny Shiau, MD

## Mission/Vision

**Mission:** The mission of the Center for Global Health Engagement is to provide operational support to the Department of Defense Global Health Engagement (DoD GHE) enterprise to meet national security objectives. We accomplish this by providing a hub for DoD GHE thought leadership and knowledge; operational support to the Joint Force; education and training; research and scholarship; and assessment, monitoring and evaluation.

**Vision:** By the end of calendar year 2021, the Center for Global Health Engagement will be globally recognized as a leading institution for the DoD GHE enterprise.

## Overview

The Center for Global Health Engagement (CGHE) was founded in 2016 at the Uniformed Services University of Health Sciences (USU) with the purpose of providing operational support to the DoD GHE enterprise. Specifically, CGHE focuses its efforts on geographic Combatant Commands (CCMDs) priorities and activities. With CCMD support in mind, the Center coordinates and builds support for GHE within the DoD and other U.S. government entities as needed, in addition to championing the USU priorities by increasing contributions to DoD GHE academia and research.

2019 marks CGHE's third year as an established center within USU. We moved from defining to refining our Mission and zeroed in on key deliverables for those we serve in the defense health community. Most importantly, we have accomplished a number of significant initiatives as outlined in our strategic plan and in line with USU leadership. CGHE has streamlined several internal and external processes to improve accountability, compliance, efficiency and knowledge

sharing, which included fulfilling more than 70 percent of the requests for assistance and information we receive from across all of the geographic CCMDs, the services, and several DoD entities, including the Office of the Joint Staff Surgeon and the Defense Health Agency. We continue to work on the future of CGHE to ensure continuity of training, guidance and support for our uniformed service members.

It has been a dynamic year at CGHE. We began 2018 with 30 personnel and finished the year with 38, expanding our pool of expertise and skills and allowing for more effective operation of our Mission and vision. Whether it is through our exportable and customizable DoD GHE training programs—such as the Fundamentals of Global Health Engagement course—or our ability to implement complex, multi-year programs, CGHE continues to provide steady support to the CCMDs to enable effective DoD GHE activities in support of strategic objectives.

## Recent Deliverables

### Fundamentals of Global Health Engagement Course

Since its inception in 2016, CGHE has successfully delivered 27 Fundamentals of Global Health Engagement (FOGHE) courses to more than 1,000 Military Health System professionals. FOGHE is a three-day awareness-level course designed to help MHS professionals better conduct GHE activities and it touches the largest number of MHS professionals of any CGHE program to date.

### Global Health Strategies for Security Course

CGHE has also delivered its annual Global Health Strategies for Security (GHSS) course to over 90 participants from CCMDs, the services, other DoD agencies, the U.S. government interagency, and partner nations. This two-week course, held annually each spring in the Washington, D.C. metro area, is designed to develop an in-depth understanding of DoD GHE, outline civil and military considerations at the nexus of global health and security, and foster a whole-of-government approach to strengthening USG global health activities.

### Support to USU's Military Contingency Medicine Course and Operation Bushmaster

CGHE supported the USU School of Medicine's Department of Military and Emergency Medicine by facilitating the DoD GHE components of USU's annual Military Contingency Medicine course and its field exercise named Operation Bushmaster. The CGHE-led training activity provided more than 200 participants with exposure to DoD GHE principles and practices and a simulated experience of working with partner nation personnel to execute a DoD GHE scenario.

### The Playbooks Initiative

CGHE was granted Defense Health Program Research, Development, Test and Evaluation funding for the launch, research and development of tools to support operational entities implementing DoD GHE programs focused on specific health functional areas. The Playbooks Initiative will include gathering existing DoD

CGHE coordinated the first-time Vendor Training for the Uganda People's Defence Forces (UPDF) in May 2019 in Jinja, Uganda. More than 25 UPDF personnel participated in the training, learning skills to set up and take down a UN level-2 hospital for rapid deployment missions.

GHE resources, such as assessment tools, engagement guides and curricula, to be made available to the enterprise. Research efforts will analyze how DoD GHE programs can be better planned, prepared, executed and evaluated to achieve intended outcomes, and will be conducted in the setting of real-world DoD GHE activities.

### African Peacekeeping Rapid Response Partnership

On behalf of U.S. Africa Command, CGHE manages the medical component of the African Peacekeeping Rapid Response Partnership (APRRP), a U.S. Department of State-funded program that builds the capacity of African militaries to rapidly deploy peacekeepers. CGHE implements training courses on a variety of topic areas, including nursing, equipment maintenance, field sanitation, medical logistics, patient movement and trauma life support. APRRP courses are tailored to the needs of each country, conducted by service members, and align with the goals of the United Nations Peacekeeping Capability Readiness System. CGHE supports the medical components of APRRP in Rwanda and Uganda and is in the early stages of engagement with Ghana and Senegal.



# Center for Neuroscience and Regenerative Medicine

[www.usuhs.edu/cnrm](http://www.usuhs.edu/cnrm)

## CNRM



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**Director**

David L. Brody MD, PhD

**Co-Director**

Leighton Chan MD, MPH

## Mission/Vision

**Mission:** Our mission is to conduct great science that improves outcomes for service members with traumatic brain injury.

**Vision:** Our vision is to build a substantial evidence base that will influence and enhance clinical practice in the diagnosis and treatment of traumatic brain injury in service members. The Center for Neuroscience and Regenerative Medicine plans to achieve this vision in the following stages:

Two years: The Center will run multiple studies that test treatments in human patients as well as new therapies in animal models that closely mimic studies with human participants.

Five years: The Center will fully implement a scientifically rigorous, well-organized, and highly focused military TBI research program that has twice the funding of its existing program.

Ten years: CNRM will develop a substantial body of knowledge about what is effective and ineffective when treating service members with traumatic brain injury.

## Overview

The Center for Neuroscience and Regenerative Medicine (CNRM) is a joint federal military traumatic brain injury (TBI) research program of the Uniformed Services University of the Health Sciences (USU) and the National Institutes of Health (NIH). Congress appropriated funding for CNRM in 2008 (Public Law 110-252), in response to the alarming number of blast-related TBIs sustained by service members in Operation Iraqi Freedom and Operation Enduring Freedom. During this appropriation, it was agreed that researchers from USU and NIH would work together to study blast-related TBI and post-traumatic stress (PTS) from combat care patients at the Walter Reed National Military Medical Center, formerly the Walter Reed Army Medical Center and the National Naval Medical Center.

Since 2008, CNRM has grown to become a mature interagency organization whose research directly

addresses current military TBI treatment gaps. Its research agenda is organized into four areas: 1.) translational research, 2.) clinical research (interventional clinical trials, in particular), 3.) operational research, and 4.) neuropathology and neuroradiology. Its administrative team provides program-wide support with program management, finance, operations, scientific writing, and communication.

CNRM consists of more than 30 senior scientific investigators and 100 staff. It currently has 28 active research projects conducted at 11 locations in the Washington, D.C. area and throughout the United States. To date, CNRM has funded a total of 131 research projects and has enrolled over 8,000 research participants, 63 percent of whom are service members enrolled at nationwide military treatment facilities.

CNRM has 10 scientific core research facilities and three repositories. CNRM also offers a unique Military TBI Fellowship Program that aims to train the next generation of civilian and military leaders in military-relevant TBI research and clinical care. This fellowship includes rotations at either NIH, the University of Maryland's Shock Trauma, or USU.

For more information about CNRM, please visit: <https://www.usuhs.edu/cnrm>.

## Recent Deliverables

### Cultivating a Unified Response to the Comprehensive Strategy and Action Plan for Warfighter Brain Health

On October 1, 2018, the Deputy Secretary of Defense issued a memo calling for a "Comprehensive Strategy and Action Plan for Warfighter Brain Health." At the request of Dr. Richard Thomas, USU President, CNRM facilitated three one-hour "All Hands Sessions" that discussed and captured the TBI research community's recommendations for this strategy. These three sessions took place at USU during October 2018. More than 150 subject matter experts attended from numerous organizations within the Department of Defense, the Department of Veterans Affairs, the Department of Health and Human Services, and the private sector. CNRM compiled the feedback from each of the sessions into a final report, which Dr. Thomas presented to Department of Defense leadership. Preparations for the Comprehensive Strategy for Warfighter Brain Health's six lines of effort are well underway. Leadership from CNRM and the newly created TBI research consortium are actively involved in three of these lines of effort.

