

2006 REPORT



UNIFORMED SERVICES UNIVERSITY
of the Health Sciences

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Incoming students take the Hippocratic Oath

Uniformed Services University of the Health Sciences (USU)

The University is the nation's federal school of medicine and graduate school of nursing, located in Bethesda, Maryland, a suburb of Washington, D.C. It was authorized by Congress in 1972 and is funded by the Department of Defense (DoD) to ensure military medical readiness.

Message from the President

The Uniformed Services University of the Health Sciences (USU) offers something found nowhere else—a unique combination of education, research and military and public service. It is the very special nature of this University that attracts a distinctive group of faculty, students and staff, all of whom share the common goal of providing good medicine in bad places.

This institution is singularly charged with teaching its students to care for those in harm's way. The USU faculty, students, staff, administration and alumni embrace a shared mission, and each brings their distinct strengths and talents to this pursuit. In large measure, it is this clarity of commitment and shared vision that makes the people of USU exceptional.

Our students learn in a multi-service environment—one that emphasizes and capitalizes on the strengths of each service. Throughout their education, they discover what it means to be a military or Public Health Service officer and how to interact with the other services. Through training exercises and daily interactions with our enlisted men and women in the USU Brigade, our students learn to become better officers.

Our faculty members serve as educators, clinicians and scientists. From developing vaccines for lethal viruses to conducting fundamental research in radiation biology, they advance the boundaries of science. Faculty and students take part in special research relationships afforded by our interactions with other federal agencies, including the National Institutes of Health, the National Science Foundation, the U.S. Army Medical Research and Materiel Command and the Naval Medical Research Center.

Our accomplished alumni serve their country around the world. These men and women practice the clinical skills that we teach and advance medical knowledge and capabilities through their research. They continue a tradition of excellence in military and public health medicine.

A key element of our unique environment is our affiliation with the local military hospitals with whom we are about to embark on a transformative journey. At the core of any quality health sciences center is a health care delivery system, and the U.S. military has the largest system in the country. Looking ahead, this university will play a key role in the delivery of that health care and in advancing military-relevant clinical research. USU will be at the core of the new Walter Reed National Military Medical Center, the new world-class academic health center being constructed on the Bethesda, Maryland campus, adjacent to the University.

I am particularly proud that the University is an integral part of this ambitious and far-reaching plan. USU is embarked on a shared mission to expand and strengthen our partnerships within the military health system, with other federal agencies and with our nation's great universities. We also are working with the U.S. Public Health Service to educate a cohort of officers prepared to better respond in emergency situations and times of national crisis. We will serve as a resource to the nation on military medical matters, and our role in international relations, through medical diplomacy, will increase as we provide support for and strengthen our relationships with partners worldwide.

This report highlights some of our many accomplishments in the last year. I am proud to serve as the fifth president of this University, especially at such a critical time for our military and our country. My goal is to maximize our contribution to the military, the nation and the world by advancing military medicine and improving health worldwide.



A handwritten signature in black ink that reads "Charles L. Rice". The signature is fluid and cursive, with a long, sweeping line extending from the top of the "C" over the "L" and "R".

Charles L. Rice, M.D.

USU: Our Past, Our Future

The Uniformed Services University of the Health Sciences (USU) was chartered in 1972 by an Act of Congress, as envisioned by Congressman F. Edward Hébert (D-LA). The medical school, later named for Congressman Hébert, opened in 1976 and the Graduate School of Nursing was added in 1993. USU is the nation's military medical academy, with missions that include the accession of fully qualified officers into the medical departments of the uniformed services, the building of a cadre of career officers to provide much of the future senior leadership of the uniformed services health activities and the generation of new knowledge, particularly related to the care of those who go into harm's way on behalf of the nation.

In 1947, Congressman Hébert first advocated the idea of a "West Point for doctors." Historically, the military acquired physicians primarily through the draft. As a result, turnover was high, with roughly 30 percent of the force departing each year as obligations were completed. Medical departments were chronically short of experienced specialists.

In 1970, when President Nixon called for an end to the draft, the DoD began to plan for an all-volunteer environment. Scholarship programs and compensation enhancements

were believed to be the best solution. In 1971, Congressman Hébert became the chairman of the House Armed Services Committee and reintroduced his vision of a military medical academy. The next year, the Health Professions Revitalization Act became law, establishing the Armed Forces Health Professions Scholarship Program and chartering USU.

A Board of Regents was appointed and academic leadership for the University recruited. This included military medical department officers, civilian medical educators of national repute and promising young scholars. The question facing the group was how to add to the standard medical education in a way that would produce the leadership cadre needed to ensure effective military health care. The medical students would have to become not only physicians, but also military medical officers. Further, there were things that deployed physicians would need to know that civilians likely would not. There also were aspects of military medicine—largely operational—that were not directly related to any traditional medical school department, and would have to be the province of an additional department.

Today, approximately 25 percent of active duty military medical officers are USU graduates. Faculty and graduates also have made significant contributions to military medical research efforts that benefit both the military and civilian populations. However, one of the best examples of the University's contributions to scholarship is the development of a joint-service medical way of thinking.



The University's charter class of 1980

"We will create a new medical center—Walter Reed National Military Medical Center, located in Bethesda, Maryland, co-located with the Uniformed Services University of the Health Sciences. This new entity will be a clinical, research, education and training facility whose excellence will rival that of Johns Hopkins, the Mayo Clinic and other top-rated medical centers."

*—The Honorable William Winkenwerder, Jr.,
Assistant Secretary of Defense for Health Affairs*

Prior to 1975, both strategically and operationally, joint military medical endeavors were rare. USU faculty assembled textbooks, compiling knowledge from the various services. They prepared and ran joint exercises for fourth-year students. Perhaps most importantly, the faculty and students wrote and talked about “military medicine” as a joint ideal. By the early 1980s, when the rest of the DoD began to embrace the idea of “jointness,” defense medicine was already largely accustomed to the concept.

Today, a Marine cared for by a Navy shock trauma platoon can be transferred to an Army Combat Surgical Hospital, then to an Air Force combat casualty evacuation team who returns him home for further care in the U.S. At all levels, the Marine is likely to encounter a USU medical or nursing school graduate. Such increasingly seamless transitions are a testimony to USU’s founding ideals.



The University's class of 2006

Since graduating its first class in 1980, the University has become a nexus for military medical research and education. USU is now poised to begin a new stage of evolution—becoming the home of military medicine throughout the DoD system.

The Congressionally mandated May 2005 Base Realignment and Closure (BRAC) Commission directed the establishment of a world-class academic health center on the grounds of the Bethesda National Naval Medical Center and the USU campus. The University will become the academic core of the new Walter Reed National Military Medical Center (WRNMMC), which is envisioned to be a world-renowned biomedical research, education and patient care facility.

The University is working closely with colleagues throughout the National Capital Area on an integration plan that will establish the organizational structure to support this vision. The WRNMMC will be the core health care facility in the area. It will serve as the tertiary care teaching hospital for the area and the University, and will enhance USU’s already strong collaborative relationships with the NIH by providing clinical research opportunities.

The location of a world-class teaching hospital adjacent to USU’s campus provides the University with the opportunity to expand its undergraduate medical education program, and to develop leading-edge graduate education programs in a multi-service environment. USU faculty also will have expanded teaching and clinical research opportunities. These developments will allow USU to broaden its already significant contributions to military medicine, helping to create a stronger, more effective military medical system.

“With every war, it can take military medical folks a while to become prepared to provide care in the military setting. These USU grads hit the ground running—they have commitment and are ready at any time for wartime and disasters.

“The establishment of USU marked a turning point for the Department of Defense. USU students are loyal, with a strong commitment to serving the nation and working as a team with the various services. We are producing the leaders in military medicine.”

—Colonel (Ret.) Norman M. Rich, M.D., was Chair of the USU Department of Surgery (now the Norman M. Rich Department of Surgery) for 25 years. Rich has had a distinguished career as a military medical surgeon and educator and was one of the first surgeons to be deployed to the jungles of Vietnam.

School of Medicine

The University's SOM attracts students from all 50 states with diverse backgrounds. Approximately 45 percent have prior military backgrounds, including graduates of the service academies. Students pay no tuition or fees and receive salary and benefits as entry-level commissioned officers in exchange for a seven-year service commitment.



The mission of the University's F. Edward Hébert School of Medicine (SOM) is to provide the nation with physicians dedicated to career service in the DoD and Public Health Service. The SOM was created by visionary members of Congress who understood that a military-trained cadre of physicians is a critical component of national security. A USU medical school education prepares students to practice good medicine in bad places and make decisions in the context of complex and high-intensity situations.

The SOM delivers a unique year-round, four-year curriculum roughly 20 weeks longer than at other U.S. medical schools. Additional education and training, beyond that in a civilian medical school, focuses on epidemiology, health promotion, leadership and field exercises, disease prevention, tropical medicine and other topics related to the distinct requirements of military physicians and those who will practice in the Public Health Service. The SOM's Department of Military and Emergency Medicine enjoys worldwide recognition for establishing and expanding the military medical curriculum.

The uniformed services offer the same medical career opportunities as civilian medicine, but also include expanded specialties in areas such as preventive medicine and public health medicine, because a prime responsibility of military medicine is keeping forces healthy. In addition, the Army, Navy and Air Force, as well as the Public Health Service, have concentrations in service-unique practice areas, such as aerospace medicine, undersea

medicine, global infectious disease, combat resuscitation and disaster medicine.

