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The Division of Trauma and Critical Care

University Hospital is the only verified adult Level 1 Trauma Center serving Southwestern Ohio, Eastern Indiana and Northern Kentucky. The Trauma Center has been in operation for over 20 years, and the current referral area encompasses almost 2 million people.

The Trauma Surgery Service has experienced sustained growth in admissions over each of the past five years. In 2007, the

service had a 4% increase in patients over 2006. Over 1,820 patients were evaluated by the Trauma Surgery Service, with 1,156 admissions to University Hospital.

The Division of Trauma and Critical Care continues to be a regional leader in patient care, education and research.

Patient Care

The Trauma Center treats injuries typically seen in a large urban setting. Approximately 78% of the injuries are from blunt force mechanisms and 22% are penetrating injuries. Patients are cared for by a multidisciplinary team of surgeons, nurses, respiratory therapists, physical therapists, physician's assistants, pharmacists, and social workers. This multidisciplinary team provides a continuum of care with the goal of returning the patient to the previous level of health as rapidly as possible.

Our commitment to patient care extends beyond the Tri-State area as the Division continues its collaboration with the United States Air Force. University Hospital serves as one of the nation's three Air Force Centers for the Sustainment of Trauma and Readiness Skills (C-STARS) training. During the previous calendar year, this unique process has provided specialized training to over 200 members of the Air Force's elite Critical Care Air Transport Teams. These CCATT personnel go on to serve in Iraq, Afghanistan and other locations around the world. In fact, the CCATT group responsible for transporting

ABC News reporter Bob Woodruff to safety when he was injured in Iraq received their training at the C-STARS Cincinnati facility. Mr. Woodruff returned to Cincinnati in March 2008 to participate in a fund-raising event for the Drake Hospital, where trauma patients and others receive physical therapy and rehabilitation care.

Community Connections

An important part of patient care is not only treating injuries, but also helping to prevent them. To this end, Division members actively promote trauma prevention and education. The hospital-based violence intervention initiative, "Out of the Crossfire," recently marked its first anniversary by noting that, according to police statistics, there has been less gun violence in the city and a decreased recidivism rate. Employment readiness has increased among those who have been discharged from the hospital due to penetrating trauma. There has also been an increase in client responsibility for themselves, their families and communities. Some clients have been helping to mentor other clients, child support is being paid, and many clients are either completing their high school educations or pursuing advanced studies. The program is receiving regional and national recognition from several sources. Office space has been acquired at the hospital for interns and volunteers. In January 2008, Out of the Crossfire's Executive Director, Jennifer Williams, Ed.D., was presented with a Martin Luther King, Jr. Scholarship as part of the College of Medicine's annual "Living the Dream" celebration.

Dr. Jay Johannigman was named to the Board of Directors of the Charitable Pharmacy for the Society of St. Vincent de Paul. This is the only pharmacy in Southwest Ohio which provides free medications and professional pharmaceutical care to low-income patients in Butler, Clermont, Hamilton and Warren counties.

The Division members once again "adopted" an inner-city classroom for the holidays and used contributions to buy school supplies, winter coats, and other gifts for needy children. Dr. Kenneth Davis, Jr. and Richard Branson, RRT, visited the school for a small party and gift presentation just before the students' holiday break.

Dr. Davis was recognized for his work with the Cincinnati Health Improvement Collaborative with a Volunteer Leadership Award, presented in November 2007 during the organization's annual banquet. Dr. Davis is working to recruit minority physicians to the Cincinnati area and regularly visits local schools to encourage minority students to pursue careers in medicine.

The Division's interest in helping others extends beyond the Cincinnati area at times, and this year was no exception. In October 2007, Dr. Timothy Pritts, along with a group of fellow UC surgeons and residents, joined in the American College of Surgeons' "Operation Giving Back" to help re-build a medical clinic in New Orleans after the city was devastated by Hurricane Katrina.



Education

The Division of Trauma and Critical Care considers education a vital component of its mission. Division members are frequently invited to speak at regional and national conferences, and they are regularly involved in educating UC's medical students, surgical residents, fellows and other health care providers. The weekly Trauma Conference, featuring multidisciplinary case studies and discussion, remains a popular learning venue for resident house staff from many departments. Rotations in the Surgical Intensive Care Unit and with the Trauma Surgery Service allow residents from multiple specialties and institutions to learn more about caring for critically ill and injured patients. All Division Faculty are active instructors for the American College of Surgeons Advanced Trauma Life Support (ATLS) course.

There were four ATLS classes offered locally this year. These classes, coordinated by Jenny Lemmink, RN, successfully trained 14 auditors and 59 physician providers, with 19 physicians receiving refresher training. The hospital's Trauma Nursing Core Course (TNCC) trained 88 RNs as providers, with 8 nurses receiving refresher training.

Dr. Timothy Pritts has been appointed Director of the Department of Surgery's Division of Education. Dr. Pritts is also continuing his work as an attending physician/surgeon in the Division of Trauma and Critical Care, in addition to conducting research.