### Key Resources for the TBI Research Community

We can all make a difference in TBI research by working together. CNRM's three repositories—the Biospecimen Repository, the Brain Tissue Repository and the Data Repository—are valuable resources for the TBI research community. These repositories were created to accelerate TBI research progress to the benefit of America's warfighters. The Biospecimen and Brain Tissue Repositories will share samples, when available, and the Data Repository will share de-identified data with approved requestors. CNRM's Informatics Core launched a new initiative called the Collection, Access, Sharing and Analytics Platform (CASA). CASA is a secure, electronic data platform that supports human subjects, animal and biospecimen research projects. CASA also supports the Data Repository and has data analytic abilities.

## Exciting Additions to Our Research Agenda

CNRM adapted its research agenda to include more interventional trials, operational research, prolonged field care efforts and the creation of a Neuropathology-Neuroradiology Integration Core. Our interventional trials are spearheaded by the Translational Therapeutics Core and the Clinical Trials Unit. The Translational Therapeutics Core is a state-of-the-science paradigm for the preclinical testing of TBI treatments. It has developed a complex, chronic model of TBI in mice that incorporates rigorous clinical trial requirements and conducts preclinical interventional trials to test the effectiveness of novel TBI therapeutics. The Clinical Trials Unit assists clinical interventional trials with design, feasibility assessments, site developments, monitoring requirements, and regulatory guidance. Operational research focuses on optimizing warfighter brain health in operational environments and consists of two initiatives: Monitoring Blast Exposures and Environmental Overpressure Events; and Prolonged Field Care. These initiatives explore field-based brain health concerns such as blast overpressure exposure, impact/acceleration events, and the development of countermeasures for severe brain injuries, such as subdural hemorrhage, in austere environments. The Neuropathological-Neuroradiological Integration Core is an interdisciplinary team that is working together to develop and test novel magnetic resonance imaging (MRI) approaches that could potentially identify TBI-related structural abnormalities in vivo.

## National Capital Area TBI Research Symposium

CNRM has hosted the National Capital Area TBI Research Symposium every year since 2011. This two-day event takes place in March during Brain Injury Awareness Month in the Natcher Conference Center at NIH. Its goal is to bring together staff, students, and subject matter experts from local private and federal organizations to network, exchange ideas, and, ultimately, advance TBI research. This event includes a keynote, plenary and oral presentations, poster, breakout, and networking sessions, panel discussions and a poster award ceremony. The 2019 Symposium had over 450 participants and 130 abstract submissions. It has become one of the leading TBI research meetings in the Washington, D.C. area.

# Center for Rehabilitation Sciences Research

[www.crsr.org](http://www.crsr.org)

# CRSR



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**Director:**

COL (Ret) Paul Pasquina, MD

## Mission/Vision

**Mission:** Our mission is to lead synergistic rehabilitation-related research efforts and disseminate knowledge across the Military Health System to optimize the rehabilitative care of injured service members in order to promote the highest functional recovery, independence and quality of life. Our focus is on the unique challenges associated with war-related trauma, including blast injuries resulting in limb loss/dysfunction, neurological impairment, and the physical, cognitive and mental health complications associated with these injuries.

**Vision:** Our vision is to be a global leader in advancing rehabilitative care for war-related casualties.

## Overview

CRSR provides critical infrastructure support for the NCAA-DoD CARE Consortium, a multisite collaboration of 30 colleges and universities nationwide, including the four Military Service Academies, which aims to identify the natural history of concussion and track the long-term effects of head-impact exposure. At present, nearly 40,000 NCAA athletes and Service Academy cadets and midshipmen have enrolled in this study, with approximately 40 percent being female, making it the largest study to date of concussion. Data include the baseline assessment of over 48,000 enrollees,

as well as the post-concussion data of over 4,000 participants with documented concussion. The study prospectively collects data regarding neurocognitive performance, neurological status, postural stability and neurobehavioral symptoms. In addition, the U. S. Military Academy and the U.S. Air Force Academy participate in the Advanced Research Core of the Consortium, contributing blood biospecimen and helmet sensor data to the rich data set to help determine greater specificity to diagnostics and prognostic indicators after brain injury.

## Recent Deliverables

### Mobile Device Outcomes-Based Rehabilitation Program

The Health Executive Committee approved the Department of Defense-Veterans Affairs Health Care Sharing Incentive Fund proposal known as the Mobile Device Outcomes-Based Rehabilitation Program (MDORP) Expansion Initiative and recommended funding for FY19. The \$5.4 million initiative will build on the original MDORP, which is a comprehensive mobile rehabilitation program that is clinician-guided and incorporates the use of sensor technology to provide a self-management program facilitated through audio biofeedback in the home and community, including a prescription-based exercise program, for service members and veterans with lower limb loss. The MDORP Expansion Initiative is a collaboration between researchers and clinicians from multiple academic institutions, agencies and non-profit organizations.

### Regenerative and Rehabilitative Medical Research Laboratory

CRSR investigators within the Regenerative and Rehabilitative Medical Research Laboratory collaborate to accelerate the pace of basic and translational research to develop new therapies that combine rehabilitation and regenerative medicine. Established in 2017 and based at USU, the lab hosts a number of projects to explore regenerative medicine as it relates to neuro-regeneration, orthopedic tissue repair, vascular regeneration, biomaterials design, 3D printing and bio-printing. Ultimately, laboratory investigators hope to apply custom ink formulations toward the direct printing of various tissue components in-situ at the wound site, a technique that could prove beneficial in helping mend severed nerves, bone, muscle, etc. of service members on the battlefield in real time.

### NCAA-DoD Concussion Assessment, Research and Education (CARE) Consortium/Service Academy Longitudinal Traumatic brain injury Outcomes Study (SALTOS)

CRSR provides critical infrastructure support for the NCAA-DoD CARE Consortium, a multisite collaboration of 30 colleges and universities nationwide (including the four Military Service Academies), which aims to identify the natural history of concussion and track the long-term effects of head-impact exposure. At present, nearly 40,000 NCAA athletes and Service Academy cadets and midshipmen have enrolled in this study, with approximately 40 percent being female, making it the largest study to date of concussion. Data include the baseline assessment of over 48,000 enrollees, as well as the post-concussion data of over 4,000 participants with documented concussion. The study

prospectively collects data regarding neurocognitive performance, neurological status, postural stability and neurobehavioral symptoms. In addition, the U.S. Military Academy and the U.S. Air Force Academy participate in the Advanced Research Core of the Consortium, contributing blood biospecimen and helmet sensor data to the rich data set to help determine greater specificity to diagnostics and prognostic indicators after brain injury.

### The Pain Management Collaboratory Military Treatment Facility Engagement Committee

The NIH-DoD-VA Pain Management Collaboratory, an \$81 million inter-agency initiative designed to support a multi-component research effort focusing on nonpharmacological approaches for pain management (particularly addressing the needs of service members and veterans) was formed in 2017. A PMC Coordinating Center was established to facilitate collective learning and to optimize the impact of the PMC as an integrated whole through the implementation of Pragmatic Clinical Trials (PCTs), four of which are supported by a DoD-focused Military Treatment Facility Engagement Committee (MTFEC), developed and supported through CRSR infrastructure and chaired by Dr. Paul Pasquina. The MTFEC, which consists of experts from across DoD Services who bring a wealth of experience in the execution of pain-management-related clinical trials, is a valuable resource for principal investigators in facilitating discussion and problem-solving specific to the conduct of clinical trials in military treatment facilities. The ultimate goal of this multi-agency effort is to advance the non-pharmacological management of pain to help reduce the nation's opioid crisis.

### A New Model for Service-Dog Training to Help Advance Rehabilitation

CRSR investigators conducted a retrospective analysis of a popular service-dog training program (SDTP) at Walter Reed National Military Medical Center that entails teaching service members how to train service dogs. Preliminary results indicate that participation in this program may help injured service members develop skills, such as attention and discipline, which are needed to successfully shape a dog's behavior and are translatable to other social settings. Further, participation in the program appears to enhance the participants' well-being, quality of life and relationship with significant others, including their children. In 2019, CRSR investigators began recruitment for a prospective study that aims to evaluate physical psychological, biological, and social effects of the SDTP as an adjunct intervention for patients with psychological and physical trauma.

