



Clinical Investigations Program

2024 Annual Report

All animal procedures reported herein were conducted in accordance with protocols approved by the appropriate Institutional Animal Care and Use Committee and conducted according to the principles set forth in the National Research Council's Guide for the Care and Use of Laboratory Animals and the Animal Welfare Act of 1966, as amended.

Table of Contents

About this Report	2
About the Clinical Investigations Program Office	2
Military Treatment Facility Clinical Investigations Programs	4
The CIPO Young Investigator Competition	5
U.S. Army Capt. Bradley Pierce Wins Young Investigator Oral and Poster Competitions	5
Young Investigator Oral Competition Participants.....	7
Young Investigator Poster Competition	9
Accomplishments at the 2024 Military Health System Research Symposium.....	12
Advancing Military Orthopedics: Innovations from Animal Models to Patient-Centered Research	12
Cracking Cryptosporidiosis: Insights from Camp Lemonnier for Optimizing Forward-Deployed Treatments	13
Limbs and Lives: A Breakthrough Device for Junctional Hemorrhage in Trauma	14
Mission Possible: Acute Liver Inflammation from X-Ray Irradiation in a Lunar Porcine Model	15
Pathogen Tracking: Monitoring Warfighter Exposure Through Wastewater Analysis	16
Space-Ready Appendectomy: A Prototype for Space and Austere Environments	17
Tick Borne Virus: A Threat to High-Risk U.S. Servicemembers.....	18
Women’s Health and Readiness: Evaluating Performance in Active-Duty Military	19
Womack Wins MHSRS Team Award for MARS Database	20
Highlighting Scholarly Activity at MTF Research Days	21
Alexander T. Augusta Military Medical Center 3rd annual Research Symposium	21
Naval Medical Center Camp Lejeune 14 th Annual Research Symposium	22
Showcasing academic excellence at the Mike O’Callaghan Military Medical Center 13 th Annual Research Symposium	23
Tripler Army Medical Center Research Symposium: A Salute to Military Health Systems Research	24
Walter Reed National Military Medical Center Research and Innovation Month Symposium: Innovations and Advancements in Medical Science.....	25
Womack Army Medical Center 8 th Annual Cape Fear Research Symposium: Military-Focused Medical Perspective	26
MTF Clinical Investigations Programs Achievements	28
“The Readiness Imperative” Published in Military Medicine Journal	28
Pioneering Treatments for Alexander T. Augusta Military Medical Center Oncology Patients.....	28
Military Treatment Facility Clinical Investigations Programs Contact Information	29
Acronyms	31

Acknowledgements

The Clinical Investigations Program Office extends its gratitude to the leadership of the Defense Health Agency Research and Engineering Division for its support of the Clinical Investigations Program Office and the 25 military medical treatment facility clinical investigations programs for their tireless dedication to advancing scholarly activities. These efforts not only meet the standards of the Accreditation Council for Graduate Medical Education and other accrediting bodies but also foster a culture of scientific inquiry and academic excellence. This vital work directly enhances the care provided to active-duty service members and beneficiaries while significantly contributing to the accreditation of graduate health science education and allied health training programs.

About This Report

The Defense Health Agency Research and Engineering Directorate Clinical Investigations Program Office is pleased to present its 2024 Annual Report. DHA R&E established the CIPO to provide a functional capability for the management of clinical investigations programs at military medical treatment facilities. CIPO, operating from Defense Health Headquarters in Falls Church, Virginia, is responsible for administrative oversight of the MTF CIPs.

The 2024 CIPO Annual Report provides a detailed overview of the CIPO and showcases the significant achievements of the DHA graduate health science education and allied health professionals during 2024.

About the Clinical Investigations Program Office

Department of Defense Instruction 6000.08, “Defense Health Program Research and Clinical Investigation Programs” established the purpose of the Defense Health Agency’s Clinical Investigations Program Office. It further establishes that Defense Health Program-funded medical research and the Clinical Investigations Program are essential missions of the MHS and require that DOD’s health-related leadership across the Department, Services, DHA, and commanders at every level make basic, clinical, and translational research a priority.

CIPO’s purpose and vision statements define the guiding principles and unite the stakeholders around a common framework, fostering a shared understanding and commitment to CIPO’s mission.

- Purpose: to improve health and readiness by facilitating the execution of scholarly activity to support graduate health science education and allied health programs.
- Vision: foster a dynamic environment of innovation and learning that drives excellence in military medicine.

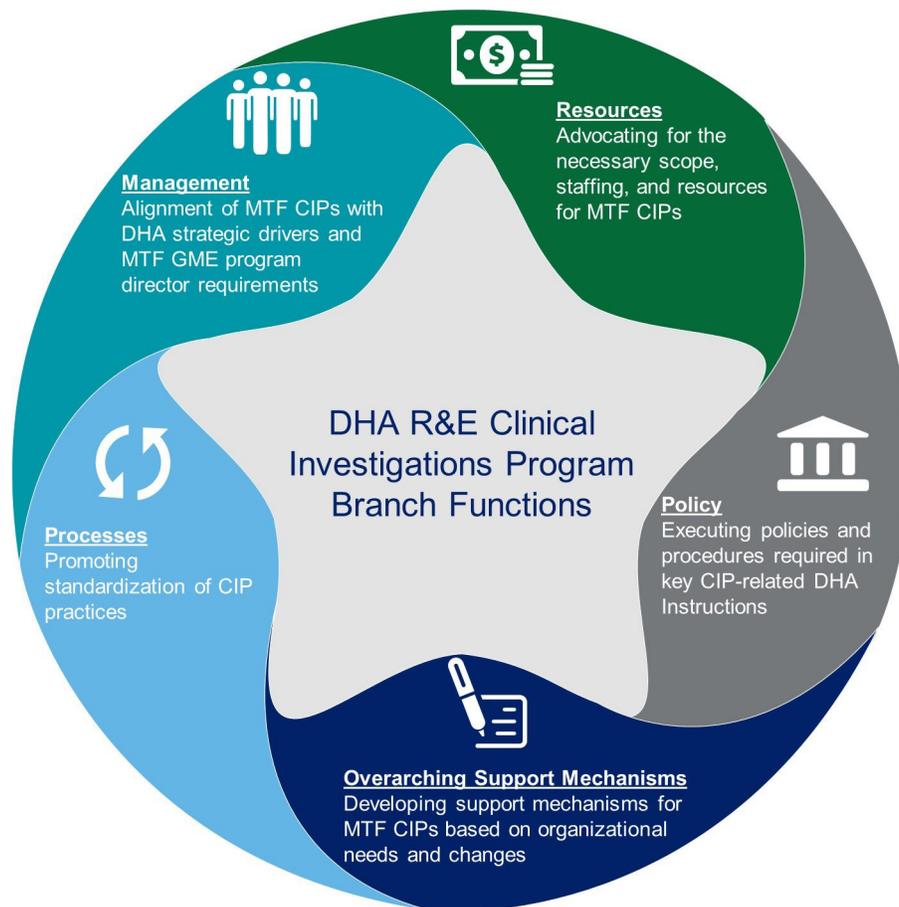
A well-trained DHA workforce is essential for providing access to high-quality, high-value health care. CIPO supports the teaching hospital system to train our physician workforce and create a learning environment with scholarly activities, training, research, and clinical investigations (herein referred to as “scholarly activity”) by the staff and medical education training of the DHA, such as Graduate Medical Education, Graduate Dental Education, Graduate Nursing Education, and Graduate Allied Health Science Education (herein referred to as “graduate health science education”) and allied health programs. Through innovative scholarly activity, DHA health care providers have access to cutting-edge treatment options, thereby enhancing patient care and contributing to medical readiness solutions. It brings together innovations, experience, and teamwork to provide the best care ‘Anytime, Anywhere – Always!’

CIPO operates under five functional areas:

- Management Support – Ensuring alignment of MTF CIPs with DHA strategic drivers and MTF graduate medical education program director requirements
- Policy Support – Executing policies and procedures required in key CIP-related Defense Health Agency instructions
- Process Support – Promoting standardization of CIP practices
- Resource Support – Advocating for the necessary scope, staffing, and resources for CIPs
- Overarching Support Mechanisms – Developing support mechanisms for MTF CIPs based on their organizational needs and changes