USU attracts distinguished faculty and staff from all over the world and the University is dedicated to fostering their success and growth. USU was one of the first institutions to adopt the acclaimed Stanford Faculty Development Program. For more than 20 years, the Department of Medicine has provided this state-of-the-art curriculum to hundreds of faculty at our affiliated hospitals across the country.

Clinical Training

Students may do their required third-year clerkships at several hospitals in the Washington, D.C., area or other military treatment facilities throughout the United States. USU's two main teaching hospitals in the National Capital Area are Walter Reed Army Medical Center (WRAMC) and the National Naval Medical Center (NNMC). In 2011, a new state-of-the-art academic health center will open adjacent to the USU campus—the Walter Reed National Military Medical Center—which will serve as the University's primary teaching hospital and will provide expanded opportunities for clinical training and research.

USU has made a singular commitment to inter-site consistency. The University has established rigorous guidelines to ensure that, regardless of location, each student receives top-quality medical training consistent with that obtained by all other students. USU has set a nationally recognized standard for timely, reliable and valid evaluation and feedback for students working on clinical rotations in hospitals.

Following graduation, students enter graduate medical education (GME) programs (internship, residency and fellowship) of three to seven or more years in length, leading to board certification in a specialty. These programs are a prerequisite for licensure and

the independent practice of medicine. The military operates an extensive system of GME programs, with 237 programs at 31 teaching facilities in 58 specialties and subspecialties. As in the civilian sector, each of these programs and sites is subject to stringent requirements by accrediting agencies, including the Accreditation Council for Graduate Medical Education (ACGME). Unlike the civilian programs, however, the military programs offer additional training in military-unique topics, such as the Combat Casualty Care Course, to prepare trainees for practice in austere environments. As in the civilian sector, the military conducts a match for graduating students. USU students fare well in this process, with the majority receiving their first choice of both specialty and training site and more than 90 percent receiving first choice of specialty.

The GME programs within the National Capital Consortium are managed centrally through USU and include programs at WRAMC, NNMC, Malcolm Grow Air Force Medical Center and DeWitt Army Community Hospital.

The ACGME has demanded more systematic and rigorous assessment of finishing residents' readiness for independent medical practice. The University sponsors a week-long course to train program directors how to demonstrate that their residents are competent and fully prepared to meet the demands of a career in military medicine.



M.D./Ph.D. Program

USU's M.D./Ph.D. program was established to train outstanding, dedicated military officers as independent physician-scientists to carry out both clinical investigations and biomedical research in the basic and clinical sciences. The program combines a rigorous basic science graduate curriculum with outstanding clinical training and special integrated M.D./Ph.D. activities that qualify students for careers in academic medicine, biomedical and clinical research and clinical practice.

***In 2006, the new
Radiation Biology
Department was
established in the
School of Medicine.***



Colonel (Ret.) Louis Pangaro, M.D., Professor and Vice Chair of Educational Programs for the Department of Medicine, is a recipient of the Master Teacher Award from the Army Chapter of the American College of Physicians, and the Sol Katz Teaching Award from the Washington Chapter. He recently received the Robert J. Glaser AOA Distinguished Teacher Award from the Association of American Medical Colleges. He is a member-at-large of the National Board of Medical Examiners.

"USU is providing something for the military that is done among the best of its civilian counterparts...[But] we achieve a level of educational consistency that our civilian counterparts only dream of."

***"Lou Pangaro at USU is recognized
by his colleagues around the country
as a leader in developing approaches
for assessing, in a developmentally
appropriate way, the acquisition of
clinical skills by medical students."***

*—Michael E. Whitcomb, M.D., former
Senior Vice President, Division of Medical
Education, Association of American
Medical Colleges*

Graduate Programs

USU students benefit from the military's overseas network of research laboratories. Many of the faculty members have conducted research at these field sites, and they bring these real-world experiences to the classroom. In addition, graduate students have opportunities to study at the laboratories, which are located in Africa, Asia and South America.



Graduate education is an important and integral component of the academic mission and scholarly environment at the University. Students who receive degrees from USU will have the opportunity to make significant contributions to the advancement of health and science in both public and private institutions.

The University offers 14 graduate degrees in the biomedical sciences and public health. Doctor of Philosophy degrees are offered in nine areas that range from emerging infectious diseases to clinical psychology. The University offers both a Master and Doctor of Public Health degree and has a physician-scientist (M.D./Ph.D.) program.

The Graduate Program in Biomedical Sciences at USU currently has 170 full-time students. Most of the graduate programs are open to civilians, with no service obligation and tuition is waived. The University provides stipends to its civilian graduate students for three years.

USU's nationally recognized civilian and military faculty is comprised of leading educators and world-renowned scientists. SOM faculty are committed to excellence in medical education, military medicine, public health, science, technology and patient care.

The central location of the campus in the metropolitan Washington, D.C. area attracts quality faculty members and students, many of whom collaborate with scientists at nearby research institutes, such as the National Institutes of Health, Walter Reed Army Institute of Research and the Naval Medical Research Center.

The University offers the following graduate programs:

Interdisciplinary Programs

- Emerging Infectious Diseases
- Molecular and Cell Biology
- Neuroscience

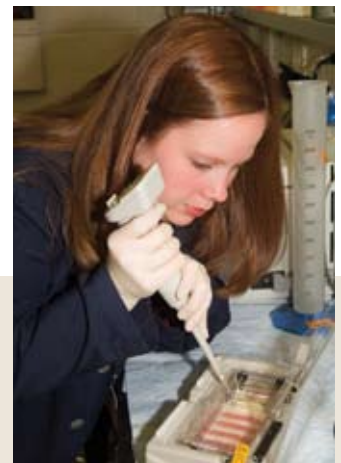
Departmental Programs

- Preventive Medicine and Biometrics
 - Doctor of Public Health
 - Ph.D. in Medical Zoology
 - Master of Public Health
 - Master of Tropical Medicine and Hygiene
 - Master of Science in Public Health
- Medical and Clinical Psychology
- Military Medical History
- Pathology

Physician/Scientist Program (M.D./Ph.D.)

"Because it's a smaller school, the faculty can give more individualized attention to the students. There is a friendly atmosphere here that promotes discussion and collaboration."

—Bethanie Morrison, class of 2008



USU's Master of Public Health Program was ranked as one of the top public health programs in the United States for the third year in a row by U.S. News and World Report.

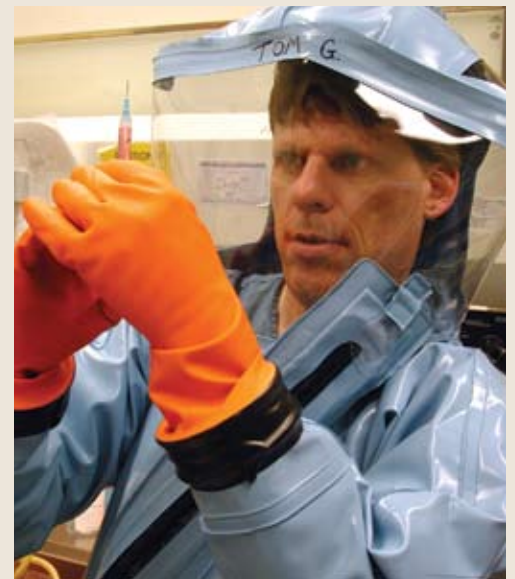
"USU has a phenomenal faculty. Each of them has a unique perspective that comes across in their teaching and mentoring. It makes for a great educational experience."

—Jeremy Henriques, class of 2007



Prime Location for Collaboration

The University's close proximity to the National Naval Medical Center, the National Institutes of Health and the National Library of Medicine provides a rich and unparalleled environment for education and research. Additionally, USU is situated close to the I-270 Biotechnology Corridor, Walter Reed Army Medical Center, Walter Reed Army Institute of Research and the Naval Medical Research Center, which enables frequent interactions with some of the world's premier researchers at seminars and conferences, as well as guest lectures at the University.



The deadly Ebola virus has a mortality rate estimated at 80 percent among humans. A 2005 outbreak of the Marburg virus claimed more than 300 lives. Currently, there are no approved vaccines or therapeutics for these Category A agents—pathogens that pose a risk to national security.

Groundbreaking research conducted by 2003 USU graduate Thomas Geisbert, Ph.D., and other investigators at the United States Army Medical Research Institute of Infectious Diseases shows tremendous promise for a single vaccine to protect against both viruses. Studies conducted by Geisbert and his colleagues have demonstrated complete protection from Ebola and Marburg hemorrhagic fevers using a vesicular stomatitis virus-based vaccine platform.

"The education that I received at USU was instrumental in preparing me for a successful career as a virologist. I gained a fuller understanding of molecular biology, received skills that will benefit me throughout my career and made professional and personal relationships that will last a lifetime."

Graduate School of Nursing

The USU Graduate School of Nursing is the home of the nation's only Clinical Nurse Specialist program dedicated to the perioperative specialty, whereby clinical application of the specialty, along with military-specific training, are integrated throughout the curriculum.

The USU Graduate School of Nursing (GSN) was established in 1993 by members of Congress who understood the key role of advanced practice nurses in the military. The GSN provides the nation with highly skilled nursing professionals dedicated to a career of service in the Armed Forces, Public Health Service and other federal health agencies. This innovative program offers a unique, international perspective on leadership, education, research and service. GSN students who are members of the uniformed services incur varying service obligations, determined by the lengths of their programs.