# Center for the Study of Traumatic Stress

[www.cstsonline.org](http://www.cstsonline.org)

# CSTS



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**Director:**

Col (Ret) Robert J. Ursano, MD

## Mission/Vision

The Center for the Study of Traumatic Stress is dedicated to addressing a wide range of traumatic exposure from the consequences of combat, operations other than war, terrorism, natural and human-made disasters, and public health threats.

## Overview

Established in 1987, the Center for the Study of Traumatic Stress (CSTS) is one of the nation's oldest and most highly-regarded academic-based organizations dedicated to advancing trauma-informed knowledge, leadership and methodologies. CSTS is a part of our nation's federal medical school, the Uniformed Services University of the Health Sciences (USU), and its Department of Psychiatry. These affiliations represent the Center's history, Mission and future directions as a major contributor to our country's understanding of the impact of trauma and the advancement of trauma-informed care.

A unique aspect and contribution of the Center is the bridging of military and disaster psychiatry and the integration of disaster mental health and public health. In applying the principles and practices for dealing with individuals and groups exposed to extreme environments (in the military), the Center has generated and disseminated its subject matter expertise to inform disaster preparedness, response and recovery principles and practices across a wide range of traumatic events and populations.

Today, as well as looking ahead and into the future, the Center is uniquely positioned to respond to DoD Mission relevant activities and issues, and

to educate regional and national stakeholders in government, industry, health care, public health and academia on mitigating the effects of disaster and trauma in the civilian community to foster human continuity and community and national resilience.



## Recent Deliverables

### The National Military Family Bereavement Study

CSTS has conducted analyses on data obtained from the National Military Family Bereavement Study ([www.militarysurvivorstudy.org](http://www.militarysurvivorstudy.org)), which is the first systematic study of the impact of military duty-related death on bereaved military family members. In addition to examining risk and protective factors contributing to grief outcomes in these family members, these data have been analyzed to recommend clinically meaningful criteria for a clinical disorder of impairing grief to be adopted by the American Psychiatric Association's Diagnostic and Statistical Manual.

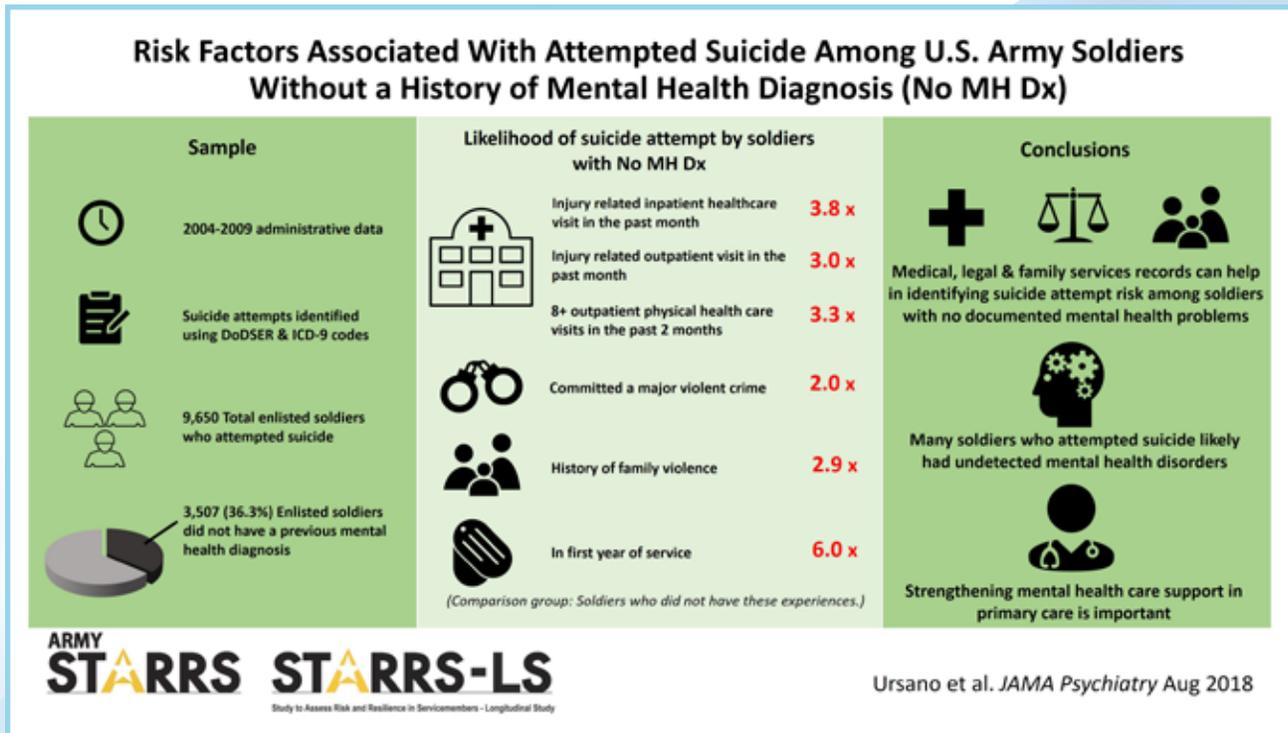
### Study to Assess Risk and Resilience in Service Members (Army STARRS)

As the lead institution for the STARRS (Study to Assess Risk and Resilience in Service Members) family of studies, CSTS has been instrumental in increasing understanding of military suicide and developing actionable findings for suicide prevention. STARRS has generated more than 80 publications and dozens of actionable findings to date. Key reports include a study demonstrating that suicide attempts in military units increase the risk of future attempts (Ursano et al.,

2017); a study showing that suicide attempts following mental health inpatient visits can be predicted from administrative data using precision medicine techniques (Kessler et al., 2016); and a genome-wide analysis study of insomnia disorder (Stein et al., 2018).

### Disaster Mental Health Education

CSTS is the DOD's lead purveyor of disaster mental health education. The center has provided disaster education resources as well as consultation to public and private sector stakeholders in response to over 100 national and global disasters, including 9/11, Hurricane Katrina, Haiti Earthquake, the Washington Navy Yard shootings, and the West Africa Ebola virus pandemic. CSTS developed, disseminated and maintains a growing repository of just-in-time, highly actionable disaster mental health fact sheets to assist community leaders, health care providers, first responders, teachers and families to more effectively respond and recover following disaster events. The Center offers the only disaster psychiatry fellowship in the United States, having graduated 10 U.S. military psychiatrists as well as over a dozen distinguished members of partner nations, including the former Surgeon General of Singapore and the senior disaster mental health advisor and researcher supporting the Japan Self Defense Force.



# Collaborative Health Initiative Research Program

[www.usuhs.edu/chirp](http://www.usuhs.edu/chirp)

## CHIRP



Uniformed  
Services  
University

**Director:**

Harvey Pollard, MD, PhD

## Mission/Vision

The goal of this National Heart, Lung, and Blood Institute/Department of Defense collaborative initiative is to transform patient care by harnessing genomics, supercomputers and bioinformatics to predict and preempt disease, mitigate and repair traumatic injury, optimize human performance and resilience, and generate novel personalized therapies that will benefit civilians and service members alike.

## Overview

The Collaborative Health Initiative Research Program (CHIRP) was established on October 1, 2014 at the Uniformed Services University of the Health Sciences (USU). It represented a strategic alliance between the National Heart, Lung, and Blood Institute (NHLBI) and USU. CHIRP is intended to advance the Precision

Medicine Initiative led by the National Institutes of Health (NIH) by exploring problems of particular importance to NHLBI and the Department of Defense (DoD), especially disorders of the heart, lungs, blood and sleep.

## Recent Deliverables

### 40,000 Whole Genome Sequences

In support of CHIRP, The American Genome Center uses state-of-the-art technologies, including Illumina HiSeq X and Nova-Seq sequencing platforms, high-performance compute clusters, multi-petabyte storage for high throughput data generation, and pipelines for population genomic analyses. The American Genome Center is Illumina SeqLab-certified and contributes to global research initiatives in genomics. In addition, the Informatics Core and Clinical Core within CHIRP evaluate deep phenotyping to identify associations of genetic variations to disease states.