Policies Governing the Clinical Investigations Program Office

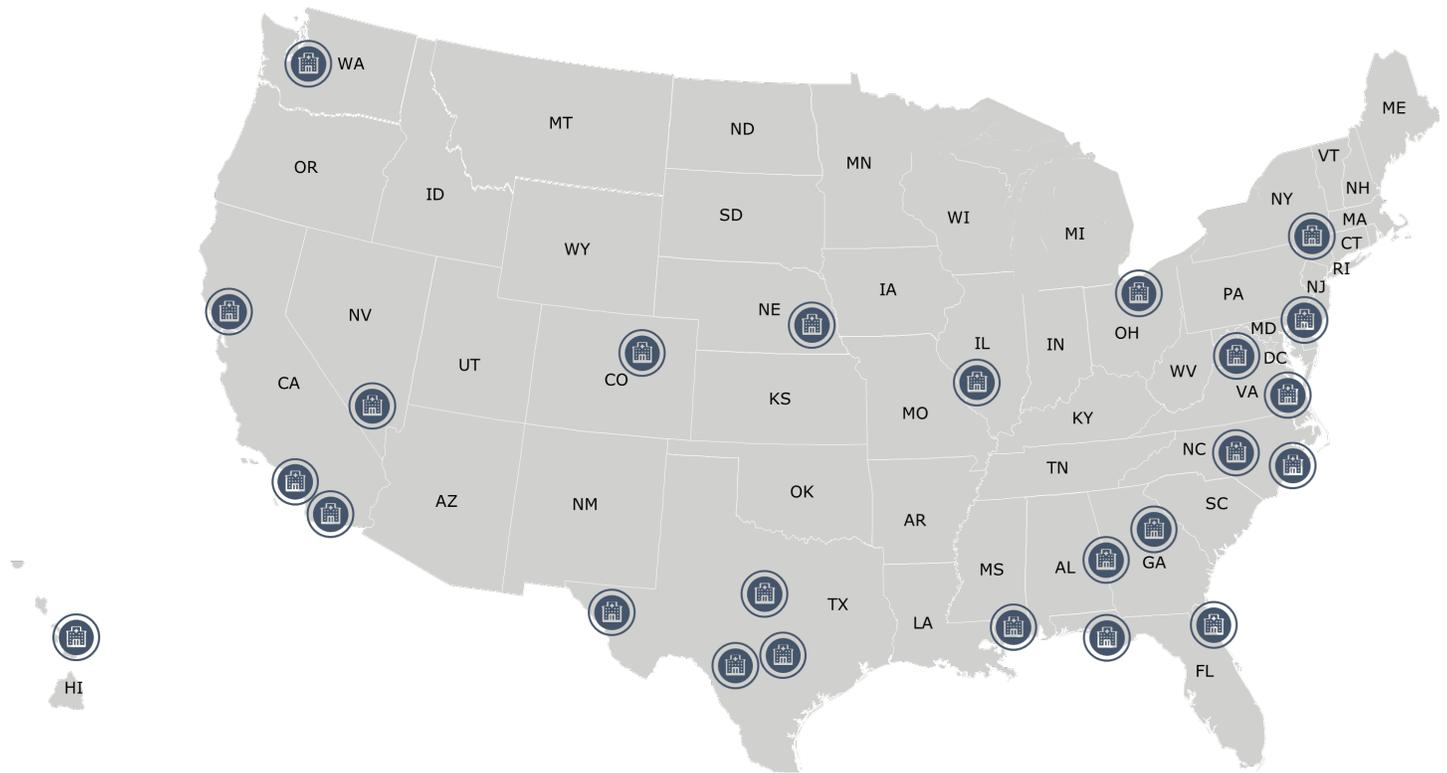
- DOD Instruction 6000.08, Defense Health Program Research and Clinical Investigation Programs, January 22, 2014, as amended.
 - Establishes the purpose for CIPO to support GHSE. Establishes procedures for funding and administration of research funded by the Defense Health Program appropriation.
- DHA-Procedural Instruction 3200.02, Clinical Investigation Program in Medical Treatment Facilities, September 24, 2019, Incorporating Change 1.
 - Implements DOD Instruction 6008.08 and provides details on the execution of the DHA CIPO (e.g., applicability, responsibilities, procedures). Establishes responsibilities for MTF CIP leadership.
- DHA-Technical Manual 3200.02, Scientific Review of Clinical Investigations in Military Medical Treatment Facilities, June 7, 2021.
 - Establishes CIPO overseeing MTF CIP scientific review policy and procedures with respect to oversight of scientific review. Provides guidance to ensure MTF CIPs support research and clinical investigations that are feasible, scientifically sound, and reasonably expected to achieve intended objectives.



CIPO Branch Functions

Military Treatment Facility Clinical Investigations Programs

CIPO supports MTF CIPs that aim to improve the quality of health care for DOD beneficiaries by generating an atmosphere of scientific inquiry and promoting an academic environment of high professional standing to assist in the accreditation of GHSE and allied health training programs. Accreditation committees consider scholarly activity important in evaluating medical education and training programs. CIPO meets its aims by establishing, advocating for, guiding, and supporting MTF CIPs in serving as the learning medical forces' bridge between GHSE and allied health program requirements, R&E's research programs, and the DHA's medical skills and competency requirements.



MTF CIP Site Map

CIPO offers extensive research resources to the MTF CIPs, including a continually updated repository of tools to guide investigators through the DHA research process. This encompasses areas such as survey development, human subjects review, data sharing agreements, and access to general and database-specific resources.

A continually updated list of resources for researchers is maintained at health.mil/ResearchResources



Strategic tie of military GHSE and allied health scholarly activities

Collaborate with DAD-MA, Clinical Communities, and health programs to establish a standardized approach for disseminating research objectives ensuring clear communication of priorities.



Strategic alignment of military GHSE and allied health scholarly activities with DHA research and development priorities

Incentivize R&D grant awardees to collaborate with GHSE and allied health trainees and staff.



Leveraging electronic systems for standardization of DHA clinical research and clinical research management

Implement DHA wide electronic data capture systems for standardization of data elements to provide comprehensive solutions for collection, organization, and analysis of research data.



Sponsorship of overarching agreements for enhanced multi-site collaborations with research partners

Development of academic and non-profit research agreements to leverage academic and industry expertise while creating overarching research resources.

CIPO Key Objectives

The CIPO Annual Young Investigator Competition

In 2024, the DHA Clinical Investigations Program Office hosted its third annual Young Investigator Competition at the AMSUS Society of Federal Health Professionals annual meeting. The event took place in February at the National Harbor, Maryland, and featured both poster and oral competitions reviewed by a distinguished panel of judges from across DHA. For the first time, the competition also included an oral competition featuring the top three abstracts selected from the poster competition. The oral competition featured five-minute rapid-fire presentations in front of AMSUS attendees, DHA, and other federal medical care senior leaders. Competitors were selected locally by their MTF CIPO leadership and were current active-duty resident physicians (or GHSE trainees) presenting their own research as a first or second author on a poster. The competition was established to provide a platform for young investigators to showcase their innovative scholarly activity, further establishing DHA as a world-class teaching system. U.S. Army Lt. Gen. Telita Crosland and U.S. Air Force Chief Master Sgt. Tanya Johnson were in attendance to award the winner of the poster and oral competitions as determined by the panel of judges.

U.S. Army Capt. Bradley Pierce Wins Young Investigator Oral and Poster Competitions

U.S. Army Capt. Bradley Pierce won both the oral and poster competitions against six other competitors for the research titled “Evaluation of a 405nm Light-Emitting Diode Technology for Portable Decontamination of Surgical Instruments in Austere or Resource-Limited Environments.” In remote or austere environments, combat-related injuries pose an elevated risk of infection due to delays in medical evacuation and the lack of sterile surgical tools. To address this, Pierce’s study aimed to develop a lightweight, portable sterilizer that uses visible violet-blue light (405 nm LEDs) to decontaminate surgical instruments. This device, called the Violet-Blue Light Inactivation Chamber, was designed for use by medical teams in settings where standard sterilization methods like autoclaving are impractical due to power constraints.

The study tested the efficacy of 405 nm LED light at various doses to reduce bacterial contamination on surgical instruments. Instruments contaminated with bacteria were cleaned with either water or a disinfectant scrub, then exposed to the LED light for different durations (15, 30, or 60 minutes). The results showed that after one hour of light exposure, there was no bacterial growth, similar to the effectiveness of autoclaving. Shorter exposure times reduced bacteria but did not completely eliminate them. This portable LED-based sterilizer offers a potential solution for improving trauma care in remote locations, with advantages such as low power consumption, long operational use, and effectiveness against a range of drug-resistant bacteria. The study demonstrated the technology's promise for providing critical infection control in environments where standard sterilization tools are not available. Pierce stated "we think our invention, which is presently awaiting patent through DHA, could potentially assist in meeting a vital DOD requirement for sterilizing and decontaminating surgical and medical equipment in harsh settings. We have shown that a high level of decontamination may be achieved without the use of heat, pressure, or chemicals by using only 405nm LED light." Pierce went on to say that he is eager to carry out this work and collaborate with business to provide the warfighter with these capabilities. Pierce graduated medical school from the Uniformed Services University of the Health Sciences in Bethesda, Maryland and is a general surgery resident physician at Tripler Army Medical Center, Honolulu, Hawaii.



From Left: U.S. Army Lt. Gen. Telita Crosland, U.S. Army Capt. Bradley Pierce, U.S. Air Force Chief Master Sgt. Tanya Johnson at the 2024 CIPO Young Investigator competition (DVIDS Photo)

“So exciting to see the young teammates understanding that in medicine, research is the key. I believe we are morally obligated to own that space as well if we are going to make a difference going forward.”

—DHA Director, U.S. Army Lt. Gen. Telita Crosland

Young Investigator Oral Competition Participants

In addition to U.S. Army Capt. Bradley Pierce, several other young investigators also participated in the inaugural oral competition.

U.S. Air Force Maj. Vladimir Vader presented the research “Assessing the Diagnostic Interrater Reliability of Virtual and In-Person Sick-call Exams at a Military Dental Treatment Facility.” Vader is a dental resident physician at Lackland Air Force Base, 59th Medical Wing, in Texas. This study explored the use of teledentistry, or virtual dental exams, to improve access to emergency dental care in a military setting. The goal was to see how well virtual exams compared to in-person exams in diagnosing dental issues. Researchers conducted both virtual and in-person exams for one hundred patients seeking emergency dental care on the same day, using video calls for the virtual exams. The results showed that there was a “substantial” agreement between the virtual and in-person diagnoses, meaning virtual exams were mostly reliable for diagnosing dental problems. “This study demonstrated the potential benefits of providing active duty military with access to virtual dental sick call appointments, which would increase patient convenience, reduce missed duty time, reduce in-patient expenditure/time, and expediate final dental treatment” said Vader.