The graduate program provides comprehensive education that prepares nurses to deliver high-quality care and services to all beneficiaries of the uniformed services during peace, war and other contingencies, including natural disasters. The signature curriculum includes three focused research and practice areas that are woven throughout all programs: Operational Readiness in Changing Environments, Population Health and Outcomes and Clinical Decision-Making in the Federal Healthcare System. Each of these areas includes emphasis on patient safety, ethics, evidence-based practice, leadership, force protection and international health.

GSN faculty are dedicated to student success and to advancing medical research and patient care. The GSN teaching staff includes 25 military and civilian faculty members.

Master of Science in Nursing (MSN) Program

Building on the foundation obtained from an undergraduate nursing education, masters students take part in learning experiences that are designed to increase the breadth and depth of their knowledge base.

The University's MSN program prepares students for collaborative and autonomous advanced nursing roles in both acute and primary care settings. The curriculum is designed to foster professional development, enhance clinical expertise, support patient teaching and stimulate clinically relevant research. The program emphasizes health promotion; disease prevention; case management; perioperative and anesthesia services; emergency preparedness; patient safety and administration. Students also advance the profession by conducting evidence-based research and applying findings to nursing practice.

MSN program options include:

- Perioperative Clinical Nurse Specialist
- Family Nurse Practitioner
- Nurse Anesthetist

The GSN has accredited clinical practice sites for each of its masters program options. These include 58 military treatment facilities and 62 civilian and non-DoD federal clinical sites.



Students in the GSN benefit significantly from USU's location. One resource that contributes to student education is the National Capital Area Medical Simulation Center—one of the most advanced medical simulation facilities in the world.

Ph.D. Program

GSN doctoral students transition from a masters specialty domain to a program of study that emphasizes nursing leadership, research, education and practice. The program is uniquely focused on a signature curriculum that encompasses operational readiness and force protection, clinical decision making and population health and outcomes, within the context of the federal/military health sector.

The Ph.D. program in Nursing Science includes a foundation of required courses, as well as a diverse selection of cognates and electives. The curriculum fosters research, while providing opportunities for development, such as structured assistantships designed to broaden and improve expertise. Areas of concentration include nursing knowledge; research methods, statistics and designs; and federal and military healthcare policy and issues.

Students take full advantage of USU's location in the heart of the National Capital Area. Practicum opportunities include research-focused experiences at local federal or military agencies under the guidance of seasoned military nurse researchers, federal health care researchers and civilian university researchers.

Ph.D. areas of curriculum concentration are:

- Nursing knowledge
- Research methods, statistics and designs
- Federal and military health care policy and issues

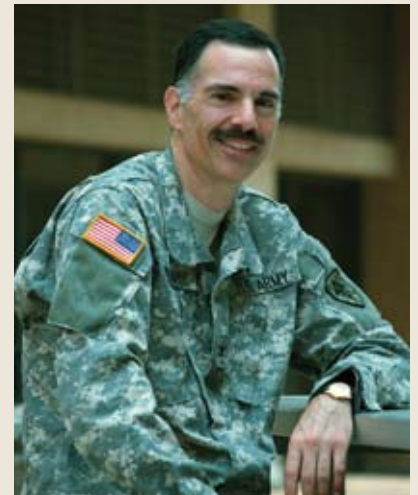


GSN students are uniquely prepared to provide top-quality care in challenging environments.

“During my tenure as Chief of the Army Nurse Corps, I had many opportunities to work with USU faculty, students and alumni. During this time, the Army Nurse Corps made the decision to send all of our students pursuing a degree as a family nurse practitioner to USU’s GSN. We believed this program, more than any other, prepared our future leaders, clinicians, researchers and academicians at a level best suited for today’s military missions worldwide.”

—Brigadier General (Ret.) William T. Bester, R.N., acting Dean, USU Graduate School of Nursing

At the GSN, students are provided guidance for identifying topics for publication and submitting manuscripts for refereed review. As a result, many GSN Ph.D. students are published as early as their second year of enrollment.



Colonel Richard Ricciardi, Ph.D., a 2006 graduate of the GSN doctoral program, worked with co-investigators to identify the physiological risks for military personnel associated with personal protective equipment, such as body armor, and to develop strategies for preventing or mitigating negative effects. He received the Military Officers Association of America Distinguished Student award—the highest academic honor a graduating student can receive. He also was the first GSN student to receive the prestigious Board of Regents Award.

“Being a nurse practitioner in the Army, I have always been interested in injury and disease prevention in war-fighters and their families... Thanks to the mentoring of senior scientists in both the GSN and School of Medicine, along with support from many civilian and military personnel in the Department of Military and Emergency Medicine...I had the opportunity to conduct militarily-relevant research that is quickly translatable to the war-fighters, and to policymakers in all services.”

Field Training Exercises

Throughout their tenure at USU, both School of Medicine and Graduate School of Nursing students take part in several unique exercises designed to impart real-world wisdom and experiences, and prepare them for their future roles as uniformed officers.

Antietam Road March

First-year students take part in a distinctive training exercise designed to give them a historical perspective on wartime medicine, as well as basic military training. The students travel to Sharpsburg, Maryland, where they take part in a six-mile road march, stopping periodically at designated stations to learn about medical treatment during the Battle of Antietam. What makes this event even more meaningful is that the instructors are USU faculty and professional Civil War historians dressed in period attire.



Part of USU's Military Medical Field Studies course, the activity is designed to reinforce the military-unique curriculum and demonstrate how landmark events, such as the Civil War, have shaped current practices in military medicine. Additionally, the exercise is students' first experience wearing load-bearing gear and moving cross country in controlled movements by platoons.



At Operation Bushmaster, students learn and practice some fundamental medical skills in field conditions.

For example, all medical students learn how to initiate an IV under duress and time constraints, while wearing a flak vest and helmet and carrying a rifle.

Operation Kerkesner

More than half of USU students have no prior military service. Operation Kerkesner was created to give first-year students their first real experience of how to live and work in military field conditions.

Throughout the four-day exercise, medical students receive training from non-commissioned officers, most of whom have deployment experience. The education they receive covers critical military skills—such as land navigation, use of firearms, hand-to-hand combat, camouflage skills, effects of wearing body armor and use of military vehicles and radios—that other military physicians might not learn prior to a real-world deployment.





Operation Bushmaster

Ask any USU graduate about their most memorable experiences from their time at the University and it's certain that one of them will be Operation Bushmaster. A four-day field exercise, Operation Bushmaster is the culmination of, and the practical exam for, USU's rigorous Military Contingency Medicine (MCM) course.

Taken by all fourth-year School of Medicine students, and many Graduate School of Nursing students, the MCM course is the capstone of USU's military-unique curriculum. It is designed to prepare students to provide the highest quality care possible in austere, resource-poor environments. The course augments students' clinical knowledge with specialized medical training that enables them to excel as General Medical Officers in operational settings. The curriculum covers a broad range of militarily relevant topics, including advanced trauma life support, preventive medicine, patient care in flight, military medical ethics, medical considerations following biological attack and combat stress control. Students also learn how to provide care in natural disaster settings.

Once classroom training is complete, students embark on Operation Bushmaster, a simulation exercise in which they not only put to the test the training they received in the MCM course, but also draw upon experiences and education from their previous years at the University. The exercise begins with students being transported by CH-47 helicopters to the exercise site at Fort Indiantown Gap, Pennsylvania. While on board, the students are tasked with monitoring partners' vital signs, demonstrating some of the difficulties of attending to patients during transport. Once they arrive, students receive training

Consistently, USU graduates recognize the MCM course and Operation Bushmaster as some of the most valuable education they have ever received.



NIH Director Elias Zerhouni, M.D. (center), Rear Admiral Richard Wyatt, USPHS (left) and USU President Charles Rice, M.D., observe as a USU first-year medical student is outfitted for his role as an injured soldier for Operation Bushmaster.

“We at the NIH are pleased at the growing interactions between NIH and USU. During the past year since Dr. Rice has been appointed President, our Institute and Center leadership have met with Dr. Rice on several occasions. We have explored new ways of interacting with USU; two of our Institutes are now supporting medical students at the University, and that will certainly bring our institutions closer. I personally gained a new appreciation of the medical school's unique capacity to train its students under field conditions by observing the Bushmaster mass casualty exercise this summer.”

—Elias Zerhouni, M.D., NIH Director



classes to familiarize them with the equipment and procedures they will use throughout the following three days.

Throughout Operation Bushmaster, students live in field conditions and work in groups of roughly 15 to run an entire medical unit by themselves under perpetually changing conditions. The students set up sites and begin to receive casualties, played by moulaged first-year students, suffering both routine illness and battle injuries. Those running the unit must triage the casualties and treat them making the best use of their available resources.

Students are evaluated by USU faculty on their medical knowledge and leadership abilities as they rotate through positions as commander, executive officer, medical officer and ambulance team leader. They also take part in a combat stress rotation. Students are assessed on their abilities to stabilize and treat combat casualties at the point of wounding and

evacuate them to higher levels of care. Additionally, they are assessed on their abilities to provide routine care for non-battle related injuries and illnesses, to protect from illness through appropriate preventive medicine measures and to provide screening and initial treatment for combat stress-related problems. When not under evaluation, students fill in as medics, radio operators and security personnel.