### Whole Genome Sequences on 1,093 Sickle Cell Patients and Others with Vascular Disease Mutations in Intramural NHLBI

As a strategic alliance between USU and NHLBI, CHIRP has been studying clinical diseases and disorders of the heart, lungs and blood through the use of next-generation sequencing and analysis since its founding in 2014.

### 12,000 Whole Genetic Sequences from Minority Early Onset Dementia and Healthy Controls

Current programmatic efforts include studies of the genetic associations of psychological disease and PTSD with cardiovascular disease within diverse large cohorts sourced from the Vietnam-Era Twins Repository

(Veterans Administration) and Army STARRS (DoD). Identification of the genetic influences for depression as well as suicide risk and ideation are associated efforts for these studies. CHIRP is also currently partnered with the National Institute of Aging to investigate possible genomic influences for dementia.

### Cancer Biomarkers for Lung, Ovarian, Prostate and Breast Cancer in Support of the Vice-President's Cancer Moonshot

The American Genome Center (TAGC) is also the genomic profiling center for the Applied Proteogenomics Organizational Learning and Outcomes (referred to as APOLLO) Network, a collaborative effort between the National Cancer Institute, the Department of Defense and the Department of Veterans Affairs. Its Mission is to transform proteogenomic data into beneficial outcomes for patients by investigating a deep cross-section of different cancer types. The CHIRP leadership supports a "unity of effort" with the DoD/VA enterprise and with all institutes at NIH to participate in precision medicine initiatives.

### Four OncomiRs in Serum Identified with High Likelihood of Exposure to Burn Pits

TAGC and CHIRP have also worked with the DoD to identify genetic biomarkers that indicate deployment-associated exposures of service members at military installations with open burn pits. In addition, TAGC and CHIRP are also currently participating in other DoD programs to investigate possible genetic influences of other deployment-associated environmental exposures, including radiation and psychological trauma.



# Consortium for Health and Military Performance

[www.usuhs.edu/champ](http://www.usuhs.edu/champ)

## CHAMP



Uniformed  
Services  
University

**Director:**

Patricia A. Deuster, PhD, MPH

## Mission/Vision

**Mission:** Our mission is to optimize warfighter mission and family readiness through leadership, community engagement, education, and conducting and translating human performance research.

**Vision:** Be the premier Department of Defense translational resource in the complete range of disciplines associated with military-unique Human Performance Optimization (HPO) and Total Force Fitness (TFF) for maximizing warfighter readiness and performance and for optimizing the resilience of the global military family. As it continues to evolve, the Consortium for Health and Military Performance (CHAMP) will become an asset for the entire U.S. national security community.

## Overview

Established in 2006, the Consortium for Health and Military Performance (CHAMP) is a Department of Defense Center of Excellence within the Uniformed Services University of the Health Sciences (USU) Department of Military Emergency Medicine. CHAMP is dedicated to serving the U.S. Armed Forces with education, training, research, scholarship, leadership, and service resources to apply human performance optimization (HPO) to the military's Total Force Fitness (TFF) paradigm. HPO applies knowledge, skills and emerging technologies to improve and preserve the ability of warfighters to execute their Mission-essential tasks through enhancement, sustainment and restoration. TFF is a holistic approach to building and maintaining optimal health, readiness and performance of warfighters using the connections between mind, body, spirit and social relationships.

CHAMP's expert staff of scientists and educators collaborates with military research and medical communities, federal partners and academic institutions to advance the knowledge of human performance and develop innovative resources for warfighters, their families, military healthcare providers and the military community as a whole.

To learn more about CHAMP, visit [www.usuhs.edu/champ](http://www.usuhs.edu/champ).

For warfighter-centric HPO and TFF resources from CHAMP, visit our educational websites: [www.hprc-online.org](http://www.hprc-online.org) and [www.opss.org](http://www.opss.org).

## Recent Deliverables

### Clinical Practice Guideline for Exertional Rhabdomyolysis

CHAMP developed a Clinical Practice Guideline for exertional rhabdomyolysis for the Military Health System that was approved by the Clinical Practice Guidelines committee. It is currently being used across DoD and has resulted in many consultations for complex exertion-related cases.

### Operation Supplement Safety

Operation Supplement Safety developed the Dietary Supplement Risk Assessment (DSRA) tool. The DSRA tool provides a series of seven binary (yes-no) questions intended to help consumers identify likely safe or potentially unsafe dietary supplements. It is also being used as a teaching tool for healthcare providers, their patients, and all military service members. It can be found on the Operation Supplement safety website (OPSS.org).

### Go for Green Hub

CHAMP coordinates the hub for Go for Green®, a joint-service performance-nutrition initiative to improve the food environment where military service members live and work. Go for Green® uses a stoplight-color system (green, yellow and red) to code food items to clearly identify and realign food choices so diners can easily access performance-enhancing foods and drinks in dining facilities and galleys.

### Performance Psychology Subcommittee Charter approved by Psychological Health and Readiness Council

CHAMP hosted a Performance Psychology Summit in February 2018 that resulted in the formation of a Performance Psychology Subcommittee Charter under the Psychological Health and Readiness Council. This subcommittee should help enhance the readiness and resilience of our military service members by developing validated metrics, sharing best practices and identifying research gaps.

# Defense & Veterans Center for Integrative Pain Management

[www.dvcipm.org](http://www.dvcipm.org)

## DVCIPM



Uniformed  
Services  
University

**Director:**

COL (Ret) Chester "Trip"  
Buckenmaier, MD

## Mission/Vision

**Mission:** Our mission is to leverage the best available evidence, clinical expertise and collaboration to develop and communicate consensus recommendations in support of Air Force, Army, Navy, and the Veterans Health Administration pain management practice, education and research.

**Vision:** Our vision is to serve as the unifying force for military pain management excellence and standardization.

## Overview

In 2009, the DoD Pain Management Task Force (PMTF) developed a pain management strategy for the Military Health System (MHS). Among more than 100 recommendations from the PMTF was an overarching requirement for a coordinating/advisory organization to facilitate MHS efforts to standardize and optimize pain management. The Defense & Veterans Center for Integrative Pain Management (DVCIPM) was the only MHS organization with the unique combination of pain management historical perspective, clinical and research expertise as well as a collaborative network that spans the DoD, VHA and also civilian medicine. Following concurrence by the Assistant Secretary of Defense for Health Affairs at the April 2011 Senior Military Medical Advisory Committee, DVCIPM has been serving as the coordinating organization for

DoD pain management. In January 2014, DVCIPM realigned as part of the Uniformed Services University of the Health Sciences under the Department of Military and Emergency Medicine.

Originally established as an organization focused on regional anesthesia, DVCIPM's evolution has paralleled the national pain medicine's evolution over the past decade from a narrow and physician and specialty-centric effort to a focus on providing pain care that is holistic, integrative, multidisciplinary and patient centered. DVCIPM has maintained the MHS presence on the leading edge of national pain management clinical practice, research and education.

## Recent Deliverables

### Defense and Veterans Pain Rating Scale

Developed and validated by DVCIPM, the Defense and Veterans Pain Rating Scale (DVPRS) improves on traditional pain scales by allowing for a measurement of the impact of pain on function and quality of life indicators like sleep, activity, mood and stress. After years of increasing use of the DVPRS in research and clinical practice, the new DHA policy establishes it as the MHS pain scale for adults.

### Pain Assessment Screening Tool and Outcomes Registry

The Pain Assessment Screening Tool and Outcomes Registry (PASTOR) is a short survey that produces a comprehensive clinician report of a patient's complex or chronic pain. DVCIPM developed PASTOR in response to the National Defense Authorization Act 2010 directive to develop improved performance measures for pain care as well as MHS interest in an outcomes registry that would facilitate pain research, while also providing clinicians with outcomes data to improve evidence-based decision making. Following a multi-year research, development and validation process led by DVCIPM, PASTOR was transitioned to a DHA IT program and designated in the new DHA pain policy as the MHS outcomes measurement system for pain.