Vladimir Vader at the 2024 CIPO Young Investigator competition (CIPO Photo)

U.S. Army Capt. Sean Rogers, family medicine resident physician, also competed in the oral competition on behalf of Womack Army Medical Center, Fort Liberty, North Carolina. This presentation “Adults 18–39 Years Old with Hypertension in the U.S. Military System” examined the prevalence of high blood pressure (hypertension) among active-duty military personnel aged 18–39. Hypertension is a major health issue in the U.S., affecting nearly half of all adults and increasing the risk of heart disease and stroke. While it is usually diagnosed around age 46, this study found that hypertension is more common in younger adults, particularly in the military. Researchers looked at blood pressure data from two million service members between 2016 and 2022, totaling over 28 million readings. They found that 18.6% of these readings met the criteria for hypertension, with only about 43% of individuals having normal blood pressure. Factors like obesity and smoking, which are known to increase the risk of hypertension, were also considered. The study suggests that hypertension is more prevalent among young service members than previously thought, possibly due to underreporting in this age group or higher rates of tobacco use and obesity in the military. While military personnel may still be physically fit for their duties, these health issues could affect their long-term well-being, military readiness, and deployability, and need further investigation.



U.S. Army Capt. Sean Rogers at the 2024 CIPO Young Investigator competition (CIPO Photo)

“All three presentations were phenomenal, all relevant, all bring value, and you are all winners. No matter who gets the award, the director’s going to look at how we take what you just educated us [about] and how we make it better for everyone organizationally. Well done!”
—DHA Director, U.S. Army Lt. Gen. Telita Crosland

Young Investigator Poster Competition Participants

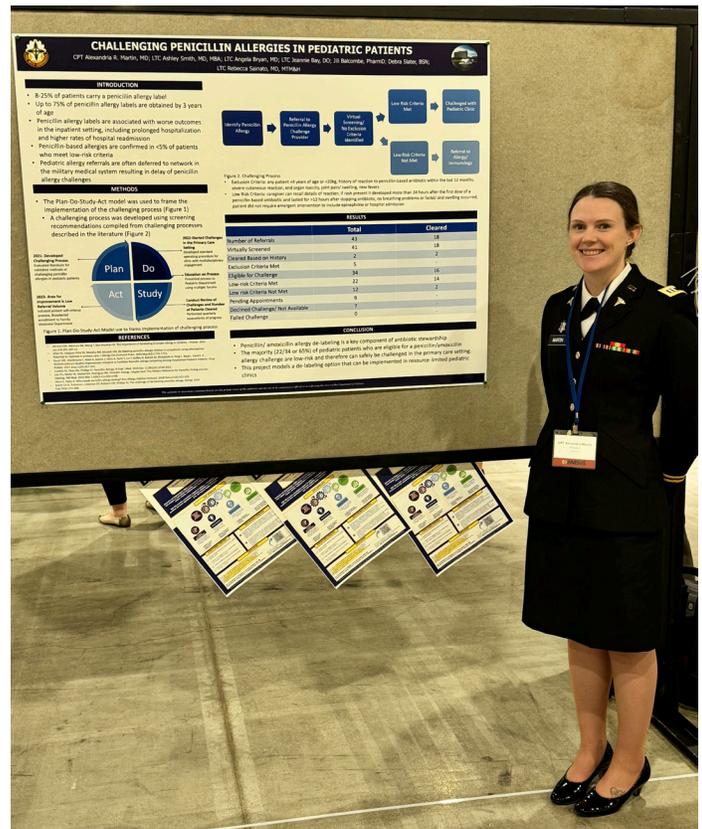
In addition to the oral competitors, several other young investigators also participated in the poster competition.

U.S. Army Capt. Ashley Flinn Patterson presented the research titled “Feasibility of Endovascular Localization of Non-Compressible Torso Hemorrhage Using Swine (*Sus scrofa*): A Pilot Study.” This study focused on improving the treatment of non-compressible torso hemorrhage, a common cause of death in both civilian and military trauma. The current method, called resuscitative endovascular balloon occlusion of the aorta, uses a balloon to temporarily stop bleeding in the aorta but is not targeted to the exact injury site and serves mainly as a bridge until surgery can be performed. The researchers aimed to develop a more precise way to locate the source of bleeding inside the blood vessels using advanced imaging techniques and a new pressure-sensing catheter. In this pilot study, they tested their approach on 12 pigs. The pigs were divided into two groups based on where the injury occurred (in the chest or abdomen) and which device was used to assess it: intravascular ultrasound or a novel multi-sensor pressure catheter. Both devices were used to locate and monitor the injury site. The IVUS group used ultrasound to visualize the bleeding inside the aorta, while the MSPC group used the new catheter to measure pressure above and below the injury. The results showed that IVUS could identify bleeding through visual signs like disruptions in the aortic wall and swirling patterns, while the MSPC successfully captured pressure data that could help guide future treatments. The study demonstrated that this animal model could be used to test new tools for more precise hemorrhage control in the future and, while REBOA does not precisely locate the injury, it shows a potential of new technologies like IVUS and MSPC to improve targeted treatments for life-threatening hemorrhages. “Our overall goal is to minimize uncontrolled hemorrhage between the point-of-injury and definitive treatment at a Role 3 facility to save lives that might otherwise be lost during transport” said Flinn Patterson, a general surgery resident physician at Brooke Army Medical Center, Fort Sam Houston, Texas.



U.S. Army Capt. Ashley Flinn Patterson at the 2024 CIPO Young Investigator competition (CIPO Photo)

U.S. Army Capt. Alexandria Martin presented “Challenging Penicillin Allergies in Pediatric Patients.” This study focused on safely removing incorrect penicillin and amoxicillin allergy labels in children. Many children are labeled as allergic to these antibiotics, but fewer than 3% actually have a true allergy. These incorrect labels prevent children from receiving the best treatment, leading to longer hospital stays, more complications, and higher healthcare costs. Most of these labels are given before the age of 3 and challenging the allergy (called “de-labeling”) can confirm whether it is real or not. At Madigan Army Medical Center, a shortage of allergy specialists means many allergy challenges are referred to outside clinics, but there is no system to update medical records when the allergy label is removed. To fix this, the pediatric team developed a process to screen and de-label children with low-risk penicillin or amoxicillin allergies in their clinic. Since starting this project, 33 children have been referred for allergy de-labeling. Of those, 30 have been screened, and 27 were eligible for a challenge. Nineteen children had low-risk reactions, meaning they could be safely tested in the primary care setting. So far, 12 have successfully been de-labeled without any bad reactions, and more are scheduled. Martin, a pediatric resident physician at Madigan Army Medical Center at Joint Base Lewis-McCord, Washington, stated “by creating a penicillin allergy challenging process in the primary care setting, we can help decrease the number of documented penicillin allergies in low-risk patients; thereby increasing the number of antibiotics available to a patient and improving antibiotic stewardship.”



U.S. Army Capt. Alexandria Martin at the 2024 CIPO Young Investigator competition (CIPO Photo)



U.S. Navy Lt. Cmdr. Phillip Castrovinci presented “A Novel Lateral Canthotomy/Cantholysis Model Using Perfused Fresh Cadaveric Cephalus: A Pilot Study.” This study tested whether using a cadaver head with simulated blood flow (perfused cadaveric cephalus) can create a more realistic model for training medical professionals in a critical eye surgery procedure called lateral canthotomy/cantholysis. This procedure is used to relieve dangerous pressure in the eye caused by bleeding in the orbit. The experiment involved 17 participants, 8 ophthalmologists and 9 non-ophthalmologists, who performed the procedure on both perfused and non-perfused cadaver heads. In the perfused model, blood flow was simulated by cutting certain arteries and adding pressure through the carotid artery. Eye pressure and orbital pressure were measured before, during, and after the procedure to track changes. The study found that eye pressure and bulging increased during the simulated bleeding and returned to normal after the procedure. Participants felt more confident performing the procedure after training on the perfused model, with confidence rising from 2.6 to 4.3 on a 5-point

U.S. Navy Lt. Cmdr. Phillip Castrovinci at the 2024 CIPO Young Investigator competition (CIPO Photo)

scale. Their knowledge of the procedure also improved significantly. Participants rated the perfused model as more realistic than the non-perfused one and believed it better prepared them for performing the procedure. Overall, the perfused cadaveric model provided a more realistic and effective way to train medical professionals, making them more confident and comfortable with lateral canthotomy/cantholysis. “Orbital compartment syndrome is a sight threatening condition resulting from trauma to the face and eye. We developed a high-fidelity lateral canthotomy and cantholysis trainer to improve readiness of our medical forces to treat this condition” said Castrovinci, an ophthalmology resident physician at Naval Medical Center San Diego, California.

U.S. Air Force Capt. Cougar Jimenez Jaramillo presented “Differential Histopathologic and Transcriptomic Profiles in the Creation of Cerebral Organoids Derived from iPSCs.” This study explored how lab-grown mini-brains, called cerebral organoids, could help model and understand traumatic brain injuries and blast injuries, which are common in military personnel. TBI, often linked to contact sports, is characterized by an accumulation of a protein called phosphorylated tau, while blast injuries, caused by pressure shockwaves, lead to changes in brain cells called astrocytes. Jimenez Jaramillo’s research aimed to determine whether cerebral organoids could effectively replicate the distinct causes and effects of these injuries in a controlled laboratory setting. Researchers grew organoids from two different stem cell lines for about 190 days and analyzed them using various staining techniques and molecular profiling tools. They measured the organoids’ size, looked for key proteins related to brain injury, and performed detailed genetic analysis (spatial transcriptomics) to understand how the cells in these organoids matured over time. The results showed no major differences between the two cell lines in terms of size or staining for injury markers, but one cell line showed a trend of slower growth and different cell development. The study also found that one cell line tended to accumulate more pTau, which could affect its use as a model for studying TBI. While cerebral organoids show promise as models for brain injuries, more research is needed to refine these models, particularly by expanding the number of cell lines, tracking changes over time, and exposing the organoids to blast injuries to see how they compare to human and animal studies. “My research developing cerebral organoid models for the investigation of non-concussive blast trauma sits at the intersection of translational research and military medicine. We are innovating a biological system that will be used for the elucidation of therapeutic targets and the assessment

of their efficacy, offering a new and exciting avenue of experimentation and a bright hope for servicemembers exposed to blast injury today and tomorrow” said Jimenez Jaramillo, a Department of Pathology and Area Laboratory Services resident physician at Lackland Air Force Base, 59th Medical Wing, in Texas.