All students rotate through the deployable medical facility to gain a full joint military experience. They spend one day each at an Army, Navy and Air Force facility. During these rotations, they must attend to their own sick-call patients, as well as requests for evacuation.

The event culminates in a demanding nighttime mass casualty exercise in which students must respond to a platoon that has sustained significant casualties. They arrive at the scene in total darkness, hearing voices calling for help from the surrounding woods, and must locate and retrieve the casualties, treat them and arrange for their evacuation.



"USU was my top choice for a medical school because I wanted to get the best education to be a military physician and serve my country. USU was the best place for that. Every day I'm here confirms that I made the right choice."

—2nd Lieutenant Roselyn Clemente, class of 2010

"I feel very privileged to have the opportunity to help teach our future military and federal physicians and nurses. Our students are motivated not only to serve their patients, but also to serve our nation. They are not only among the best and the brightest, but they are also uniquely focused on service to their country and their fellow human beings. Many of them come to USU with previous military experience that makes them better students, and better practitioners. They are committed to service over self, and this core value will make them superb health care providers."

—James G. Smirniotopoulos, M.D., Professor of Radiology, Neurology and Biomedical Informatics and Chair, Radiology and Radiological Sciences



"It is a pleasure to interact with so many talented students. One of the most rewarding aspects of being a faculty member is to watch our student body develop into competent and caring physicians dedicated to providing the best health care for our patient population."

—Colonel Richard M. Conran, M.D., Ph.D.,
Professor of Pathology and Emerging Infectious Diseases



USU Department of Pathology faculty members Colonel Richard Conran, M.D., Ph.D., (left) and Colonel Tom Stocker, M.D., review an interesting pediatric case.

Commitment to Ethics

USU is dedicated to developing leaders in military medicine who are not only committed to providing outstanding patient care, but also observe the highest level of ethical standards. Issues of ethics are woven throughout the curriculum and are an integral part of the rigorous field exercise Operation Bushmaster. The keystone of the University's ethics education is a multifaceted, dynamic course designed to impress upon students the importance of ethical behavior and potential impacts of their actions.

Central to the course's effectiveness is the high caliber of the guest lecturers. Students receive in-depth instruction from some of the world's most renowned ethicists, including Edmund Pellegrino, M.D., Chair of the President's Council on Bioethics; Robert Veatch, Ph.D., from Georgetown University's Kennedy Institute of Ethics; and Nancy Sherman, Ph.D., Georgetown University Professor, former Chair of Ethics at the U.S. Naval Academy and author of the acclaimed book on military culture,

Stoic Warriors. This dynamic class uses a diverse range of approaches—from lectures and small-group discussions to dramatic presentations and films—to address a broad range of issues that students will likely face during their careers.





"I chose USU because the curriculum emphasizes infectious diseases. I also thought the military training would give me the skills to work in resource-poor environments, such as refugee camps.

"I joined the Public Health Service because I'm interested in the impact of poverty on disease and wanted to find a way to help address health disparities in the U.S. and abroad. I'm excited to work for the Indian Health Service because the Native American communities I've met had a strong sense of culture and identity. Navigating the role of medicine within the context of their traditions and addressing their specific health needs will be an exciting challenge.

"I think USU has prepared me for my future career even more than I originally anticipated... I feel that the lessons I've learned here will be relevant throughout my career, whatever path it takes. The greatest advantage is the comfort I've gained working with the military system. It's rare for a Public Health Service officer to have this exposure to military logistics, training and equipment."

—Ensign Molly Evans, class of 2007, assigned to work for the Indian Health Service after graduation

The Uniformed Services

Students enrolled in USU's F. Edward Hébert School of Medicine can elect to serve in one of the Armed Forces—Army, Navy or Air Force—or the Public Health Service, which operates under the jurisdiction of the U.S. Department of Health and Human Services. Students enrolled in the Graduate School of Nursing also are officers in one of the four services.

Army, Navy and Air Force students have the opportunity to experience a variety of assignments throughout their careers, ranging from providing clinical care in a military treatment facility, caring for troops in a combat theater of operations or conducting tropical medicine research overseas to ensuring the health of our nation's top political leaders on Capitol Hill and in the White House. Many currently serve as faculty members on the USU campus. Whether they are serving in hospitals or on the front lines of the battlefield, their unique USU education prepares them to be leaders who work collaboratively across all uniformed services.

Students serving in the PHS are presently assigned to the National Institute of Allergy and Infectious Diseases, the National Cancer Institute or the Indian Health Service. Students assigned to either of the Institutes have the opportunity to conduct research on critical health issues facing the country and the world. Those working with the Indian Health Service provide high-quality healthcare and related services to medically underserved Native American populations.

The military and the PHS have assumed greater roles in large-scale disaster response as well as humanitarian relief efforts. At USU, students benefit from learning side-by-side with counterparts in each of the four services, thus becoming distinctively adept at working in a joint environment in times of crisis. All students have the opportunity to

contribute to the broader mission of the uniformed services.



Members of the U.S. Public Health Service, including USU alumnae, played a key role in Hurricane Katrina response and recovery. PHS personnel helped to erect a 200-bed field hospital, including a full pharmacy, on the floor of a sports arena at Louisiana State University.

"I am proud of the strong and continued outstanding relationship between USU and the U.S. Public Health Service. Our Commissioned Corps has long benefited from the rich tradition of military medicine and officership that prevails as an integral part of the curricula of the university."

—Rear Admiral Kenneth P. Moritsugu, M.D., M.P.H., USPHS, Acting Surgeon General of the United States

USU Brigade

The USU Brigade is the military leadership component within the University. A significant number of USU graduates are leaders in military medicine. It is the responsibility of the Brigade to prepare USU students to become skilled officers who can function effectively in a joint service environment.



USU Brigade Commander Colonel Charles Serio, MSC, USA, changes command with Captain John R. Rumbaugh, MSC, USN (right).



The USU Brigade helps to provide students with critical military training.

All uniformed personnel at USU, including faculty and staff members, are part of the Brigade. Comprised of approximately 250 members from all branches of the Armed Services, the Brigade serves as the school's link to the broader U.S. military. The USU Brigade Commander is the senior active duty officer at the University and serves as the principal advisor to the University President on matters concerning military policy and requirements.

Brigade members provide students and active duty faculty and staff with necessary military-specific administrative, legal and operational support. Students also receive critical instruction and training from the Brigade, which makes USU graduates uniquely prepared for successful careers in military medicine.



“USU ensures that its graduates become not only doctors and nurses, but leaders, and the Brigade is a crucial part of that...”

In addition to the training that the Brigade staff provides, interacting with enlisted personnel on a regular basis is an important learning experience for students. It makes them better prepared to be officers in an actual field environment, and to have successful and professional working relationships with their enlisted personnel.”

—Captain Tim Gerlach, Brigade Headquarters Company Commander

National Capital Area Medical Simulation Center

USU students have access to some of the most advanced medical simulation technologies available in the world through the University's National Capital Area Medical Simulation Center. The 20,000 square-foot Center conducts approximately 8,000 simulations each academic year and is open to all medical and nursing students, interns, residents and others in the USU community. The facility also provides continuing medical education and training to personnel from other federal and DoD agencies.

The Center utilizes state-of-the-art technologies to conduct both clinical and surgical skills training. The Clinical Skills Teaching Laboratory includes 12 patient examination rooms in which standardized patients are used to train and assess the communication, interpersonal, professional, physical exam and diagnostic reasoning skills of learners. Encounters



USU students receive more simulation practice than at most other medical schools. By the time they graduate, USU learners will have participated in roughly 40 different simulations preparing them for their careers as military medical officers.

The Simulation Center, a leader in advancing simulation technologies, has developed a number of simulators that are world firsts. They include simulators for cricothyroidotomy, pericardiocentesis and diagnostic peritoneal lavage. Center staff conducted the nation's first Advanced Trauma Life Support course using virtual-reality based simulators, computer-controlled mannequins and medical models.

are monitored by faculty and videotaped, allowing students to review the tapes with and gain feedback from their instructors.

The Surgical Simulation Laboratory includes a full-scale operating room and a virtual reality room, which provide realistic scenarios for trauma and surgical training. The operating room is equipped with computerized, high-fidelity human patient mannequins to teach and assess skills in resuscitation, trauma, anesthesia and surgical emergencies. The virtual reality room includes several computer-enhanced task trainers with the capability to teach and assess students as they practice surgical procedures, endoscopic skills and laparoscopic techniques.

New to the Center is the Wide Area Virtual Environment (WAVE), an 8,000-square foot full-scale immersive virtual reality area that allows teams of students the opportunity to take part in mass casualty drills, biochemical attacks and other medical training scenarios, in conjunction with simulators and live simulated patients. It is one of the only facilities of its kind in the world.

International Programs

A significant portion of USU's core mission involves global health. The University faculty and staff include acclaimed clinicians and researchers from other countries, and USU plays host to international students for military medical training exercises such as Operation Bushmaster. Additionally, some USU students opt to receive part of their elective training abroad, which is facilitated through the University's network of international partners.



USU and India's Armed Forces Medical College enter into an agreement that allows the partners to share facilities, military medical experience and professional knowledge.