### Pain BioBank

The Pain Registry Biobank is a clinical data registry and tissue biobank for the advancement of pain-related research. This biobank contains PASTOR survey data, the Defense and Veterans Pain Rating Scale, electronic health record data, and biospecimens (blood and saliva) from targeted individuals eligible for care within the Military Health System. Data is collected from participants in a longitudinal fashion with continual enrollment. The richness of PASTOR data matched with biological samples will allow future researchers to address significant research gaps and enhance health care for service members, veterans and civilians. The data collected from this project is available to all researchers studying pain and psychological health

### Acute Pain Fellowship

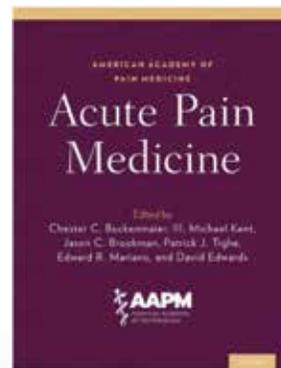
Regional Anesthesia and Acute Pain Medicine (RAAPM) has been a major driver of pain care for wounded service members since the beginning of the Afghanistan and Iraq conflicts. In response to the identified training requirement for this emerging subspecialty of anesthesiology, Walter Reed Army Medical Center created the first military RAAPM fellowship programs in 2004, which was one of the first programs in the United States. Today military anesthesia providers

are recognized for their particular expertise in acute pain medicine. For its role in the development of this sub-specialty, the RAAPM program, which is now based at the Walter Reed National Military Medical Center, was recently recognized by receiving full ACGME certification. The Walter Reed military program is among the first institutions to receive this certification since it was established three years ago.

### "Acute Pain Medicine" (Oxford Press, 2019)

Written and edited under the auspices of Oxford Press and the American Academy of Pain Medicine's shared interest group, "Acute Pain Medicine" is the first comprehensive, case-based text of its kind that explores the essential topics of acute pain medicine, including interventional, pharmacologic and diagnostic considerations. This text includes an introduction to acute pain medicine and an easily referenced interventional section. The text is rounded out by the complete content of the thoroughly revised Military

Advanced Regional Anesthesia and Analgesia Handbook (MARAA II). Although the MARAA handbook gained its reputation as a useful resource for managing the pain associated with battlefield trauma, its beautifully illustrated step-by-step guidance is useful for providing vital acute pain services in all settings.



"Acute Pain Medicine" was published by Oxford Press in 2019



The DVPRS has been integrated into clinical practice and research outside of the DoD. Examples include rebranding of it by West Virginia University and the American Society of Acupuncturists.

# Infectious Disease Clinical Research Program

[www.idcrp.org](http://www.idcrp.org)

## IDCRP



Uniformed  
Services  
University

**Program Director:**

CAPT Timothy Burgess, MD, MPH, FACP

**Science Director:**

David Tribble, MD, DrPH

## Mission/Vision

**Mission:** Our mission is to conduct multicenter infectious diseases clinical research, focusing on high-impact cohort and interventional trials, and to inform and improve the care of the warfighter.

**Vision:** Our vision is to substantially reduce the impact of infectious diseases in the military population through collaborative clinical research.

## Overview

The Infectious Disease Clinical Research Program (IDCRP) was founded in 2005 under an interagency agreement between the Uniformed Services University of the Health Sciences (USU) and the National Institute of Allergy and Infectious Diseases (NIAID) and through a cooperative agreement with the Henry M. Jackson Foundation for the Advancement of Military Medicine. The program's work is executed through a unique, adaptive, and collaborative, globally-distributed, Military Health System (MHS)-based clinical research network. IDCRP contributes to force readiness by advancing clinical practice and informing health policy for military personnel.

IDCRP supports a broad clinical research portfolio within the MHS through collaboration with other DoD and interagency partners, academia, and industry. From observational, longitudinal cohort studies to field-based interventional trials to the evaluation of long-term health outcomes, IDCRP conducts protocols that address critical knowledge gaps in the control and prevention of infectious diseases in the military. Study outcomes have far-reaching implications for public health and disease prevention beyond military communities.

The IDCRP research portfolio includes seven research areas: 1) Acute Respiratory Infections; 2) Deployment and Travel-Related Infections; 3) Emerging Infectious Diseases and Antimicrobial Resistance; 4) Human Immunodeficiency Virus; 5) Skin and Soft-Tissue Infections; 6) Sexually-Transmitted Infections; and 7) Trauma-Related Infections.

## Recent Deliverables

### Acute Travelers' Diarrhea Management

Sponsored (with the Naval Medical Research Center) an expert panel to produce the first DoD Clinical Practice Guidance for prevention and management of acute travelers' diarrhea in deployed military personnel. In collaboration with the University of Virginia, IDCRP sponsored development of a customized TaqMan® PCR assay for detection of pathogens associated with travelers' diarrhea; sensitivity and specificity of the assay using Whatman FTA Elute cards was 73 percent and 98 percent, respectively, which supports the use of FTA cards in combination with the TaqMan® PCR assay for the detection of enteropathogens in the field setting.

### Polytrauma-Associated Wound Infections

Findings from the Trauma Infectious Diseases Outcomes Study have supported antibiotic stewardship practices and refinement of Joint Trauma System clinical practice guidelines for combat trauma-related wound infections (invasive fungal wound infections). Recent analyses examined infectious outcomes among wounded military personnel with open fractures and soft-tissue injuries with regards to antibiotic prophylactic regimen and the findings support the current Joint Trauma System recommendations for use of a narrow-spectrum antibiotic.

## “Cascade of Care” for Newly HIV Positive

Established in 1986, the HIV Natural History Study (NHS) includes more than 5700 subjects. HIV NHS investigators are currently contributing to the evaluation of DoD quality of HIV patient care by assessing the “cascade of care” among active duty found to be newly HIV positive. IDCRP HIV NHS investigators provided subject-matter expertise to the Defense Health Agency as they respond to the National Defense Authorization Act of 2017 to evaluate HIV viral suppression rates among HIV+ personnel receiving care in the military.

## Fort Benning Recruit Training *Staphylococcus aureus* Vaccine Study

Executed a study to evaluate the safety and efficacy of a vaccine candidate to prevent *Staphylococcus aureus* colonization in Fort Benning trainees, a high-risk population for skin and soft-tissue infections. The Phase 2 vaccine trial targeting *S. aureus* initiated among recruits at Ft. Benning in 2017 successfully completed enrollment and vaccination of 382 subjects, with the final study report expected in early 2020. Furthermore, more than 20 family medicine and preventive medicine residents at Martin Army Community Hospital provided ongoing support for the *S. aureus* NovaDigm vaccine trial through the Skin and Soft-Tissue Infections Research Area.

## U.S. Military Deployment/Travel-Related Infection (TravMil) Study

TravMil study provides deployment-related infectious disease threat assessments to Geographic Combatant Command Surgeons to enhance force health protection. Presently, more than 4,100 deployed military personnel and traveling DoD beneficiaries have enrolled in TravMil. Surveillance data collected through the TravMil study

provides assessment of deployment and travel-related infectious disease threats, and the effectiveness of mitigation strategies. The cohort study also provides necessary infrastructure to execute clinical trials.

## U.S. Marine Corps STEC Outbreak Long-Term Cohort Study

IDCRP is leading the first study to examine the long-term consequences of Shiga toxin-producing *Escherichia coli* (STEC) infections among a U.S. military population in response to the U.S. Marine Corps Recruit Depot-San Diego outbreak (nearly 300 cases), which was the largest within the U.S. military.

## Acute Respiratory Infections and Influenza Vaccines

The on-going Acute Respiratory Infection (ARI) Consortium Natural History Study has enrolled over 2000 influenza-like-illness and severe ARI cases since its inception, providing data on burden and clinical manifestations of ARI in military personnel and their families. Preliminary results from Study to Address Threats of ARI in Congregate Military Populations show a high frequency of respiratory viruses circulating during the first two weeks of recruit training. Five military treatment facility sites initiated the Pragmatic Assessment of Influenza Vaccine Effectiveness in the DoD (PAIVED) protocol, which is designed to determine whether there are clinically meaningful differences in the effectiveness and immunogenicity between different types of available, licensed influenza vaccines. More than 1600 study volunteers enrolled in 2019 and additional sites will participate in the coming year. Findings from PAIVED are intended to provide evidence needed for assessing influenza vaccination policy in the military.