Congratulations to all the participants and thank you for contributing to cutting-edge GHSE research that enhances patient care and contributes to medical readiness solutions.



U.S. Air Force Capt. Cougar Jimenez Jaramillo at the 2024 CIPO Young Investigator competition (CIPO Photo)

2024 Military Health System Research Symposium

The Military Health System Research Symposium is the Department of Defense's foremost scientific meeting, focusing on the unique medical needs of warfighters. It facilitates the exchange of information among military providers, researchers, international partners, and industry on various health care initiatives. The 2024 MHSRS meeting was held in August at the Gaylord Palms Resort & Convention Center in Kissimmee, Florida. Young investigators from the MTF CIPs were prominently featured throughout the symposium, showcasing their scholarly work through both poster and oral presentations. Their participation highlights the dedication and leadership of the CIP Directors and their teams, who work diligently across DHA. Noteworthy presentations at this year's MHSRS include a wide array of scholarly activity and research, further demonstrating the program's commitment to advancing scientific discovery and innovation.

Advancing Military Orthopedics: Innovations from Animal Models to Patient-Centered Research

U.S. Air Force Capt. Manuela Gaviria presented the research "Evaluation of a Novel Antimicrobial Coating on Implanted Kirschner Wires in Rats." Infections related to implants are a major problem for soldiers who have had trauma and surgery. Treating these infections is difficult because bones do not have a lot of blood flow, and the infections often involve antibiotic-resistant bacteria. A new antimicrobial coating called XBIO®, takes a different approach by using a chemical system to break down bacterial biofilms rather than relying on antibiotics. The goal of this study is to test how well XBIO®, -coated metal rods (k-wires) can prevent bacterial colonization in a rat model using *Staphylococcus aureus* (a common infection-causing bacteria). The researchers compared results in rats where the bacteria were introduced through the bloodstream or directly into the bone before implanting the k-wires. There was also a control group to see the effects of the surgery alone. Early data from one experiment showed no significant difference in bacterial growth between coated and uncoated k-wires. However, more detailed results are anticipated with the next part of the study, which will include histopathology, scheduled for fall 2024.

Gaviria presented a poster titled "Empowering Recovery: Enhancing Patient Preparedness and Education Post-Anterior Cruciate Ligament Injury." Every year, around 2,500 to 3,000 U.S. military personnel undergo surgery for anterior cruciate ligament injuries. Unfortunately, about half of these patients still face limitations or disabilities after their surgeries. Research shows that many patients lack a clear understanding of their ACL injury, treatment options, and the recovery process, which negatively impacts their recovery and satisfaction with the outcomes. To address this issue, a new educational program was created to help patients better understand ACL injuries and prepare for surgery. This program consists of six modules that provide valuable information about ACL injuries and treatment. After receiving standard counseling from their surgeons, patients were given the curriculum to study independently before surgery. The program was tested with 12 patients who had ACL injuries. Results showed significant improvements in patients' knowledge and understanding of ACL injuries and treatments after completing the curriculum. All participants reported being satisfied with the course and would recommend it to others. The study concluded that adding a structured educational program to standard pre-surgery counseling can greatly enhance patients' understanding of their ACL injuries, which may lead to better recovery and rehabilitation. Although this study did not measure the direct impact on recovery outcomes, improving patient comprehension could lead to better overall results, and further research is needed to explore this connection.

Gaviria is an orthopedic surgery resident physician currently undergoing a research year at Brooke Army Medical Center, Joint Base San Antonio, Fort Sam Houston, in Texas. Gaviria stated this work "primarily focuses on microsurgery, hand and upper extremity surgery, and quality improvement within the military healthcare system. I utilize animal models, cadaveric studies, and patient-centered studies to drive my research. In addition to furthering my own knowledge and surgical skills, my work aims to enhance the knowledge and capabilities of other military surgeons, contributing to the DHA mission of improving military medical readiness and patient care."



U.S. Air Force Capt. Manuela Gaviria at the 2024 Military Health System Research Symposium (BAMC Photo)

U.S. Navy Lt. Emily Jaber presented the poster “Curious Cases of Cryptosporidiosis at Camp Lemonnier: Retrospective Analysis of BioFire® FilmArray® Multiplex Stool PCR Results to Optimize Deployment-Related Treatment Options in the Forward-Deployed Setting.” Traveler’s diarrhea is a significant health concern for U.S. military personnel, affecting their ability to perform missions effectively. Since 2021, a military research group has been monitoring TD at Camp Lemonnier in Djibouti using a testing method that checks for twenty-two common germs that cause gastrointestinal diseases, including the parasite *Cryptosporidium*. *Cryptosporidium* typically leads to watery diarrhea but can usually resolve on its own in healthy individuals, however, symptoms can improve more quickly with proper treatment. This study aimed to track how often *Cryptosporidium* was detected at Camp Lemonnier from February 2021 to February 2024 and to ensure that the necessary medication to treat it was available at the camp’s pharmacy. In total, 614 stool samples were tested, and 442 of those (about 72%) were positive for some form of diarrhea-causing germ. *Cryptosporidium* was found in 25 samples (4.1%) during the study period. Notably, half of these *Cryptosporidium*-positive cases also had other bacterial infections, with *E. coli* being the most common co-infection. The recommended treatment for *Cryptosporidium* is a drug called nitazoxanide, but this medication has not been available at Camp Lemonnier’s pharmacy since 2021. In conclusion, while *Cryptosporidium* only accounted for a small percentage of diarrhea cases, identifying it was important for protecting the health of military personnel. The study emphasizes the need for nitazoxanide to be stocked at forward-operating medical facilities to help reduce illness duration, improve health readiness, and allow service members to return to duty more quickly. “This research highlights the importance of real-time disease surveillance in the forward-deployed setting and ability to directly impact our servicemembers. With the identification of cryptosporidiosis at Camp Lemonnier, we were able to advocate for the purchase of the first-line treatment to treat future patients” stated Jaber, a pediatric resident physician at Naval Medical Center Portsmouth in Portsmouth, Virginia.

Limbs and Lives: A Breakthrough Device for Junctional Hemorrhage in Trauma

U.S. Army Maj. Bobby Zhang, a general surgery resident physician at Madigan Army Medical Center, Joint Base Lewis-McCord, in Washington presented his research “Saving Limbs and Lives: A Novel Percutaneous Vessel Occlusion Device to Combat Junctional Hemorrhage in Trauma.” Junctional hemorrhage is a serious type of bleeding that can lead to high rates of injury and death. Current devices to control this type of bleeding have shown limited effectiveness. This study aimed to test a new device called the Amsel’s SCureTO™ in pigs to see if it can effectively stop bleeding from specific blood vessels, restore blood flow, and be removed without needing surgery. A pig model was used to simulate trauma and test the SCureTO™ device on two major arteries: the carotid artery in the neck and the femoral artery in the leg. The device was used to stop bleeding from a partially cut carotid artery, and a shunt was placed to repair the injury. After testing, the devices were removed, and the blood vessels were checked for bleeding and proper blood flow. The study tested 12 SCureTO™ devices on 5 male pigs. Most of the devices were successfully used on the femoral artery, with some targeting the carotid artery. Most devices (83%) fully blocked the target vessels, while a few needed adjustments to achieve complete blockage. On average, it took just over 54 seconds to place the devices. All devices were successfully removed without needing surgery, and the blood vessels remained open and free of bleeding afterward. This study showed that the SCureTO™ device can effectively stop bleeding from major blood vessels and can be safely removed without additional surgery. It holds promise for treating difficult bleeding situations where traditional methods fail. Zang stated “this work represents years of work from multiple years of residents and faculty. This project is [made] possible by support from DHA and its constituents to support research to further the care of our injured warfighters.”



U.S. Army Maj. Bobby Zhang at the 2024 Military Health System Research Symposium (MAMC Photo)

U.S. Air Force Capt. Sarah Hay presented the poster “Transient Acute Liver Inflammation During Fractionated X-ray Irradiation Within Parameters of a Lunar Mission: A Porcine Model.” Aircrews operating at high altitudes or latitudes as well as space crews are regularly exposed to elevated levels of cosmic radiation, including X-rays, which can increase their risk of serious health issues like cancer, heart disease, and neurodegeneration. Understanding the effects of chronic radiation exposure is important for developing protective strategies. To study these effects, researchers used six-month-old Yucatan minipigs to simulate chronic exposure to cosmic radiation. The pigs were subjected to different doses of X-rays over eight weeks, which resulted in varying cumulative radiation doses to their hearts and livers. Blood samples were taken weekly to measure certain biomarkers, and at the end of the study, the pigs were euthanized so researchers could examine their organs for damage. The findings showed that all radiation doses led to temporary liver inflammation, indicated by elevated levels of a specific enzyme, which returned to normal after four weeks. In contrast, the control pigs that were not exposed to radiation did not show any liver inflammation. Furthermore, the irradiated pigs showed signs of more serious liver issues, including fatty infiltration, tissue damage, and inflammation. While irradiated pigs experienced a temporary increase in liver enzyme levels, this was in line with nonalcoholic fatty liver disease, which is less severe. The study highlights that pig liver metabolism is different from humans’ and affects how they accumulate fat. The overall prognosis for the pigs was generally positive, indicating that while there is some risk from radiation exposure, healthy young pigs can recover from mild damage. These findings underline the potential health risks faced by aircrews and space crews from long-term exposure to cosmic radiation during missions. “It’s rewarding to know my efforts will help ensure the long-term safety of our aircrews as we continue to expand military efforts beyond our atmosphere. Who knew my fascination with the microscopic could have an out-of-this-world impact,” said Hay, who is a pathology resident physician at Brooke Army Medical Center, Joint Base San Antonio, Fort Sam Houston, Texas.