“There are not many schools in the world that are full-service military medical schools. Medicine can build international bridges. USU sharing its expertise and entering into partnerships with international institutions not only facilitates collaboration and advances medicine, but also helps to create good will for American citizens who are stationed overseas.”

*—Colonel (Ret.) Emmanuel Cassimatis, M.D.,
USU Associate Dean for Clinical Affairs, School of
Medicine, and Vice President for Affiliations and
International Affairs*



The University provides a support system for students and their families.

“Military medicine allows physicians to actually practice medicine instead of worrying about things like restrictions created by insurance companies...Also, I'm married and didn't want to assume the debt from another medical school. The pay I receive as a USU student allows my wife and me to live relatively the same lives that we lived when I was an O-3.”

—Ensign Ted Utz, class of 2010



The USU campus is surrounded by park-like woodlands and is adjacent to the National Naval Medical Center and across the street from the National Institutes of Health. Most students live close to the University and have access to mass transit facilities, making it easy to take advantage of the many cultural, educational and social activities in the Washington metropolitan area.



USU class of 1992 graduate Lieutenant Colonel Chester "Trip" Buckenmaier, III, M.D., Assistant Professor in the USU Department of Anesthesiology, is Chief of Regional Anesthesia at Walter Reed Army Medical Center. Together with Colonel Jack Chiles, M.D., Buckenmaier created the Army Regional Anesthesia and Pain Management Institute, a Congressionally funded, ground-breaking initiative that is changing the way military anesthesiologists address pain. He spends a great deal of his time teaching regional anesthesia techniques to both military and civilian anesthesiologists.

"My USU education prepared me well as a physician, but more importantly I was prepared to serve as a military physician. This distinction is important. Without the unique training in military medicine emphasized at USU, I do not think the innovative answers to combat trauma pain my team has brought to the battlefield would have been realized."

Continuing Health Education

A key component of the University is the Office of Continuing Education for Health Professionals—an expansive program with six accreditations for physicians, nurses, psychologists, social workers, pharmacists and health care executives. Few programs address this many disciplines under one roof, and USU's program is the only one of its kind in the military health system.

The office conducts state-of-the-art continuing education activities on medical advances in clinical practice, research, medical technology, clinical pathways, outcomes management, quality of care, managed care, patient safety and other relevant topics. It also organizes and executes DoD medical treatment facility-based activities in response to quality management issues, as well as TRICARE management education activities. The office organizes courses and workshops, as well as Internet continuing education, distributes materials such as DVDs and print education activities and runs regularly scheduled conferences.

Key to the program's mission is maintaining enhanced readiness among our Armed Forces. As part of its work to keep military medical personnel up-to-date on new technologies and advances in care, the office partners with other USU programs including the DoD Center for Patient Safety, Center for Disaster and Humanitarian Assistance Medicine and the Armed Forces Radiobiology Research Institute to offer leading edge continuing health education.

The Military Training Network (MTN) conducts advanced cardiac life support, pediatric advanced life support and advanced trauma life support classes. Not only does the MTN act as a community training center for CPR, but also it manages training programs embedded within military units all over the world.



The MTN is recognized as an American Heart Association Regional Training Center. MTN staff train roughly 275,000 participants each year.

Research

The University's educational, scientific and clinical care missions are supported by research efforts aimed at bringing the leading edge of discovery to the benefit of humanity.

Improving Malaria Prevention

Malaria kills more than one million people each year, and is especially widespread in less developed regions of the world. For a time, it was widely believed that the global eradication of malaria was a distinct possibility, due mainly to the use of DDT to control the carrier mosquito. Although it has been proven to be a safe insect repellent, DDT suffers from negative public perceptions, largely due to potential harm to the environment when overused. Because of these concerns, the use of DDT was curtailed in the 1970s. Subsequently, malaria began a resurgence.

USU researchers, headed by Don Roberts, Ph.D., a Professor in the Department of Preventive Medicine and Biometrics, are working to reduce the incidence of malaria. Utilizing funding from the NIH, they have conducted extensive studies on compounds to prevent transmission of the deadly disease. Based on tests of hundreds of chemicals, their studies show that responsible and focused use of DDT is still the most cost-effective malaria control method and is crucial to stopping malaria transmission among high-risk populations.

Roberts and his colleagues headed an effort to keep DDT from being banned as part of a global agreement to eliminate 12 persistent organic pollutants. Malaria workers around the world joined this campaign and, in the final agreement, DDT was preserved for use in disease control programs.

The USU team also works in collaboration with the group Africa Fighting Malaria, and

"Using personal perseverance and the scientific process, Dr. Roberts and his colleagues have made the most significant global public health contribution in a decade. This work will literally save hundreds of thousands of children's lives each year in the less developed, malaria-endemic regions of the world. "

—Captain (Ret.) Larry Laughlin, M.D., Ph.D., Dean, F. Edward Hébert School of Medicine

has testified at U.S. Senate hearings on the subject. Recently, they worked with the Agency for International Development and the World Health Organization to update their policies. Largely due to these efforts, the WHO now recommends indoor house spraying as a tool for malaria control. The change in U.S. policy allows government aid agencies to support international programs that use DDT.

Henry M. Jackson Foundation for the Advancement of Military Medicine (HJF)

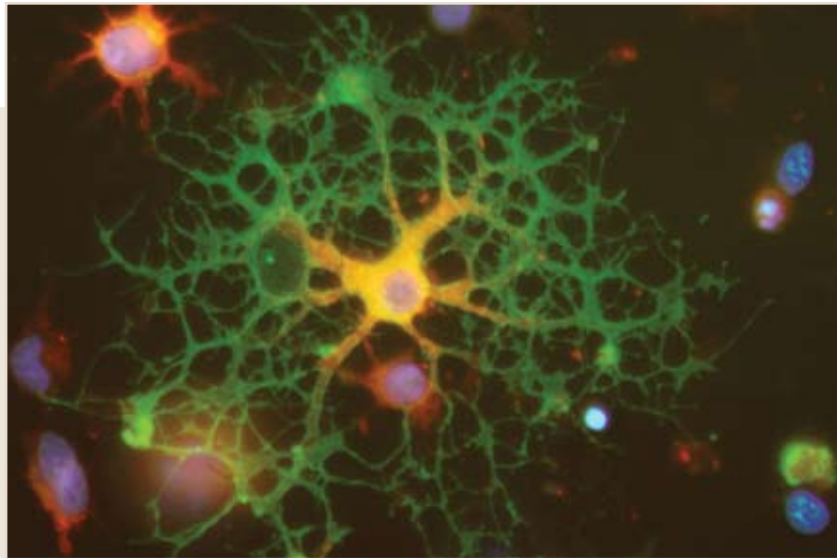
Research at the University is conducted in collaboration with the Henry M. Jackson Foundation for the Advancement of Military Medicine (HJF), a private, not-for-profit organization that supports research and education at USU and throughout military medicine.



Restoring Central Nervous System Function

Regina C. Armstrong, Ph.D., Professor of anatomy, physiology and genetics, and Director of USU's neuroscience graduate program, and her team are studying potential methods of restoring central nervous system (CNS) function in adults. This NIH-funded research holds special relevance for military service members who have experienced impairment of CNS function due to traumatic injuries, infections, exposure to toxins or genetic diseases.

Armstrong's research focuses on the restoration of myelin—the white matter that coats axons (the neuron extensions that send signals to other neurons throughout the body). Myelin sheaths, which are produced by specialized glial cells in the CNS called oligodendrocytes, facilitate rapid transmission of impulses along the axons. When degeneration of the myelin sheath occurs, nerve impulses are slowed drastically, preventing the CNS from functioning normally. Myelin repair, known as remyelination, can protect axons from permanent damage and allow recovery of signal transmission along surviving axons.



Armstrong's team has put into play a research program that manipulates neuroreceptors for various growth factors that direct neural cells to grow, with the aim of repairing damaged nerves. In conjunction with this neural regeneration project, Armstrong's team also is studying how to promote remyelination of damaged neurons. Both of these projects focus on how to project nerves and to assist nerves' responses to injury.

Saving Lives on the Battlefield

Historically, 20 percent of soldiers who sustained a battlefield injury to a major artery died because of hemorrhage within 30 minutes, while waiting for help to arrive. QuikClot®, a hemorrhage control agent manufactured by Z-Medica Corporation, has played a key role in efforts to minimize casualties in the Iraq conflict. The University's Department of Surgery conducted tests that helped lead to the approval of QuikClot by the Food and Drug Administration. They also consulted with military officials before they adopted the product for use in combat.

Now, all Marines' first-aid kits include a small pouch of QuikClot, which they can either self-administer or use on fellow personnel. They simply pour QuikClot on the open wound and apply compression. The minerals absorb the fluids in and around the wound, thus concentrating the body's own natural clotting agents and effectively sealing the wound until the Marine can be evacuated to a hospital.



Determining How Brain Trauma Can Lead to Seizures

Brain trauma—as a result of head injury, infection or neurodegenerative disease—can have numerous and far-reaching effects. One of these is seizures, which are potentially dangerous and can be difficult to control with the current arsenal of drug therapies. No drugs are available to prevent epileptogenesis—the process through which a normal brain becomes chronically prone to seizures.

Sue Bausch, Ph.D., Assistant Professor in the Department of Pharmacology, has both Congressional and NIH funding to discern how an otherwise normal brain becomes “rewired” during epileptogenesis. She also is examining how several drugs affect these changes.