## IDCRP: The Military Health System’s Global ID Clinical Research Network (31 Partner Sites; 120+ Staff Members; 66 Open IRB Protocols)



# John P. Murtha Cancer Center Research Program

[www.wrnmmc.capmed.mil/CancerCenter](http://www.wrnmmc.capmed.mil/CancerCenter)



**Director:**

COL (Ret) Craig D. Shriver,  
MD, FACS, MC, USA



determine if these cancers are related to occupational exposure or other common stresses. They also provide the opportunity to investigate carcinogens specific to military settings and determine their relationship to tumor development. The active duty military population is unique in its potential for exposure to dangerous chemicals, inhalants, biological agents and nuclear contaminants. The benefits of these research specimens include improving our overall understanding of cancer and other disease processes as they relate to the military population and beneficiaries, developing a new generation of biomarkers for early detection of cancer, and developing new therapeutic regimens for cancer treatment.

### **The Oncology Research Information Exchange Network Achieves Tier 1 Operational Status**

DoD beneficiaries, through a MCC/MCCRP partnership with 17 NCI-designated cancer centers in the Oncology Research Information Exchange Network (ORIEN), now have enhanced ability to participate in cancer clinical trials and pharmaceutical companies looking for unique patients potentially have access to DoD patients. MCC/MCCRP through the Henry M. Jackson Foundation for the Advancement of Military Medicine is a member of ORIEN, which is a unique research partnership among 17 of North America's top cancer centers aiming to accelerate cancer discovery and deliver hope through collaborative learning and partnerships. It is currently the world's largest precision medicine collaboration to address cancer. ORIEN is a consortium of NCI-designated cancer centers across America. It is a unique research partnership among North America's top cancer centers that recognize collaboration and access to data are the keys to ongoing and future cancer discoveries. The long-term objective is to develop and improved standard of cancer care by facilitating new clinical trials, new technology, new informatics solutions, translational research and personalized medicine.

### **APOLLO Network Accelerates Cancer Research Findings Into Clinical Care**

In response to the 2016 Presidential Cancer Moonshot Initiative to accelerate progress toward a cure for cancer, the Department of Veterans Affairs, Department of Defense and National Cancer Institute established a Memorandum of Agreement that will enable the three agencies to increase the pace of discovery in cancer and translate findings into clinical care. This agreement led to the Applied Proteogenomics Organizational Learning and Outcomes (known as APOLLO) Network. It is designed to strengthen and develop research collaborations in using state-of-the-art methods in proteogenomics to characterize and compare tumors, develop a deeper understanding of cancer



biology, and identify potential targets and pathways of cancer detection and intervention. Whole genome sequencing, performed by the American Genome Center (TAGC) within the Uniformed Service University, as well as multiplatform proteomics, performed by the MCC Clinical Proteomics Consortium, have been accomplished to identify genomic, transcriptomic, and proteomic alterations in patients. Preliminarily, several new genomic alterations in cancers have been identified, some new global protein expression tumor subtypes have been discovered, and new advanced techniques and processes have been found that will enhance the outcomes of future molecular research.

### **The DOD Framingham Longitudinal Cancer Study is Coming to Fruition**

The DoD Framingham Longitudinal Cancer Study represents a unique opportunity to leverage the DoD's cancer registry and serum repository to identify linkages between pre-diagnostic biological markers. The availability of longitudinal samples from active duty service members at points before their incident diagnosis of cancer, during the period of illness, and after resolution, when combined with the highly innovative mass spectrometric techniques available at Pacific Northwest National Laboratory, have enabled the identification of markers predictive of cancer diagnosis. A routine health screening and required annual health examination for all active duty service members has been demonstrated to result in earlier age of diagnosis and higher proportion of early stage disease in cancer. Identification of serum biomarkers predictive of certain types of cancers to be included in routine annual health surveillance will contribute to earlier detection of cancers, better prognosis, and improved health readiness of the operational unit.

### **Initial Capabilities Document for Cancer Care Approved by the DoD Joint Capabilities Board**

MCC/MCCRP is leading the effort to implement the requirements and recommendations of the Initial Capabilities Document for Cancer Care, which identified gaps in the ability to provide cancer care to the Joint Force and recommended solutions. Based on surveillance data gathered by the Armed Forces Health Surveillance Branch, an average of 1,000 active duty service members are diagnosed with cancer every year. The Department of Defense, through the Military Health System, along with Veterans Affairs, aims to ensure that all active duty and separated members of the military, as well as beneficiaries, receive prompt, safe, and high-quality care for cancer. The Initial Capabilities Document for Cancer Care recognizes that MCC/MCCRP was established to manage cancer care for the DoD. The document also identifies 64 recommendations for improving cancer care. MCC/MCCRP is analyzing these recommendations and has initiated a process to address them as they pertain to military cancer care.

# National Center for Disaster Medicine and Public Health

[www.usuhs.edu/ncdmp](http://www.usuhs.edu/ncdmp)

## NCDMPH



Uniformed  
Services  
University

**Director:**

Thomas D. Kirsch, MD, MPH, FACEP

## Mission/Vision

**Mission:** Our mission is to improve our Nation's disaster health readiness through education and science.

**Vision:** Our vision is to become the Nation's academic center of excellence in leading domestic and international disaster health education and research efforts. In collaboration with partners, we will create and translate science and education to improve readiness.

## Overview

The National Center for Disaster Medicine and Public Health (NCDMPH) was established under the Homeland Security Presidential Directive 21 to be an "academic center of excellence in disaster medicine and public health." The Center is a unique organization in two key ways:

1. The Center was founded to be a collaboration of five federal agencies: the Department of Health and Human Services, Department of Defense, Department of Homeland Security, Department of Transportation, and the Department of Veterans Affairs.

2. The Center is both a federal organization and an academic center, which is located within the Uniformed Services University of the Health Sciences (USU). This positions it to act as a bridge between agencies and the academic and government spheres. The unique structure and position makes the Center especially suited to meet our nation's critical disaster preparedness Mission.

The overarching strategic focus of NCDMPH is medical and public health readiness to ensure that our nation is prepared to respond to disasters and catastrophic events. To achieve the necessary level of preparedness, the Center will rely on interagency collaboration as well as strong leadership to advance an education and research agenda for disaster readiness in the United States.

## Recent Deliverables

### Formation of the National Alliance for Hazards and Disaster Science

This national association for university-based, academic disaster research centers was voted into existence at the 43rd Natural Hazards Workshop in July 2018.

### “Stop the Bleed” Leadership

Provided national leadership for the “Stop the Bleed” layperson education campaign. This included:

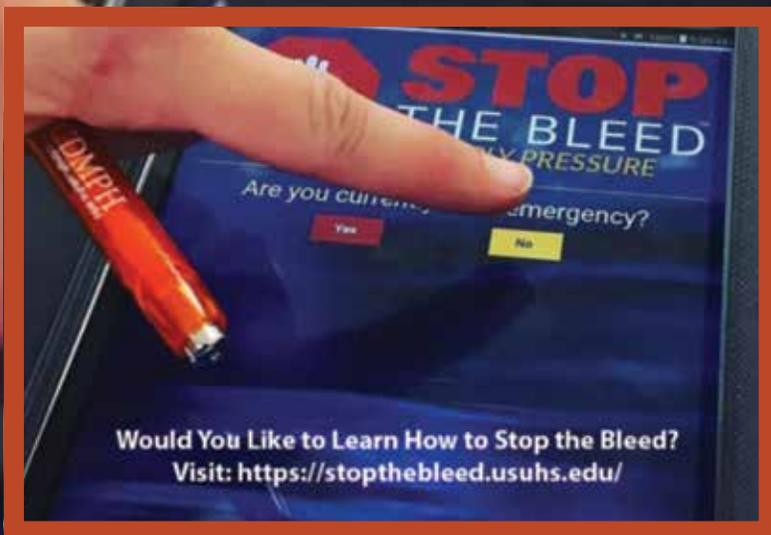
- Convened the “Stop the Bleed” Education Consortium and published guidelines
- Created cutting edge web-based and mobile application training for lay public
- Published significant guidance for characterizing the need for tourniquets in mass casualties, which garnered mainstream media attention

### Launched Disaster Health Core Curriculum

This first free, online training program for health professionals covers the 11 “Core Competencies for Disaster Medicine and Public Health.”