Cadets Riley McGarry and Cullen Ingersoll from the Life Science Research Center at the United States Air Force Academy in Colorado presented their poster “Monitoring the Warfighter’s Exposure to Pathogens Using VirCapSeq-VERT and BacCapSeq to Interrogate Wastewater.” Monitoring microbes and pathogens is crucial for the health of people working or living near certain locations that have unique mixes of microbes and pathogens that can pose risks. Checking wastewater can reveal the pathogens that are present in a community. Current methods for monitoring pathogens include quantitative polymerase chain reaction, which can measure specific pathogens but only provides information about those targeted. Another method is the BIOFIRE® panel system, which is useful in clinical settings for diagnosing known symptoms but does not provide quantitative data or detect all relevant pathogens. To improve monitoring, researchers use whole genome sequencing, which analyzes the complete genetic material in a sample. However, WGS generates a lot of data, making it challenging to focus on specific pathogens.

Two newer methods, called VirCapSeq (for viruses) and BacCapSeq (for bacteria), are designed to bridge the gap between traditional methods and WGS. These techniques use advanced sequencing to target all known vertebrate viruses and pathogenic bacteria, making it easier to identify specific types and strains of pathogens. Currently, VirCapSeq is being used at the U.S. Air Force Academy to monitor wastewater for pathogens that might cause gastroenteritis, and preliminary results suggest that Adenovirus 41 is a probable cause of recent outbreaks. The researchers also used qPCR, BIOFIRE®, VirCapSeq, and BacCapSeq to identify pathogens in wastewater and melted permafrost samples, which may contain pathogens that were previously trapped. VirCapSeq-VERT has already received clinical approval in New York for diagnosing and monitoring viral infections, and it is in the process of being approved by the Food and Drug Administration. These new methods offer promising improvements in monitoring and identifying environmental pathogens. McGarry stated “tracking wastewater viral communities has the potential to revolutionize preventive medicine in the military. With the efficacy of VirCapSeq coming to light, this opens so many doors for the DOD to better track and prepare for health concerns that could affect mission readiness.”

“I’m very excited about the improvements in wastewater pathogen detection that VirCapSeq presents. Especially considering its ability to detect such a wide range of pathogens, being able to prepare for location-specific infectious risks in a timely manner presents a huge advantage in ensuring warfighter preparedness” said Ingersoll.



US Air Force Academy C1C Riley McGarry and C1C Cullen Ingersoll at the 2024 Military Health System Research Symposium (USAFA Photo)

U.S. Air Force Maj. Nicholas Antonino presented the poster “Appendectomy Using a Hermetic Surgical System: A Prototype for Surgery in Space and Austere Environments.” NASA has identified 26 medical conditions that could require surgery during space missions. A recent review of human space exploration recommended that astronauts have the capability to diagnose and treat injuries and illnesses surgically. To address this need, a hermetic surgical system was developed, which allows for surgical procedures in reduced gravity by containing the surgical area. This system uses domes with ports for laparoscopic instruments and a dressing to adhere to the patient’s skin. In a test, a laparoscopic appendectomy was performed on a cadaver. The surgical team made adjustments to the port size and orientation to improve instrument movement. After the necessary incisions and placement of the containment domes, the surgery was successfully completed. The domes were then removed, and the incisions were closed. The test showed that the HeSS works well for laparoscopic surgery, with good sealing to maintain the pressure needed for the procedure. The design was later improved by creating smaller, more flexible domes with a gel interface to make instrument handling easier. Further tests will assess how well these modifications work in low-gravity environments like space. The study also found that traditional surgical site visibility and irrigation are not needed for laparoscopic surgery, though the current domes limit instrument mobility. A new dome design with a transparent gel disc aims to improve this. Further trials with cadavers will help evaluate the effectiveness of this design for space missions. Maj. Antonino, a surgery resident physician at David Grant Medical Center, Travis Air Force Base, in California stated “the work we’ve been doing here at David Grant Medical Center, with the Clinical Investigation Facility, has been an exciting look into the idea of surgery in space and reduced gravity environments. I look forward to seeing what ways we can expand our understanding of this field for the Air Force and the DHA.”



U.S. Air Force Maj. Antonino at the 2024 Military Health System Research Symposium (DVIDS Photo)

Cadets Michael Rossen, Mckenzie Daffin, and Kira Enos from the United States Military Academy, West Point, in New York presented their poster “Emerging Tick-Borne Powassan Virus Seroprevalence in a High-Risk U.S. Servicemember Population.” Powassan virus is a tick-borne virus that can cause serious illness, but it is often mistaken for Lyme disease due to similar symptoms. This misdiagnosis, along with limited testing, means that the true number of cases is likely underestimated. Currently, there are no FDA-approved diagnostics, vaccines, or treatments for POWV infection. The cadets at West Point Military Academy are at higher risk of exposure because they spend a lot of time outdoors in an area with many ticks. Blood samples from West Point cadets were collected at the start and end of their time at the academy (2013-2017). Researchers used a method called ELISA to check for antibodies against POWV, which indicates past exposure to the virus. The results showed that about 1.3% of the cadets had been exposed to POWV, a rate higher than what the CDC reports. This could be due to the cadets’ outdoor military training in areas with large tick populations. Further analysis is needed to better understand cross-reactivity with other viruses like West Nile Virus and to identify factors that increase the risk of exposure. Researchers are also exploring potential treatments based on the antibodies found in the cadets’ blood. This project was done in collaboration with the Albert Einstein College of Medicine and included faculty from the West Point Chemistry and Life Science Program.



From left: United States Military Academy C1C Michael Rossen, C1C Mckenzie Daffin, C1C Kira Enos, U.S. Army Maj. Stacey Bateman, Dr. Kevin O'Donovan at the 2024 Military Health System Research Symposium (West Point Photo)

The poster “Evaluation of Performance and Women’s Health in the Military in a Readiness Program for Active-Duty Service Women” was presented by U.S. Air Force Capt. Anita Pechenko. Women in the military make up 16% of the military workforce and face unique challenges during their service. Various resources have been developed to help meet their needs, particularly regarding fitness and performance. The Readiness Program at Brooke Army Medical Center aims to enhance the operational effectiveness and well-being of active duty service women and their spouses, focusing on health and wellness indicators. This study gathered data from active duty service women enrolled in the Readiness Program. Researchers reviewed individual medical records for various health metrics, including body mass index (BMI), bone density, vitamin levels (like D and B12), blood glucose levels, and more. They also noted any preventive treatments given for abnormal results, such as those for conditions like osteopenia or prediabetes, and how these related to fitness for duty. The study included 77 active duty service women with an average age of 52.6 years and a BMI of 25.5. Among them, 20.78% were found to have prediabetes. Additionally, 16.8% had insufficient levels of vitamin D, and 10.4% had a deficiency. A small percentage had anemia (5.19%), while no cases of folate deficiency were found. About 1.3% had vitamin B12 deficiency, with 9.1% at borderline levels. While there is a risk of unnecessary testing, programs like the Readiness Program can provide early preventive care strategies and intervention. Proper diagnosis, follow-up, and continued screening are necessary for key diagnoses such as prediabetes and anemia. Pechenko, an internal medicine resident physician at Brooke Army Medical Center, Joint Base San Antonio, Fort Sam Houston, in Texas stated “I chose to focus on health and wellness performance markers of specifically active duty service women as it concerns pre-diabetes, osteopenia/osteoporosis, and anemia from the standpoint of preventive health and correlation with fitness for duty parameters. As an active duty resident physician, I appreciate the opportunities DHA has provided me in supporting my attendance at seven research conferences and two published works during my Internal Medicine residency.”



U.S. Air Force Capt. Anita Pechenko at the 2024 Military Health System Research Symposium (BAMC Photo)

The Medical Assessment and Readiness System team at Womack Army Medical Center, Fort Liberty, North Carolina, won the Outstanding Research Accomplishment Team at the 2024 MHSRS. MARS is a comprehensive database supporting military medical readiness and research. Operational since January 2020 at Womack Army Medical Center, it originated as the Medical Readiness Assessment Tool developed by the Army's Office of the Surgeon General in 2011. MARS provides a longitudinal repository of demographic, clinical, and administrative data for over three million active-duty service members, enabling large-scale analysis of health and career trajectories over 15 million person-years of service. With extensive resources, including IRB and HIPAA approval and partnerships with DoD entities, MARS facilitates rapid-response analytics for leaders and short-deadline research projects, producing actionable insights for policy and procedure.

The Outstanding Research Accomplishment Team award honors the MARS WAMC team for exceptional research contributions that supported senior command requests and exempting certain large-scale studies from lengthy regulatory requirements, expediting impactful research.

MARS has contributed to high-priority projects on topics such as medication use among Special Forces and retention following suicidal ideation, as well as learner-led projects that have achieved accolades, including multiple DHA Young Investigator Awards. Since February 2023, MARS research accomplishments include 32 publications and presentations, featuring studies on injury prevention, occupational health, and military-specific medical issues.



The 2024 Military Health System Research Symposium awards ceremony held in Kissimmee, Florida, on Aug. 26. The awards honored excellence in military health research from professionals across the Military Health System. (DVIDS Photo)

Highlighting Scholarly Activity at MTF Research Days

Alexander T. Augusta Military Medical Center 3rd Annual Research Symposium

Alexander T. Augusta Military Medical Center, Fort Belvoir, Virginia hosted its 3rd Annual Research Symposium on May 16, 2024, focused on expanding the boundaries of military medical research. This event highlighted the outstanding research from GHSE staff and trainees, including a collaboration with the Intrepid Spirit Center.