Bausch and her team use epilepsy models to examine changes in the brain and to test a full range of drugs that target the N-methyl-D-aspartic acid receptor, which plays a role in the pathogenesis of epilepsy. The researchers are compiling data on

whether and how each of these drugs affects brain connections and impacts seizures, as well as their long-term effects.

For some drugs, the issues that Bausch and her colleagues are investigating have not been explored previously. The research will provide a clearer picture of the benefits and drawbacks of these therapies, and could lead to different or expanded uses of the drugs. In turn, this could enable improved therapies not only for epilepsy, but also for other neurological conditions, resulting in better care for service members and their dependents.



“The noncompetitive, congenial atmosphere among the students has really impressed me. The faculty and staff also really care about the students and support us in so many ways. All of this is a pleasant change from what I found when I was looking at other medical schools.”

—Shana Miles, M.D./Ph.D. student

U.S. Military Cancer Institute

The University’s U.S. Military Cancer Institute (USMCI) is a tri-service program that aims to identify incidence patterns of cancer in the military. In addition, the Institute also coordinates and supports multi-institutional cancer research within the DoD.

USMCI has several initiatives underway including a new BioSpecimen Network and a Tissue Microarray Core facility. When it opens in 2011, the new Walter Reed National Military Medical Center will serve as the USMCI Clinical Research Cancer Center, and as the focal point for cancer research in the military.

The Institute operates with Congressional funding and is a collaborative effort among Walter Reed Army Medical Center, the National Naval Medical Center, the Armed Forces Institute of Pathology and the Henry M. Jackson Foundation for the Advancement of Military Medicine. The scientific team also is expanding its collaboration with the National Cancer Institute.



Innovative Approaches to E. Coli and Anthrax Research

Alison O'Brien, Ph.D., Professor and Chair of the Department of Microbiology and Immunology, has spent most of the last two decades researching a highly potent strain of *E. coli* called enterohemorrhagic *E. coli* (EHEC). O'Brien is credited with several seminal studies on the biology and pathogenicity of EHEC. Along with her team of USU researchers, she is developing new technologies to identify, prevent and treat this food-borne pathogen.

O'Brien's NIH-supported research includes developing an edible plant-based vaccine for young cattle that would prevent many human infections associated with under-cooked hamburger meat. Her laboratory also developed a second plant-based oral vaccine that confers protection in mice against lethal systemic intoxication, a consequence of EHEC infection. The results of this study were published in the May 2006 issue of the *Proceedings of the National Academy of Sciences*.

O'Brien developed a patented technology resulting in a diagnostic test for EHEC that is

awaiting FDA approval. Related technology that encompasses therapeutic antibodies for treating EHEC-related infection in humans also has been licensed. The resulting products have been granted both Orphan Drug Status and Fast Track designation for the treatment of Hemolytic Uremic Syndrome. Clinical trials for these products are being conducted in the U.S. for the treatment of Shiga toxin-producing *E. coli* infections.

In another area of research, O'Brien is working with Army and Navy scientists to develop a vaccine that would serve as a short-term preventive and therapeutic agent for anthrax. In 2006, O'Brien was named co-principal investigator of the Middle Atlantic Regional Center of Excellence for Biodefense and Emerging Infectious Diseases Research (MARCE). Her team was selected to join the MARCE in 2003, when it was established. They were also recently selected as the Toxin Quality Control center for the NIH Biodefense and Emerging Infections Research Resources Program in coordination with the American Type Culture Collection.



Alison O'Brien, Ph.D., is Professor and Chair of the Department of Microbiology and Immunology. She was instrumental in founding the University's Emerging Infectious Disease Graduate Program—one of the first such programs in the country.

O'Brien has published more than 170 articles on her work, and has served as the Editor-in-Chief of *Infection and Immunity*, the American Society for Microbiology journal, since 1999. She is the president of the Association of Medical Microbiology and Immunology Chairs, and has been a member of advisory panels for the National Institute of Allergy and Infectious Diseases, the Food and Drug Administration and the U.S. Department of Agriculture.



"I came to USU to be part of something bigger than just medicine by serving my country. I love the atmosphere here and everyone—students and faculty—helps each other. There is a real spirit of cooperation and support."

—Ensign Michael Cunningham (right), class of 2009

"In the three decades since its inception, USU has experienced remarkable growth and development.

What began, jointly with the Armed Forces Health Professions Scholarship Program, as an incentive for the accession of physicians to the military services, has matured into an extraordinary institution that excels as an academic core for military medicine.

—Vice Admiral (Ret.) James Zimble, M.D., USU President Emeritus, former Navy Surgeon General

Defending Against Emerging Biological Threats

The threat of international bioterrorism has grown in recent years. Subsequently, military scientists and their civilian colleagues have stepped up efforts to create vaccines and therapies for a full range of biological agents to protect the health of both service members and civilians.

Two category C agents—emerging infectious pathogens that could be engineered for use as bioweapons—are a primary area of study for USU researcher and immunology and microbiology Professor Christopher C. Broder, Ph.D. He and his team are among only a handful of scientists focused on the Nipah and Hendra viruses. Broder is a principal investigator on one of six projects from the Middle Atlantic Regional Center of Excellence for Biodefense and Emerging Infectious

Diseases, and has three additional National Institute of Allergy and Infectious Diseases grants aimed at developing vaccines and therapeutics for these agents.

Broder and his NIH-funded team of researchers and investigators have developed several vaccine candidates and products that could be used as pre- or post-exposure measures for infection by Hendra and Nipah. One vaccine, composed of a component of the virus particle known as the G glycoprotein, demonstrated complete protection from infection by Nipah in early-stage testing. In addition, Broder's lab, in collaboration with the Australian Animal Health Laboratory and the National Cancer Institute, isolated the receptor for the viruses—a cell surface protein called Ephrin-B2.

Science Watch recognized

Christopher C. Broder,

Ph.D., as one of the top 20

most cited researchers in

microbiology from January

1995 through August 2005.

Research Targets Parasite That Threatens Deployed Troops

U.S. troops deployed throughout the world face not only threats to their safety, but also to their health. This is often the case when our forces are deployed to developing nations and tropical zones that harbor organisms not found in the U.S.

One such threat is schistosomiasis, which infects roughly 200 million people worldwide. The disease, which is caused by parasitic worms, is difficult to detect and treat. The parasites have been known to avoid destruction by the host's immune system for decades. Though schistosomiasis is not found in the U.S., it has been frequently diagnosed in personnel deployed to endemic areas, such as Southeast Asia and sub-Saharan Africa. The disease is particularly relevant to the current conflict because it is endemic to the population in Iraq.

Stephen Davies, B.V.Sc., Ph.D., an Assistant Professor in the Department of Microbiology and Immunology, is focusing his scientific investigations on the elusive disease for which there is no vaccine and, currently, only one approved therapeutic agent. With some early evidence that the parasites are starting to develop resistance to the drug, research into new treatments is crucial.

Scientific evidence shows that schistosomes need the human immune system to thrive. Funded by grants from the NIH, Davies and his USU team are examining the relationship between the parasite and its host, searching for pathway inhibitors that could stifle parasitic development.



Understanding and Treating Traumatic Stress

USU's Department of Psychiatry and its DoD-funded Center for the Study of Traumatic Stress (CSTS) advance the understanding of the psychological and health consequences of trauma for the benefit of military and civilian populations. Faculty and staff conduct neuroscience research on trauma and translational research on traumatic stress response from the cellular to the societal level to inform disaster planning, response and recovery.

The Department of Psychiatry and CSTS, under the leadership of internationally renowned clinician, researcher and Chair of the Department of Psychiatry Robert J. Ursano, M.D., play a central role in understanding and shaping the military's response to the mental health aspects of disaster, war and terrorism.

Military Response to Disaster, War and Terrorism

CSTS scientists established a surveillance program to monitor and assess the physical and mental health of American troops injured during the conflicts in Afghanistan and Iraq. Early data have shown that mental health problems worsen over time in a significant portion of these service members, and that such problems are closely linked with impairment in function. Physical pain and injury also are closely linked and predict mental health problems. This research will shape interventions to help troops recover.

Preparing Future Practitioners

USU students are trained on principles of combat and operational psychiatry. Through a multi-year curriculum focusing on

application of the biopsychosocial model to general psychiatric patient care in military-unique environments, students are prepared to address mental health issues among service members and their families. They also receive training on the management of mental health response in the aftermath of mass violence or destruction, when resources often are scarce. Medical student curriculum culminates in the field training exercise Operation Bushmaster, where students apply their knowledge in simulated operational stress and psychiatric cases.

Disaster Assistance and Consultation

In the wake of the Asian tsunami, the CSTS worked closely with the U.S. Centers for Disease Control and Prevention to provide critical information and consultation. After Hurricane Katrina, Houston officials enlisted the Center's help to better understand and respond to the psychological and health needs of survivors. The Substance Abuse and Mental Health Service Administration requested the Center's expertise to assist their own personnel returning from Hurricane Katrina-related deployments.



Robert J. Ursano, M.D.

Deployment Health Clinical Center

The Department of Psychiatry and the CSTS are engaged in an active partnership with the DoD's Deployment Health Clinical Center (DHCC) at Walter Reed Army Medical Center. Colonel Charles Engel, M.D., a Senior Scientist at the CSTS and the Director of the DHCC, was the lead investigator on a USU collaborative effort to study web-based education for primary care providers working with soldiers with PTSD.