### Convened “Disasters and Health: State of Science Symposium” for Leading Experts

Nearly 200 participants from many disciplines attended this symposium in April 2019. The objective was to identify important issues both enabling and constraining an evidence-based approach to disaster medicine and public health. A summary of the symposium will be published later this year.



# Surgical Critical Care Initiative

www.sc2i.org

# C2i

Uniformed  
Services  
University

**Director:**  
CAPT Eric Elster, MD, FACS

underlying biology has the potential to dramatically improve patient outcomes while reducing costs. Biology-driven care will enable clinicians to reliably deliver the right treatment, at the right time, to the right patient, thus realizing the promise of precision medicine for acute and trauma care.

## Bringing Precision Medicine to Acute & Trauma Care



## Recent Deliverables

Building on a legacy of 320 service members injured during OEF/OIF, 1,500 additional critically ill civilian and military patients have been prospectively enrolled under four trials since October 2014. Recognized by the Department of Defense for its focus on "Genetics and Precision Medicine," the SC2i is functioning under Good Clinical Laboratory Practices across its molecular core laboratories. In its short existence, the Center has already deployed three CDSTs and is leveraging its growing databank to develop a battery of predictive algorithms for conditions associated with high mortality and morbidity (e.g., venous thromboembolism, acute kidney injury, acute respiratory distress syndrome, bacteremia, pneumonia). Use of these tools are expected to generate substantial cost savings in both civilian (\$10B) and military (\$111M) health systems.

### Supporting Medical Training and Education

As a USU Center, SC2i positions itself at the crossroads of Research (developing clinical decision support tools for the critically wounded warfighter) and Education (embedding students and residents into its translational studies), and is thus uniquely positioned to support the next conflicts by maintaining critical-care currency for the battlefield surgeons of tomorrow. Annually, the SC2i supports five surgical residents, ten or more USU medical students, and three cadets from the military academies.

### Supporting Military Readiness

The SC2i has internally deployed three CDSTs to predict the occurrence of Invasive Fungal Infection (IFI) in the combat wounded, the need to activate massive transfusion protocols, and sepsis in surgical ICU environments. Approximately ten additional biomarker-based tools are in various stages of development, with the first of a series of FDA clinical trials scheduled to launch in FY21. The SC2i CDSTs will further assist readiness by either accelerating return to duty (abridged length-of-stay across the ICU, General Ward, and rehabilitation continuum of care) or curbing logistical burdens (e.g. reduced need for blood products and airlifts) during conflicts.

### Three Clinical Decision Support Tools

SC2i has deployed three CDSTs internally, as either standalone applications or solutions linked to Epic and Cerner Electronic Medical Records:

#### 1. Invasive Fungal Infection CDST

Invasive fungal infections are especially challenging for combat patients with severe traumatic abdominal and extremity injuries. This CDST, deployed at the Walter Reed National Military Medical Center, has been used on every single combat trauma enrolled by the SC2i. Thus far, the Invasive Fungal Infection CDST has demonstrated 100 percent accuracy for both positive and negative predictions of IFI.

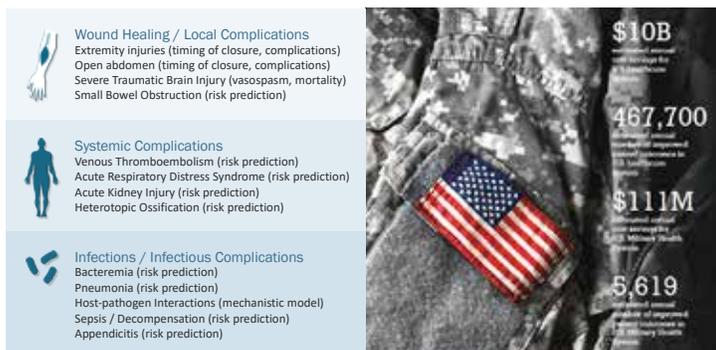
#### 2. Massive Transfusion Protocol CDST

The decision to activate a massive transfusion protocol is time-sensitive and has both clinical and logistical implications. This CDST leverages readily available physiologic data to create an extremely accurate prediction on the need for a massive transfusion. This MTP app was linked to both Cerner (the Military Health System's Genesis platform) and Epic electronic medical records and is currently in use at the Emory University School of Medicine, Grady Memorial Hospital and Duke University Hospital, both SC2i partners.

#### 3. Artificial Intelligence Sepsis Expert CDST

Sepsis is a deadly infection that is extremely difficult to diagnose and a leading cause of death for hospital patients. The Artificial Intelligence Sepsis Expert (AISE) CDST is based on an algorithm designed to predict the advent of sepsis in surgical intensive care units, up to six (6) hours prior to onset. This CDST is currently in use at Emory University School of Medicine, Grady Memorial Hospital and is being deployed at the Walter Reed National Military Medical Center.

#### Way Forward: Deploying Multiple CDSTs to Enhance Surgical Decision-Making



# Tri-Service Center for Oral Health Studies

[www.usuhs.edu/tscogs](http://www.usuhs.edu/tscogs)

## TSCOHS



Uniformed  
Services  
University

**Director:**

Lt Col Scott Irwin, DDS, MPH

## Mission/Vision

**Mission:** The mission of the Tri-Service Center for Oral Health Studies is to collect, analyze and report oral health care information, provide dental public health education, and support the Military Health System so that timely, data-driven decisions can be made for:

- the development of oral healthcare policies and programs to achieve optimum dental readiness and to improve the oral health-related quality of life for all authorized beneficiaries
- the creation of greater awareness and understanding of military oral healthcare issues
- maximizing the efficiency of the military's oral healthcare delivery system
- the advancement of programs that identify environmental and behavioral causes of oral disease as well as the countermeasures needed to overcome those factors

**Vision:** To be the premier organization within the Department of Defense globally supporting the military Mission through exceptional dental public health research and education.

## Overview

In the mid-1990s, the Tri-Service Dental Chiefs recognized the need for research and greater understanding of military oral health care issues. The Tri-Service Center for Oral Health Studies (TSCOHS) was subsequently established at the Uniformed Services University of the Health Sciences with a vision to be the premier Department of Defense (DoD) organization focused on enhancing dental operational readiness through oral health research and education. In 2014, TSCOHS was aligned with the Post Graduate Dental College and relocated to Joint

Base San Antonio, Texas. The military relevance of TSCOHS lies in its ability to provide data-driven clinical and population health research that directly links to and supports military readiness. TSCOHS instructs and mentors postgraduate residents with clinical and public health research. It also provides dental subject matter expertise to administer the DoD's assessment of satisfaction of dental care and to serve as oral health subject matter experts for TRICARE Dental Readiness Sources Selection Boards.

## Recent Deliverables

### Review and Renewal of the DoD Dental Patient Satisfaction Survey

The DoD Dental Patient Satisfaction Survey has been an instrument used by more than 340 DoD Dental Treatment Facilities to assess beneficiary satisfaction and evaluate customer responses to the dental care delivered in the Military Health System. TSCOHS administers the survey, which receives more than 150,000 responses annually, and reports the findings to the Defense Health Agency. Recently, the survey underwent a heightened level of scrutiny by DHA and was renewed for 5 years, allowing military dental treatment facilities to continue improving the delivery of patient care.