Best Oral Presentation: Acute Trauma Induced Microbiome Changes are Sex Dependent

First place in the oral presentation category was awarded to U.S. Army Capt. Matthew R. Rusling for the research titled “Acute Trauma Induced Microbiome Changes are Sex Dependent in Rodent Models.” Rusling is a psychiatry resident at ATAMMC. The research focused on the challenges of military traumatic exposure and how gut microbiome dysbiosis may play a role. Thus, gut microbiome interventions like diet, prebiotics, or probiotics may enhance functional resilience to trauma and may be cost and operationally effective.



U.S. Army Capt. Matthew R. Rusling (ATAMMC Photo)



U.S. Army Capt. Louis Kurcz (ATAMMC Photo)

Best Poster Presentation: The Heartache of Missed Diagnosis in Infective Endocarditis

U.S. Army Capt. Louis Kurcz, a family medicine resident physician, won first place in the poster presentation category for the case report titled “The Heartache of Missed Diagnosis in Infective Endocarditis” focused on a patient treated for severe infective endocarditis in early 2023 who demonstrated the limitations and nuances of the Modified Duke Criteria codified in 2000, which has sensitivities as low as 63%. The case highlights several shortcomings that were addressed by the International Society for Cardiovascular Infectious Disease in the 2023 updated Duke Criteria. The new criteria, which exists as a living document, will help providers to better stratify risk and establish an appropriate threshold to collect blood cultures and avoid inappropriate antibiotic therapy in infective endocarditis, a disease that is infamous for non-specific presentations.

Naval Medical Center Camp Lejeune 14th Annual Research Symposium



NMCCL Research Symposium (DVIDS photo)

Naval Medical Center Camp Lejeune, Camp Lejeune, North Carolina held its 14th Annual Research Symposium on April 11, 2024, showcasing a wide array of research from graduate health science residents and trainees. The symposium aims to advance military medicine by spotlighting military and civilian research.

Best Case Report: A Case of Central Pontine Myelinolysis in a Young Female with Chronic Alcohol Use Disorder and Normal Sodium Level

U.S. Navy Lt. Corey McKenzie, U.S. Navy Lt. Brandon Laffoon, U.S. Navy Lt. Rachel Crispell, and U.S. Navy Lt. Cmdr. John Busclas were awarded the Best Case Report Poster Presentation award for their work titled “A Case of Central Pontine Myelinolysis in a Young Female with Chronic Alcohol Use Disorder and Normal

Sodium Level.” Their case report investigated a 24-year-old female with chronic alcohol use, chronic pancreatitis, and alcoholic hepatitis, who presented with right-sided facial weakness and slurred speech. Despite normal sodium levels upon admission, magnetic resonance imaging indicated central pontine myelinolysis. The patient’s history of fluctuating alcohol consumption and poor nutrition likely contributed to rapid sodium changes, resulting in osmotic demyelination syndrome. ODS is a clinical syndrome that results in neurologic symptoms from rapid fluctuations in brain osmolality and is typically linked to the rapid correction of severe hyponatremia, often seen on MRI as central pontine myelinolysis. Risk factors include chronic alcohol use, malnutrition, hepatic disease, and electrolyte imbalances. This case is unique as ODS usually occurs with significant hyponatremia, and literature rarely mentions ODS with normal sodium levels in alcohol use disorder. It emphasizes the need for early intervention in patients with alcohol use disorder to prevent severe conditions like ODS. Service members and veterans are at an elevated risk for ODS and misdiagnosis of ODS, which could delay safe serum sodium correction. “Alcohol misuse is a common problem in our patient population. This case highlights the importance of treating each case with an individualized approach to potentially avoid lifelong complications,” said U.S. Navy Lt. McKenzie, a family medicine resident physician.

Best Literature Review Poster Presentation Award: Evaluating the Effectiveness of 3rd Molar Microwave Tooth Bud Ablation in Preventing 3rd Molar Formation

U.S. Navy Lt. Seth Schilhabel and U.S. Navy Lt. Cmdr. Michael McQueen received the Best Literature Review Poster Presentation award for their work on evaluating the effectiveness of 3rd molar microwave tooth bud ablation in preventing 3rd molar formation. They conducted an electronic literature search to identify relevant studies, highlighting that approximately 85% of people need their third molars extracted, with an average cost of \$550 per tooth and common complications such as swelling, pain, trismus, prolonged bleeding, alveolar osteitis, and infection. Tooth bud ablation aims to prevent third molar development as a less invasive alternative to extraction. Two studies on tooth bud ablation with microwave therapy in porcine models were reviewed. One focused on targeting and ablating molar tooth buds, while the other assessed the complete removal of targeted tissues, molar agenesis, and potential damage to vital structures. The studies demonstrated that computed tomography scans and guided surgery successfully located and treated 100% of tooth buds, with no evidence of mineralized tooth structure formation and no post-operative sensitivity alterations. While these animal studies show promising evidence for complete tooth bud ablation without damage to adjacent structures, human clinical trials are needed to fully understand the short- and long-term effects of this procedure.

Mike O’Callaghan Military Medical Center 13th Annual Research Symposium

The Mike O’Callaghan Military Medical Center, Nellis Air Force Base in Nevada, hosted its 13th Annual Regional Clinical Investigations Program Research Symposium on June 27, 2024. The MOMMC Regional CIP began in 2011 with the aim to promote young military trainees’ academic curiosity. It supports six residencies, a Vizient Nurse Residency, two GHSE trainees’ programs, and several other medical training programs.

Family Medicine resident physician U.S. Air Force Capt. Aaron Griffin was the winner of the Paul F. Crawford Award for Excellence in Research award. This award recognizes a resident who has shown exceptional scholarly output during their residency, reflecting Dr. Crawford’s legacy of promoting research and education.

Griffin’s case report titled “Big Ole Clot in the Lung: He’s Lucky to be Alive: Isolated Syncope as Solitary Symptom of Saddle Pulmonary Embolus” examined a 79-year-old male who presented to the emergency department after experiencing syncope, initially appearing stable but later found to have massive bilateral and saddle pulmonary emboli through CT angiography. Despite a heparin drip, the patient developed severe hypotension and shortness of breath, necessitating mechanical thrombectomy, after which recovery was uneventful. This case underscores the importance of considering pulmonary embolism in patients with syncope, even without classic symptoms, due to its high mortality rate and variable presentation.

“Neurocysticercosis Reactivation in a Patient Treated with Monoclonal Antibody Therapy” is the second case report presented by Griffin. Neurocysticercosis, a major cause of acquired epilepsy, can involve reactivation of dead cysts years after treatment, as seen in a 51-year-old South American woman whose seizures recurred after starting dupilumab for atopic dermatitis. MRI showed new edema and worsened lesions, suggesting reactivation potentially triggered by monoclonal antibody therapy, an unprecedented link. Following a 14-day course of albendazole and prednisone, and an increased levetiracetam dosage, the patient remained seizure-free with improved headaches, emphasizing the need for family physicians to monitor helminth reactivation in patients on such therapies.



U.S. Air Force Capt. Aaron Griffin (CIPO photo)

Tripler Army Medical Center Research Symposium: A Salute to Military Health Systems Research

The Tripler Army Medical Center Department of Clinical Investigations in Hawaii hosted its 2024 Research Symposium, “A Salute to Military Health Systems Research,” May 14-15, 2024, featuring poster and oral presentations from its graduate health science education residents and trainees. In addition to showcasing their scholarly activities, GHSE residents were able to interact and discuss their projects with special guest research directors from across the DOD.



U.S. Army Capt. Josephine U. Pierce Pucci being presented award by U.S. Army Col. Erik R. Johnson, TAMC Chief Medical Officer (CIPO Photo)

U.S. Army Capt. Josephine U. Pierce Pucci from the Department of Pediatrics received the award for best oral presentation at the 26th Annual James W. Bass Research Symposium. The research, titled “In Vitro and In Vivo Analysis of a Novel Field-Expedient Bubble Bilevel Positive Airway Pressure” evaluated the effectiveness of a new low-cost bubble BiPAP device in delivering specific respiratory parameters both in the lab and in live piglet models. The bubble BiPAP was built using modified components like a nasal cannula, tubing, and a microcontroller. It was tested in a simulated airway model to measure pressure performance and compared with a standard hospital ventilator. Then, it was tested on two anesthetized piglets, monitoring their respiratory parameters over time. In lab tests, the bubble BiPAP better maintained target pressures compared to the standard ventilator, especially as air leaks increased. In the piglet tests, the device operated reliably for 90 minutes, but the piglets showed a gradual increase in carbon dioxide levels, indicating potential limitations in the device’s ability to fully manage CO₂ clearance in larger animals or under anesthesia. Respiratory distress syndrome is a leading cause of death in premature infants in low-income countries, partly due to a lack of access to noninvasive respiratory support devices. Although low-cost bubble continuous positive airway pressure devices have been

designed for these settings, there is a need for an affordable bubble BiPAP device to help infants needing more respiratory support. Pierce Pucci stated, “The novel field-expedient Bubble BiPAP is a low-cost, portable, open-source device that can be built by a provider in an austere setting with locally available materials to support infants with respiratory distress who require bilevel noninvasive respiratory support.”