Lieutenant Colonel Karen Peterson, M.D., is an Assistant Professor in the Department of Psychiatry, and also works with the Center for the Study of Traumatic Stress. She is a graduate of the USU class of 1993.

"I entered USU with no prior military experience. I believe my leadership training at USU helped me a great deal with the pressure I experienced and great responsibility I held at my first duty assignment in Japan, and beyond. I have deployed to Kuwait and Afghanistan, both times working as part of a combat stress team that traveled extensively. The military training I gained at USU, along with my experience at Operation Bushmaster, were key to my success in these roles."





Advancing Disaster Response and Recovery

With increasing frequency, the U.S. military is called upon to support both domestic and international disaster response and other humanitarian assistance efforts. The focus of these efforts is often on the provision of medical and health care in austere environments.

The Center for Disaster and Humanitarian Assistance Medicine (CDHAM), established in 1998 within the University's Department of Military and Emergency Medicine, advances the understanding and delivery of disaster medical care and humanitarian assistance worldwide. It serves as a central resource for the DoD, other government agencies and international partners.

CDHAM's staff has knowledge and expertise in a broad range of issues, and its academic setting enables a multidisciplinary approach to disaster mitigation. The University's faculty includes recognized experts in the fields of emergency medicine, psychiatry and preventive medicine who work in close collaboration with CDHAM.

The Center is engaged in a diverse range of health-related activities around the globe. For example, CDHAM is working with the U.S.

Southern Command to establish a sustainable HIV/AIDS prevention program for select Caribbean defense forces in seven countries. Specifically, CDHAM staff helps host countries to develop educational programs and provides Continuing Medical Education credits to local health personnel.

Additionally, the Center's staff is working with the government of Chad to develop a landmine assistance program that will help government and military forces provide quality care to victims of landmines. This type of educational program can serve as a model in countries where the health infrastructure is inadequate.

Recently, CDHAM began supporting the Global Emerging Infections Surveillance and Response System as part of an avian influenza initiative. The Center serves as a central resource for commanders in the field to help them prepare for pandemic influenza and other emerging infectious diseases.



USU graduate Commander Sarah Linde-Feucht, M.D., class of 1992, is a medical officer in the Office of Orphan Products Development at the FDA. She was part of an early-response team dispatched to Baton Rouge, Louisiana, to provide critical services in the aftermath of Hurricane Katrina. Her team helped the Louisiana state health department erect a 200-bed field hospital on a local gymnasium floor. The team worked with local volunteers, as well as trained responders from other states, to organize a small hospital, including a working pharmacy.

"My experience as a USU student was superb. Not only did we learn the usual and customary medical school courses, we were

also afforded the opportunity to learn above and beyond what most students learn at civilian schools... The faculty, in addition to being leaders in their fields, were dedicated and student oriented.

"...Principles of triage, doing more with less and being able to solve problems quickly and creatively were valuable skills I developed at USU. As a senior officer who now leads teams of other PHS officers on deployment to emergencies, such as Hurricane Katrina, USU prepared me well for...bringing in different teams of people and getting them to work together."

Advancing the Detection and Treatment of Prostate Cancer

According to incidence statistics, in just over a decade, more than 11,000 men in the DoD system have been diagnosed with prostate cancer. The Center for Prostate Disease Research (CPDR) has grown into a leading clinical and research center. Based at the University and led by Colonel (Ret.) David McLeod, M.D., J.D., CPDR Director and Professor in the Department of Surgery, the program is key to the military's and the country's efforts to fight the disease.

CPDR, which operates with both Congressional and NIH funding, has been responsible for a number of critical advances in prostate disease research. Last year, CPDR entered into a collaborative agreement with a private company to develop a more effective blood test to detect prostate cancer, and to distinguish between indolent and aggressive forms of the disease. CPDR research also is the focus of license agreements that could lead to a new diagnostic test for prostate cancer. Under the agreements, the Center's patented panel of cancer markers will be used to develop and commercialize a diagnostic test.

Among their many other accomplishments, a multi-disciplinary team of researchers led by Shiv Srivastava, Ph.D., CPDR Co-director and Associate Professor in the Department of Surgery, reported discovery of the common overexpression of the ETS-Related Gene (ERG) in prostate cancer in the journal *Oncogene*. The study showed ERG expression alterations in a large fraction of prostate cancer cells. The team revealed that certain features of



Colonel (Ret.) David McLeod, M.D., J.D., (left)
and Shiv Srivastava, Ph.D. (right)

ERG expression have potential as diagnostic and prognostic biomarkers. CPDR's original discovery was recognized in *Science*.

The Center's work is emblematic of the collaborative, multifaceted research conducted by many USU investigators. Their recent discovery was the result of a highly coordinated effort by urologists, pathologists and cancer biologists from USU, Walter Reed Army Medical Center, the Armed Forces Institute of Pathology, Walter Reed Army Institute of Research and the National Human Genome Research Institute.

Infectious Disease Research

The Infectious Disease Clinical Research Program (IDCRP) is a major new initiative at USU. A collaborative effort with the National Institute of Allergy and Infectious Diseases (NIAID), the goal of the program is to strengthen the U.S. Government's ability to conduct targeted infectious disease clinical research. The program aims to build capacity, expertise and productivity in U.S. military medical departments and at NIAID.

Headed by Captain Gerald Quinnan, Jr., USPHS, M.D., Professor and Chair of USU's Department of Preventive Medicine and Biometrics, the program capitalizes on resources centered at the University and the NIH. The effort will encompass USU scientists, military clinicians, research support personnel from the Henry M. Jackson Foundation for the Advancement of Military Medicine, DoD medical treatment facilities and laboratories in the U.S. and overseas and NIAID research and research support activities.

This cooperative relationship will leverage the DoD's extensive health care and research infrastructure to foster progress in fighting new health challenges such as emerging infectious diseases, combat-related infections, multi-drug resistant pathogens and HIV. A training component of this program will increase and strengthen clinicians' abilities to conduct quality research. IDCRP will develop a new clinical research degree program at USU to address this need.



The Center's goal is to reduce and eventually eliminate health disparities in minority and underserved populations, utilizing a full spectrum of innovative strategies and techniques.



Battling the Multiple Causes of Health Disparities

The USU Center for Health Disparities Research and Education takes a multifaceted approach to reducing disproportionately high rates of health risks and disease among racial and ethnic minorities. Funded by the NIH through a grant from the National Center for Minority Health and Health Disparities, and headed by Richard Tanenbaum, Ph.D., an Assistant Professor in the Department of Medical and Clinical Psychology, the program works in partnership with the University of Maryland, Eastern Shore, towards its far-reaching goals.

The Center's efforts are centered on four key components—research, minority health and health disparity education, minority student training and community outreach/information dissemination. The program's research efforts are based primarily in USU's Department of Medical and Clinical Psychology, where researchers are examining the role of behavior in physical and mental health.

Two of the Center's core objectives are to disseminate critical information about health disparities and teach practical skills to improve future healthcare practitioners' cultural competencies. The program infuses cultural sensitivity and awareness training modules into the existing university curriculum, and provides similar instruction with students and practitioners within the community and at other military treatment facilities. In addition, the Center runs a summer internship program for minority high school, college and graduate school students who wish to pursue careers in medicine, other health care professions or biomedical research.

Among their many other efforts, Center staff are utilizing a wide variety of approaches, from traditional methods to psychodrama, to reach out to local minority populations. The goal is to involve community members in research and training opportunities and to educate them about health disparities, teaching individuals—professional and lay persons—how they can play a role in reducing them.

Lauren Hill, Ph.D., is the Director of the Minority Health and Health Disparities Education Core of the USU Center for Health Disparities Research and Education, and is a Research Assistant Professor of

medical and clinical psychology and a Research Assistant Professor of family medicine. She has played a critical role in infusing cultural competency training into the medical school curriculum.

HIV Vaccine Research

A team of USU researchers, headed by Public Health Service officer Captain Gerald Quinnan, Jr., M.D., Professor and Chair of USU's Department of Preventive Medicine and Biometrics, and including Christopher Broder, Ph.D., a Professor in the Department of Microbiology and Immunology, have been leading an effort to produce an HIV vaccine that would induce broadly cross-reactive neutralizing antibodies. The researchers believe this could be a critical step towards creating an effective vaccine to protect people from this deadly threat. The team has shown this approach to be effective in early studies, and reported results in the *Journal of Virology* demonstrating

the efficacy of such neutralizing antibody responses in protecting rhesus monkeys from experimental challenge with recombinant SHIV.

The global HIV epidemic comprises multiple subtypes (or strains) and inter-subtype recombinant forms, each with distinct geographic distribution. An effective HIV vaccine would have to protect against multiple strains of the disease. This is the first study to date demonstrating protection, in non-human primates, from one strain of the virus with a challenge from another strain.

Overcoming Multidrug Resistance

Although the advent of chemotherapy has revolutionized the treatment of cancer and microbial infections, its success is challenged by the occurrence of drug resistance and reduced bioavailability of therapeutic agents. Among the physiological and cellular factors that diminish the therapeutic effectiveness of many drugs, the role of human P-glycoprotein, or Pgp, (product of the human MDR1 gene) represents the most widely documented phenomenon.