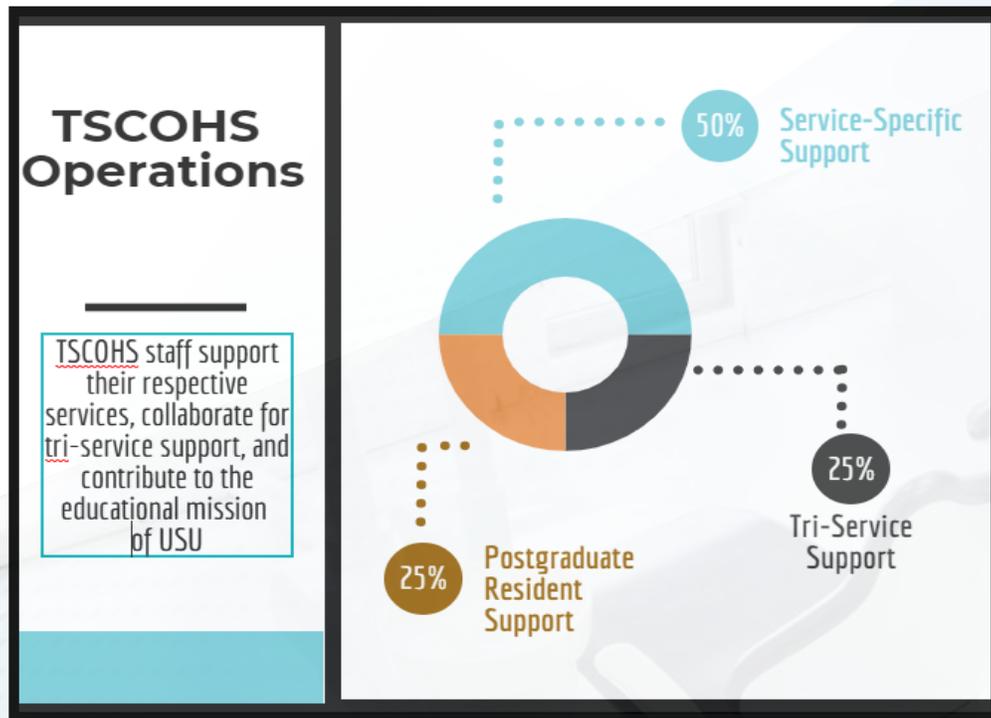
### 2018 Air Force Recruit Oral Health Study and Dental Disease Non-Battle Injuries Study

TSCOHS completed the Air Force Recruit Oral Health Study in early 2019 providing the Air Force with critical information and data to ensure a readiness posture and inform programming. This study gathered detailed surveillance information from oral examinations, radiographs and questionnaires completed by more than 1,300 recruits during a 12-month period. It is

the first time this information has been collected since 2008 and is the only source of such data. This coincided with the completion by TSCOHS of an analysis of Dental Disease Non-Battle Injuries occurring in three Air Force deployed locations, which helped identify the unique skill sets and contributions military dentists provide to operational readiness compared to civilian dentists. It also highlighted the specialized training military dentists receive in order to provide efficient and effective care to the warfighter before and during deployment. Together, both studies aid Air Force dentistry in its preparation for future clinical, educational and operational readiness.

### Resident Research Support

Beginning in 2017, TSCOHS began formally supporting postgraduate dental student research as part of its relationship with the Postgraduate Dental College. TSCOHS has assisted with evaluation of research proposals, mentorship throughout the entire research process, including study design, manuscript writing, didactic teaching in dental public health, population health, epidemiology, ethics, and tobacco cessation. These efforts have also fostered collaboration with the Murtha Cancer Center and West Virginia University.



# TriService Nursing Research Program

[www.usuhs.edu/tsnrp](http://www.usuhs.edu/tsnrp)

# TSNRP



Uniformed  
Services  
University

**Director:**

CAPT Heather King, PhD, CRNA

## BATTLEFIELD AND DISASTER NURSING POCKET GUIDE SECOND EDITION



## Mission

Our mission is to facilitate nursing research to optimize the health of military members and their beneficiaries.

## Overview

The TriService Nursing Research Program (TSNRP) was originally established in 1992 following a small appropriation from Congress to fund military nursing research. Today TSNRP is funded through the Department of Defense and has awarded more than 450 grants totaling more than \$100 million, resulting in research published in more than 60 peer-reviewed journals. TSNRP is directed and supported by the Army, Navy and Air Force Nurse Corps Chiefs. It is the only program that specifically funds and supports rigorous scientific research in the field of military nursing teams.

## Recent Deliverables

### Nursing Readiness Resource

"Battlefield and Disaster Nursing Pocket Guides," Jones & Bartlett Learning, 2nd edition released in April 2019 (Bridges & McNeill, eds.). Considered the premier quick guide for military nurses, on the front line and written by military nurses. This guide contains critical assessment and treatment information, and a translation guide to ensure accurate communication in the field. The guide was designed to fit in a uniform pocket and to stand-up to rigorous conditions. It is a primary reference within Air Force Comprehensive Medical Readiness Program for clinical nurses, and currently ranked as a best seller on Amazon with 1,208,503 downloads. The knowledge has transferred into civilian nursing and utilized by civilian disaster response teams. The second edition includes updates incorporating new evidence and was supported by each of the TSNRP Research Interest Groups (clinical communities).

### Epinephrine Administration and Effect on Cardiac Resuscitation

A series TSNRP funded research studies have been completed in the past three to seven years by a network of nurse anesthetists to establish the evidence for epinephrine administrations during cardiac resuscitation. Existing guidelines recommended administration of the same dose of epinephrine regardless of route — intraosseous (IO), intravenous (IV) and endotracheal (E). The team identified significant differences in the maximum concentration in a porcine model for intraosseous routes. Follow on studies expanded to the use of epinephrine in hypovolemic shock which identified dose alteration for IO administration. In 2019, pediatric porcine model research findings may lead to a significant trauma guideline change for pediatric hypovolemia of IV epinephrine administration preferred versus IO (Yauger, 2019). These studies have advanced clinical practice in the areas of cardiac life support for ventricular fibrillation, cardiac arrest with hypovolemia, and return of spontaneous circulation (Burgert et al., 2012; Johnson et al., 2015; Sullivan, 2016).

### Evidence-Based Practice at Military Treatment Facilities

In 2018, TSNRP commenced a two-year pilot study to evaluate the use of a dedicated Evidence-Based Practice (EBP) Facilitator at four military treatment facilities to evaluate the impact on nursing practice, patient outcomes and cost savings. These EBP Facilitators are located at Naval Medical Center Portsmouth, Naval Medical Center San Diego, David Grant USAF Medical Center at Travis Air Force Base, and the 59th Medical Wing at Joint Base San Antonio Lackland and are engaged in local and regional nursing practice initiatives. Initial efforts include providing local courses on EBP, developing a culture of clinical inquiry,

guiding important patient safety projects, and consulting with nursing leadership on how to implement evidence into local nursing policies and procedures. A manuscript sharing the steps for implementing this new role has been submitted for publication. The effort has already informed the Defense Health Agency Functional Nursing Capability planning process. In 2019, several evidence-based practice projects are improving patient outcomes: (1) the use of CHG wipes for bathing ICU patients demonstrated reduced central line and catheter related urinary tract infections; (2) the promotion of TAI CHI, a nonpharmacological evidence-based practice intervention for low back pain was integrated into the clinical practice guidelines; and (3) earlier identification and screening for delirium promoted a nursing assessment policy change.

### Professional Nursing Practice Model

The development of the Patient CaringTouch System was funded by TSNRP, embraced by the U.S. Army Nurse Corps, and implemented at every U.S. Army medical facility. It has also had a direct impact on nursing practice in the Navy and Air Force, and improved both patient and nurse outcomes by reducing variation in nursing care. Breckenridge-Sproat et al. (2015) published study identified the use of the model was associated with a 60% reduction in patient falls, a 42% drop in voluntary nurse turnover, and 6% decrease in absenteeism. Additional published studies have also identified a significant decline in medication errors (Breckenridge-Sproat, Swiger, Belew, Raju, & Patrician, 2017). It is currently serving as the primary evidence to support the development of a future nursing practice model for the Defense Health Agency.

### Research and Evidence-Based Practice Dissemination Course

The TSNRP Research and Evidence-Based Practice Dissemination Course is an annual educational event that features keynote lectures from military nursing leaders and nationally known clinical experts. It also includes break-out sessions with presentations from TriService active, reserve, guard, and retired military nurse scholars, and poster sessions featuring research and evidence-based practice (EBP) projects relevant to military nursing. TSNRP-sponsored Research Interest Group team meetings and presentations from the areas of anesthesia, biobehavioral health, expeditionary, health systems/informatics, military family, and women's health. Over the past six years of holding this event, the primary outcomes from this event are an increase in research and EBP activity across the Military Health System, an increase in TriService collaboration, and increased partnerships with nurse scholars from civilian, academic, and the Veterans Health Administration.





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