U.S. Army Capt. Cole Ogrydziak from the Department of General Surgery had the winning poster from the 18th Annual Donald A. Person Poster Session titled “Antibacterial Efficacy of a Chitosan-Based Hydrogel for the Control of Polymicrobial Extremity Wound Infections in a Porcine Polytrauma Model.” The research aimed to test the effectiveness of a chitosan hydrogel infused with an antimicrobial peptide epsilon-poly-L-lysine and extracellular vesicles from human stem cells in treating wound infections in a pig model simulating combat injuries. Wounds in young adult pigs with simulated combat injuries were treated with either a saline-soaked gauze or various formulations of the CS hydrogel. The effectiveness of these treatments in reducing bacterial infection was measured after five hours and compared with five control pigs. The wounds treated with CS hydrogel containing EPL showed a significant reduction in bacteria, outperforming the saline gauze. The addition of EVs did not enhance this antibacterial effect in the short term. The CS hydrogel with EPL effectively controlled wound infections in the pig model of severe trauma. This hydrogel could be a promising alternative to antibiotics for treating traumatic wound infections in



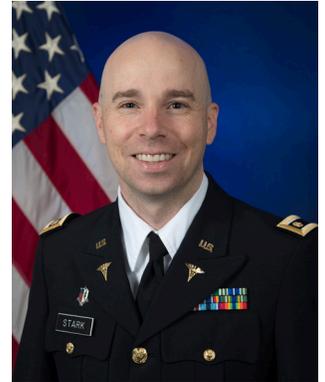
U.S. Army Capt. Cole Ogrydziak being presented award by U.S. Army Col. Erik R. Johnson, TAMC Chief Medical Officer (CIPO Photo)

combat situations, offering a practical solution for use in the field to improve survival rates of injured soldiers. “Our research at the Department of Clinical Investigations demonstrates the potential for an easily injectable chitosan hydrogel mixed with an amino acid called EPL to significantly reduce bacterial load in traumatic dirty wounds, which we investigated within a porcine polytrauma model. This hydrogel offers a promising solution for early intervention in combat-related wounds as it only costs cents per milliliter and is relatively easy to prepare and administer – making it an ideal adjunct for point-of-injury care especially in austere environments where prolonged casualty care is often necessary,” said Ogrydziak. Combat wounds contaminated with shrapnel, uniforms, and soil can lead to serious infections and increased risk of death, especially if there are delays in trauma care. Developing new treatments for these infections, especially under conditions of blood loss and poor tissue oxygenation, is crucial.

Walter Reed National Military Medical Center Research and Innovation Month Symposium: Innovations and Advancements in Medical Science

Walter Reed National Military Medical Center, Bethesda, Maryland, hosted its annual Robert A. Phillips and Bailey K. Ashford research competitions. The competitions were held on May 6, 2024, as part of the Department of Research Programs’ Research and Innovation Month. The symposium showcased cutting-edge medical research conducted by military researchers, highlighting innovations and advancements in medical science and fostering collaboration and knowledge sharing among military medical professionals. The presentations covered various critical topics, underscoring the importance of ongoing research and development in military medicine.

In the clinical fellow staff category, U.S. Army Maj. Christopher Stark from the Neonatal-Perinatal Medicine Department secured first place with the research titled “Maternal and Fetal Health Risk among Female Military Aviation Officers.” The research also won first place in the 39th Annual Navy-wide Academic Research Competition in the Approved Clinical Research conducted under the jurisdiction of the Clinical Investigation Department category, held on May 17, 2024. “This research is truly relevant for all military services. My group evaluated maternal, newborn, and pediatric health outcomes of pregnant aviators and aircrew. Our primary goal is to support service members in aviation careers to make informed decisions about their personal health and the health of their offspring. This is the first study ever to evaluate these health outcomes of pregnant aviators and their children,” said Stark.



U.S. Army Maj. Christopher Stark (WRNMMC Photo)



U.S. Navy Lt. Richard Lee (WRNMMC Photo)

U.S. Navy Lt. Richard Lee from the Orthopedics Department achieved first place in the interns and residents laboratory category with the research focused on trends in strength of various quadriceps tendon graft sizes. The research titled “Trends in Strength of Various Quadriceps Tendon Graft Sizes: A Biomechanics Study” also earned first place in the Approved Basic Science conducted under the jurisdiction of the Clinical Investigation Department Trainee category at the 39th Annual Navy-wide Academic Research Competition.

The study titled “Prognostic Biomarker Validation in High-grade Serous Carcinoma with Ovarian Tumor Tissue Analysis” conducted by Dr. Jordyn Tumas of the Gynecologic Oncology Department won first place in the fellows and staff in the laboratory category. Tumas went on to claim first place in the Approved Basic Science conducted under the jurisdiction of the Clinical Investigation Department Staff category at the 39th Annual Navy-wide Academic Research Competition.



Dr. Jordyn Tumas (WRNMMC Photo)

U.S. Air Force Capt. Marianna Caballero from the Pediatrics Department took first place in the Paul Florentino Patient and Family-centered Care and Performance, Quality Improvement poster competition for the study titled “Take My Breath Away: A Multidisciplinary Approach to Improve Screening for Sleep Disorder Breathing Pediatric Patients with Sickle Cell Disease.”

U.S. Air Force Capt. Alexis Gherzi, also from the Pediatrics Department, earned first place in the case report for interns and residents category with the research titled “Idiopathic Papilledema in Paroxysmal Nocturnal Hemoglobinuria with Severe Aplastic Anemia.”

“Live Birth After Uterine Sparing Treatment of Pyometra Following Abdominal Myomectomy: A Case Report” won first place for U.S. Army Capt. Kiley Hunkler from the Reproductive Endocrinology and Infertility Department in the case report category for fellows and staff category.

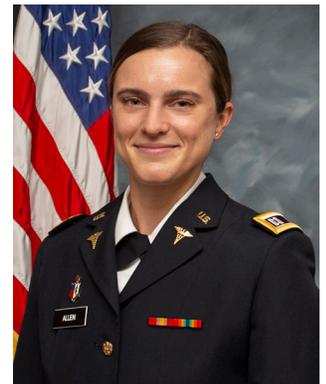
First place in the Robert A. Phillips-Clinical Interns & Residents category went to U.S. Navy Lt. Cmdr. Scott Feeley from the Orthopedics Surgery Department for the study titled “Overreduction of Type V Acromioclavicular Joint Dislocations During Acute Fixation is Associated with Improved Postoperative Rockwood Classification.”

U.S. Army Maj. Suzanne Jokajtys from the Gynecologic Oncology Department was the first place winner in the Bailey K. Ashford Laboratory category for the research titled “Quantitative Proteomics Identifies Unique Molecular Profiles in Splenic Metastasis in High-grade Serous Ovarian cancer.”

Womack Army Medical Center 8th Annual Cape Fear Research Symposium: Military-Focused Medical Perspective

The 8th Annual Cape Fear Research Symposium was held on Thursday, May 2, 2024. The presentations by researchers covered topics from a military-focused medical perspective and served as a platform for showcasing medical research from Cape Fear’s regional educational institutions, medical centers, and military organizations, including the Geneva Foundation, Womack Army Medical Center, Fayetteville State University, Methodist University, Campbell University School of Osteopathic Medicine, and Cape Fear Valley Medical Center.

Gynecologic Surgery and Obstetrics Department resident physician U.S. Army Capt. Megan Allen won Best Overall in the Research Learner Category for the podium presentation “Pelvic Floor Disorders Amongst U.S. Military Active-Duty Females.” The growing population of women in the U.S. military faces unique health challenges, including pelvic floor dysfunction. Allen stated that “compared with female athletics and physical training, the experience of active-duty females in the U.S. military with respect to PFDs is significantly under-investigated.” The study used a large, validated military database to identify the prevalence, incidence, and environment-specific sociodemographic risk factors associated with incident PFD in active-duty females during 11 years of follow-up time that were feasible in data available. Results showed a 6% period prevalence of PFD, with an incidence rate of 14.39 cases per 1,000 person-years. Increased time since service entry, multiple deployments, and specific physical fitness scores were significant predictors of PFD. The incidence of PFD is rising, necessitating further research to confirm trends and develop prevention strategies as more women join the military. “This study serves as the groundwork for future opportunity to better prevent, evaluate, and treat these disorders in our population and thereby improve overall force readiness in our military,” said Allen.



*U.S. Army Capt. Megan Allen
(Womack Photo)*



Dr. Megan Roach (Womack Photo)

Dr. Megan Roach, Musculoskeletal Health Specialist, won Best Overall Research Faculty Category for the podium presentation titled “Mental Toughness and Musculoskeletal Conditions of the Back in U.S. Army Soldiers.” This study explored the associations between mental toughness, back pain, and future musculoskeletal risk in 1,690 U.S. Army soldiers. Using the Mental Toughness Index and back pain assessments during unit in-processing, researchers identified three mental toughness clusters: high, moderate, and low. Soldiers with low mental toughness had the highest frequency of back pain (25%) and increased risk of back MSK (25%) compared to those with high mental toughness. Low mental toughness significantly increased the risk for back pain (RR=2.60) and back MSK (RR=1.46) within 12 months. The study suggests that mental toughness should be considered when developing back MSK risk assessments.

U.S. Army Capt. Adam Rifaat, family medicine resident physician, won third place in the poster competition for the Case Report “Severe Symptomatic Hypermagnesemia Following Bowel Perforation.” This report examined a 77-year-old male with Parkinson’s disease and hyperlipidemia presented with constipation, abdominal pain, and distension. Medications included several for Parkinson’s and atorvastatin, along with daily milk of magnesia. An x-ray revealed a large bowel obstruction. A colonoscopy for decompression led to bowel perforation, necessitating an emergency laparotomy and Hartmann’s procedure. Post-surgery, he developed severe hypotension and bradycardia, with tests revealing hypermagnesemia. After forced diuresis, the patient’s condition improved. This case of severe hypermagnesemia is unique due to the patient’s normal renal function, short duration of magnesium use, and rapid onset of symptoms post-bowel perforation. It suggests magnesium absorption through the peritoneum from fecal matter. Hypermagnesemia is rare and often linked to chronic kidney disease and magnesium laxative use. Treatment includes diuretics, fluids, and potentially dialysis. “This case highlights the importance of effective communication and collaboration within a multi-disciplinary team. This coupled with appropriate history gathering, data collection, and excellent training led to prompt diagnosis and treatment for this critically ill veteran,” said Rifaat.