Pgp is a plasma membrane protein that utilizes cellular energy to transport structurally unrelated hydrophobic drugs out of the cells. These compounds include many anti-cancer agents, such as paclitaxel, and anti-HIV drugs, such as HIV protease inhibitors.

A considerable effort is underway to identify and develop pharmacological agents that will inactivate Pgp function and improve therapeutic outcomes of anticancer and antimicrobial agents. In an NIH-funded research endeavor, Saibal Dey, Ph.D., an Associate Professor in the Department of Biochemistry, and his colleagues at USU are working to find an “Achilles heel” in the protein that can be pharmacologically exploited to block drug transport. Using biochemistry and molecular biology, they are identifying and dissecting the interaction sites for Pgp inhibitors



Saibal Dey, Ph.D.

and understanding how these interactions lead to transport blockage.

USU researchers have identified a region in the protein with which a certain class of Pgp inhibitor interacts and shuts off drug transport. Successful inhibition of Pgp function *in vivo* will not only help overcome the problem of multidrug resistance in treating malignancy and microbial infections, but also will improve the effectiveness of many therapeutic agents whose physiological fates are otherwise compromised by the action of Pgp.



Developing More Effective Vaccines

Vaccines are among the most important advances in modern medical history. They have eliminated smallpox, nearly eradicated polio and spared countless people from measles, tetanus and hepatitis A and B, as well as other dangerous infections.

Scientists at USU's NIH-funded Institute for Vaccine Research (IVR), led by Clifford M. Snapper, M.D., a Professor in the Department of Pathology, seek to improve vaccine technologies. Snapper and his team aim to increase the potency of current vaccines designed to stimulate antibody production through a variety of adjuvanting and immune cell targeting strategies. In so doing, the amount of vaccine necessary per immunization and the number of immunizations can be reduced, along with the ability to induce higher protective antibody titers. The IVR's staff approach this task from a basic immunologic perspective, looking for clinical applications that derive from basic immunologic insights.

One focus of their research is conjugate vaccines, which allow for effective immunization in infants. They may have identified a new carrier for conjugates, which could be used to deliver more powerful signals to the B cell. This could increase the potency of the conjugate vaccine, which is one of their major goals. Recently, Snapper and his team began working with Navy researchers on maximizing the effectiveness of DNA vaccines for Dengue fever.

These advances in vaccine technologies have the potential to improve health outcomes for a wide variety of infectious diseases.

Preventing Death from Cardiac Arrest

Roughly 250,000 to 350,000 people in the United States suffer cardiac arrest every year. Faculty members in USU's Department of Medicine are working in collaboration with scientists at the University of Rochester to improve physicians' abilities to identify those patients at the highest and lowest risks for sudden cardiac death, the most common cause of death in the United States.

Mark Haigney, M.D., an Associate Professor in the Department of Medicine whose work has been funded in part by the American Heart Association, collaborated on a five-year study designed to evaluate the effect of an implantable defibrillator on survival in high-risk heart attack patients. The device, which was brought to public

attention after Vice President Dick Cheney had one implanted, is designed to monitor electrical signals in the heart and check for abnormal heartbeats. During a cardiac event, the implantable cardioverter defibrillator (ICD) immediately shocks the heart, sending it back into a normal rhythm.

The initial study found that patients who had previously suffered a heart attack and who had significantly reduced heart function had a greater chance of surviving cardiac arrest if they had been given an ICD. Haigney found that subjects with an increased level of variability in the electrocardiogram had more than a two-fold likelihood of receiving an appropriate therapy from the device in the form of a shock or rapid stimulation to terminate a life-threatening electrical disorder. This predictive performance was significantly



better than that of either echocardiography or invasive electrophysiologic stimulation, the former "gold standards" for predicting sudden death. Haigney is participating in a second multicenter, NIH-funded study intended to validate previous findings and develop new strategies.



"After completing six years as a family nurse practitioner, I know that coming to USU was the right choice. The atmosphere, the curriculum and the training better prepared me in my role as a provider and military officer... We were trained for excellence in clinical practice, management, research and leadership."

—Major Sandra McNaughton, C.F.N.P., class of 2000 and USU Assistant Professor and Deputy Director of the Nurse Practitioner Program

From Scientific Discovery to Improved Patient Care

Through an active technology transfer program, the University's Joint Office of Technology Transfer (JOTT) facilitates private-public partnerships to move USU discoveries to the marketplace. The JOTT is a collaboration with the Henry M. Jackson Foundation for the Advancement of Military Medicine, which offers marketing support and negotiates licensing on behalf of investigators. These collaborative relationships not only accelerate the development of promising medical technologies, but also help to ensure that publicly funded research results are made available to benefit humankind.



Armed Forces Radiobiology Research Institute

The military looks to AFRRRI for the latest information and research to preserve the health and performance of our forces in the face of extraordinary threats on and off the battlefield.



Given the increased activity of terrorist organizations around the world, it is imperative that the military and the medical community are prepared for the threat of nuclear or radiological attack. The Armed Forces Radiobiology Research Institute (AFRRRI) is a component of the University, and provides unique expertise and capabilities. Researchers there are working on novel assessment and treatment technologies to protect both military and civilian populations.

Assessing Exposure Levels

A nuclear or radiological attack could result in mass casualties and would likely cause a range of acute and long-term health consequences. Research conducted at AFRRRI is improving our ability to rapidly assess an individual's exposure to radiation.

Scientists at AFRRRI are creating new approaches to classical biodosimetry, which is based on cytogenetic damage, for casualty triage soon after exposure. One area of study focuses on developing dose-assessment assays that use transportable equipment to test easily obtained samples, such as hair, urine or a drop of blood. Utilizing innovative approaches, they also are improving the accuracy, dose range, ease of use and speed of biodosimetry.

New Measures Combat Radiation Exposure

AFRRRI researchers, in collaboration with private industry and the Henry M. Jackson Foundation for the Advancement of Military Medicine, are investigating treatment options to protect both service members and civilians in a variety of radiation exposure scenarios. Using their understanding of the mechanisms of radiation damage, AFRRRI scientists are pursuing new and improved pharmacological

approaches to prevent the health-degrading and potentially life-threatening effects of ionizing radiation. Making use of novel cellular and molecular approaches and complex physiological systems, the researchers are working to move these potentially life-saving drugs from discovery through the FDA approval process.

Evaluating Military Health Risks

To ensure the health of our service members, AFRRRI scientists established a new approach to assessing the potential health effects of militarily relevant metals that may become embedded as shrapnel. Researchers evaluate the acute and long-term health risks of metals, such as depleted uranium and tungsten alloys, and they explore potential treatments for any adverse effects.

Accurate casualty prediction models enable effective command decisions and force structure planning. AFRRRI provides researchers who design such models with the necessary understanding of what can be expected when a radiological injury is combined with other battlefield challenges, such as trauma, disease and chemical exposures.



A Worldwide Resource

In collaborations with the international scientific community, AFRRI acts as a catalyst to publish medical and technical information based on data from nuclear accidents or incidents in other countries, including those in states of the former Soviet Union.

The benefits of these efforts are far reaching. Such information can be used to direct rescue operations, including those resulting from terrorist actions or industrial nuclear accidents. It also is pertinent to astronauts exposed to space radiation.

AFRRI's sources provide scientists with a variety of radiations, energies and dose rates. A medium-sized research reactor, a high-energy irradiation facility and a low-level irradiation facility are licensed by the Nuclear Regulatory Commission.

Providing Education on Medical Effects of Ionizing Radiation

AFRRI's Military Medical Operations group supports the Armed Services by providing medical and operational personnel with up-to-date information concerning the biomedical consequences of radiation exposure, how the effects can be reduced and how to manage casualties. Students receive a unique education on the hazards of ionizing radiation, radiation pathology, human exposure resulting from radiation accidents, consequences of nuclear weapons detonation and nuclear accident response by government organizations.



The Medical Effects of Ionizing Radiation course is the most comprehensive training available on this topic, and is the only graduate-level course in the DoD for training healthcare professionals in the management of uncontrolled ionizing radiation exposure.



Pataje Prasanna, Ph.D., Assistant Professor in the University's new Radiation Biology Department, and his colleagues in AFRRI's cytogenetic biodosimetry laboratory have established a method that allows them to rapidly process a large number of blood samples for radiation dose assessment. Specifically, they measure radiation-induced chromosomal aberrations in an automated laboratory environment. The sample processing throughput is augmented significantly by the use of robotic equipment and a laboratory information management system. This timely information can be used for clinical triage decisions for radiation-exposed individuals.

The National Institute of Allergy and Infectious Diseases, NIH, is funding this AFRRI-led development effort. In related studies, Prasanna's laboratory developed and patented a new clinical bioassay that enables rapid assessment of radiation exposure because it does not require the culturing of blood cells.

"At AFRRI, we have expertise in radiation biology and related fields, along with comprehensive facilities to address research, development and technology transfer needs."

*—Pataje Prasanna, Ph.D.,
Research Biologist, Armed Forces
Radiobiology Research Institute and
Assistant Professor, Department of
Radiation Biology, School of Medicine*



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"The University's quality of education and caliber of graduates has made it a model for military medical education throughout the three services and beyond."

*—Lieutenant General (Ret.) Ronald R. Blanck, D.O.,
former Army Surgeon General and President Emeritus
of the University of North Texas Health Science Center*



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