U.S. Army Capt. Adam Rifaat (Womack Photo)

MTF Clinical Investigations Programs Achievements

Our distinguished MTF CIPs continue to push the frontiers of medical research through their annual Research Symposia, peer-reviewed publications, and prestigious awards. These initiatives not only highlight the exceptional scholarly work of GHSE staff and trainees but also promote academic excellence, foster innovation and collaboration, and drive progress in military medical science—ultimately enhancing the readiness and care of our service members.

“The Readiness Imperative” Published in Military Medicine Journal

U.S. Air Force Maj. Elise Fannon, General Surgery resident physician at David Grant Medical Center, Travis Air Force Base in California, published the research “The Readiness Imperative: Leveraging Large Animal Resident Research to Enhance Expeditionary Surgical Skills” in the journal *Military Medicine*. The goal of this study was to analyze how the research program at the David Grant Medical Center’s large animal vivarium helps in surgical training by comparing the number of surgical cases performed in the research setting to what is typically seen in general surgery residency programs. The study reviewed data from DGMC’s research program over a 5-year period, looking at surgical procedures performed on large animals as part of research protocols. Researchers compared these procedures to standard surgical operations to quantify their training value. They also reviewed the case logs of 20 military and civilian residents over a 2-year period and compared their experience to the minimum requirements set by the Accreditation Council for Graduate Medical Education for general surgery residents. The findings demonstrated that the DGMC research program significantly enhances surgical training for residents, especially in trauma cases, where the volume of procedures performed far exceeded the ACGME minimums. This experience is crucial for military surgeons who may encounter significant trauma in deployment. In addition to surgery, residents also developed various critical care skills through the program, which are also essential for military medical personnel. The training benefits extend to other healthcare providers involved in trauma care, enhancing overall military medical readiness. The DGMC’s large animal research program not only supports medical education and research but also significantly enhances surgical training for military medical residents. As trauma surgery cases decline, maintaining surgical expertise is vital for military readiness. The program should be maintained and expanded to meet the growing demands of military medical training and research.



Dr. Pramvir Verma (ATAMMC Photo)

Pioneering Treatments for Alexander T. Augusta Military Medical Center Oncology Patients

The hematology and oncology team at the ATAMMC in Fort Belvoir, Virginia, led by Dr. Pramvir Verma, has introduced EPKINLY®, a monoclonal antibody medication as a pioneering treatment for diffuse large B-cell lymphoma. This innovative therapy provides new hope to patients unresponsive to previous treatments, representing a significant advancement in combating aggressive lymphoma.

One ATAMMC patient’s remarkable improvement with EPKINLY® underscores the medication’s potential. After exhausting all other treatment options, the patient, previously afflicted by infections and pain, now leads an active life, illustrating the drug’s promise despite its risks. Dr. Verma emphasizes this success as a testament to the team’s adaptability and dedication to patient care.

The ATAMMC Oncology Clinic, established in 2011, comprises a diverse team of over twenty professionals. Effective communication and teamwork, supported by the Team Strategies and Tools to Enhance Performance and Patient Safety model, are vital to its success. Nurse practitioner Sheri Denison highlights the clinic’s focus on celebrating achievements and utilizing advanced tools and treatments, fostering a positive and innovative environment.

ATAMMC's regional cancer care approach encourages collaboration and resource-sharing, which led to the introduction of EPKINLY® and other breakthrough therapies. The center has successfully administered investigational immunotherapy for advanced lung cancer (a condition with a long-term survival rate of less than 40%), resulting in significant cost savings and financial benefits. This achievement underscores the importance of preservice patient care within ATAMMC and creates an opportunity to broaden clinical trial operations, thereby providing new treatments to a larger number of cancer patients. By providing this care in-house, ATAMMC achieved over \$115,000 in cost savings, underscoring the financial and clinical benefits of their approach. The center's success in retaining patient care internally demonstrates its commitment to innovative patient care and paves the way for expanding clinical trial capabilities, allowing more cancer patients to access promising new treatments.

Military Treatment Facility Clinical Investigations Programs Contact Information

55th Medical Group, Offutt Air Force Base, Nebraska
Website: <https://offutt.tricare.mil/>

375th Medical Group, Scott Air Force Base, Illinois
Website: <https://scott.tricare.mil/>

Alexander T. Augusta Military Medical Center, Fort Belvoir, Virginia
Website: <https://belvoirhospital.tricare.mil>

Brooke Army Medical Center, Joint Base San Antonio, Fort Sam Houston, Texas
Website: <https://bamc.tricare.mil/About-Us/Research-and-Education/Department-of-Clinical-Investigations>

Carl R. Darnall Army Medical Center, Fort Cavazos, Texas
Website: <https://darnall.tricare.mil/Health-Services/Other/Research-Program-Office>

David Grant Medical Center, 60th Medical Group, Travis Air Force Base Fairfield, California
Website: <https://travis.tricare.mil/Health-Services/Other/Clinical-Investigation-Facility>

Dwight D. Eisenhower Army Medical Center, Fort Gordon, Georgia
Website: <https://eisenhower.tricare.mil/Academics/Clinical-Investigation>

Keesler Medical Center, 81st Medical Group, Keesler Air Force Base, Mississippi
Website: <https://www.keesler.af.mil/Units/>

Madigan Army Medical Center, Joint Base Lewis-McCord, Washington
Website: <https://madigan.tricare.mil/About-Us/Department-of-Clinical-Investigation>

Martin Army Community Hospital, Fort Moore, Georgia
Website: <https://martin.tricare.mil/>

Mike O'Callaghan Military Medical Center, Nellis Air Force Base, Las Vegas, Nevada
Website: <https://nellis.tricare.mil/Health-Services/Other-Services/Research-Program>

Naval Hospital Camp Pendleton, Camp Pendleton South, California
Website: <https://camp-pendleton.tricare.mil/>

Naval Hospital Jacksonville, Jacksonville, Florida
Website: <https://jacksonville.tricare.mil/About-Us/Contact-Us/>

Naval Medical Center Camp Lejeune, Camp Lejeune, North Carolina
Website: <https://camp-lejeune.tricare.mil/About-Us/Medical-Research>

Naval Medical Center Portsmouth, Portsmouth, Virginia
Website: <https://portsmouth.tricare.mil/Research-Education/Clinical-Research>

Navy Medical Center San Diego, San Diego, California
Website: <https://sandiego.tricare.mil/>

Tripler Army Medical Center, Honolulu, Hawaii
Website: <https://trippler.tricare.mil/About-Us/Department-of-Clinical-Investigation>

United States Air Force Academy, Life Science Research Center, Air Force Academy, Colorado
Website: <https://www.usafa.edu/research/research-centers/life-sciences-research-center/>

United States Military Academy, Chemistry & Life Science Program, West Point, New York
Website: <https://www.westpoint.edu/academics/academic-departments/chemistry-and-life-science>

USAF Regional Hospital, 96th Medical Group, Eglin Air Force Base, Florida
Website: <https://eglin.tricare.mil/>

Walter Reed National Military Medical Center, Bethesda, Maryland
Website: <https://walterreed.tricare.mil/About-Us/Department-of-Research-Programs>

Wilford Hall Ambulatory Surgical Center, 59th Medical Wing, Joint Base San Antonio, Lackland, Texas
Website: <https://www.59mdw.af.mil/About/Fact-Sheets-and-Documents/Display/Article/624908/59th-mdw-clinical-research-division/>

William Beaumont Army Medical Center, Fort Bliss, Texas
Website: <https://william-beaumont.tricare.mil/Patient-Resources/Clinical-Investigations>

Womack Army Medical Center, Fort Liberty, North Carolina
Website: <https://womack.tricare.mil/Academics/Clinical-Investigation-Division>

Wright-Patterson Medical Center, 88th Medical Group, Wright-Patterson Air Force Base, Ohio
Website: <https://wrightpatterson.tricare.mil/>

Acronyms

ACL	anterior cruciate ligament
ATAMMC	Alexander T. August Military Medical Center
BiPAP	bubble bilevel positive airway pressure
CIF	Clinical Investigation Facility
CID	Clinical Investigations Department
CIP	Clinical Investigations Program
CIPO	Clinical Investigations Program Office
CO ₂	carbon dioxide
CRDAMC	Carl R. Darnall Army Medical Center
CS	chitosan
DGMC	David Grant Medical Center
DHA	Defense Health Agency
DOD	United States Department of Defense
ELISA	enzyme-linked immunosorbent assay
EPL	antimicrobial peptide epsilon-poly-L-lysine
EV	extracellular vesicles
FDA	Food and Drug Administration
GHSE	graduate health science education
GME	Graduate Medical Education
HeSS	Hermetic Surgical System
iPSC's	induced pluripotent stem cells
IPV	intimate partner violence
IVUS	intravascular ultrasound
k-wires	Kirschner Wires
LED	light-emitting diode
MARS	Medical Assessment and Readiness System
MHS	Military Health System
MOMMC	Mike O'Callaghan Military Medical Center
MSK	musculoskeletal
MSPC	multi-sensor pressure catheter
MRAT	Medical Readiness Assessment Tool
MTF	Medical Treatment Facility
NCTH	non-compressible torso hemorrhage
nM	nanometers
ODS	osmotic demyelination syndrome
PCR	polymerase chain reaction
PFD	pelvic floor dysfunction
POWV	Powassan Virus
PPH	postpartum hemorrhage
pTau	phosphorylated tau
qPCR	quantitative polymerase chain reaction
REBOA	resuscitative endovascular balloon occlusion of the aorta
R	Registered
R&E	Research and Engineering
STEPS	strategies and tools to enhance performance and patient safety
TAMC	Tripler Army Medical Center
TBI	traumatic brain injury
TD	traveler's diarrhea
TM	trade mark
WAMC	Womack Army Medical Center
WGS	whole genome sequencing

For more information, please contact us at:
dha.ncr.j-9.mbx.cip-office@health.mil
or visit our website:
<https://www.health.mil/CIP>