During the 2007 Medical Student Summer Research Program, Division faculty worked closely with Heather Finlay-Morreale on her study of the relationships between women victims of gun violence and their attackers. This research was presented at the annual Western Trauma Association meeting in California in February 2008. Ms. Finlay-Morreale also visited Ghana to study trauma and critical care provisions in an African teaching hospital, where she gained valuable insights into the link between poverty and the quality of health care. These experiences moved her to establish a local chapter of the Physicians for Human Rights Asylum Network, a Nobel-Prize winning organization dedicated to helping asylum seekers who have suffered torture or abuse in their native countries.



Surgical Critical Care Fellowship

The Surgical Critical Care Fellowship encompasses all aspects of care within the Surgical Intensive Care Unit (SICU), with a strong emphasis on cardiopulmonary mechanics, principles of resuscitation and mechanical ventilation. The fellowship program was granted Continued Full Accreditation for five years, with no citations or recommendations, after the 2004 review by the Residency Review Committee of the Accreditation Council for Graduate Medical Education. In addition, a commendation was given to "the program director, faculty, and institution for the quality of the educational program." The next ACGME site visit is scheduled for 2009. The Division currently supports two fellows; both a one-year clinical track and a two-year academic clinical scientist track are available. Program graduates are currently providing academic and clinical leadership in the trauma and critical care communities throughout the United States.

The SICU capacity is currently 24 adult beds. Following a year-long renovation, the SICU will expand to 34 beds, which will further enrich the educational experiences of fellows and residents. In addition, the fellowship provides rotations in the Neurosurgical ICU (20 beds), Anesthesia and Trauma. The Division also collaborates with Cincinnati Children's Hospital Medical Center to provide our fellows with rotations in Pediatric Critical Care. Elective rotations are also available.

Our current surgical critical care fellows are Drs. Rachael Callcut and Rachel Hight.

Rachael A. Callcut, MD, received her undergraduate degree from Case Western Reserve University in Cleveland and her Doctor of Medicine degree from the University of Cincinnati. Dr. Callcut completed her general surgery residency at the University of Wisconsin-Madison, where she also earned a Master of Science degree in Population Health.

Major Rachel Hight, MD, is on active duty with the United States Air Force. She received her undergraduate degree from the USAF Academy in Colorado and her Doctor of Medicine degree from the Uniformed Services University of the Health Sciences in Bethesda, Maryland. Dr. Hight completed her general surgery residency at Keesler Air Force Base in Mississippi. She became a critical care fellow after completing two years as Chief of General Surgery at Aviano Air Force Base in Italy.

C-STARS

The Center for Sustainment of Trauma and Readiness Skills (C-STARS) provides training for military personnel who must remain skilled in the care of injured and critically ill patients. The Cincinnati C-STARS program has been identified as the training platform for all Air Force Critical Care Air Transport Teams (CCATTs). The Center is staffed by active duty military personnel, including Colonel Warren Dorlac, MD, Director; Major Robert Peron, RN, Deputy Director; Colonel Gina Dorlac, MD; Lieutenant Colonel Todd Carter, MD; and Senior Master Sergeant Dario Rodriguez, RRT.

Colonel Warren Dorlac, MD, joined the C-STARS team as Director in 2007. Prior to this assignment, he was the Director of Trauma Services at Landstuhl Army Regional Medical Center in Germany. He is the General Surgery Consultant to the US Air Force Surgeon General. Dr. Dorlac is also active in trauma research and was named to the Program Committee for the annual Trauma, Critical Care and Acute Care Surgery Convention, which was held in Las Vegas in March 2008.

Dr. (Major) Stephen Barnes of the C-STARS team was honored with the Educator Innovator Award by Medical Education Technologies in March 2008. This award recognizes his work in developing the high-tech simulation system known as METI. The METI simulates conditions on a medical aircraft transporting wounded personnel from the battlefield to the nearest treatment facility. It is a vital component in providing CCATTs with the technical skills needed to treat patients under stressful conditions. Dr. Barnes was also named the Air Force Materiel Command Researcher of the Year for his work. He will be retiring from the USAF this year and has accepted a position with the University of Missouri at Columbia.

Dr. Gina Dorlac was awarded a promotion from Lieutenant Colonel to Colonel in a ceremony conducted at the UC Surgical Amphitheatre in May 2008. She received the US Air Force Materiel Command Clinical Excellence Award as well as the Air Force Medical Services Clinical Excellence Award. She has also been named as Chief Critical Care Consultant to the US Air Force Surgeon General. Dr. Dorlac, a pulmonologist, will be taking an active role in the Division as an attending physician in the Surgical Intensive Care Unit as well as the Neuroscience ICU.

Lieutenant Colonel Todd Carter, MD, joined the Cincinnati C-STARS team this year from Andrews Air Force Base in Maryland. He is the Chief Consultant to the Air Force Surgeon General for Anesthesia and has been active in training US and allied medical personnel both nationally and internationally.

Research

In addition to a rich basic science component, the Division of Trauma and Critical Care currently oversees nearly 20 clinical trials, including studies of sepsis, infectious disease, and respiratory failure. The clinical trials group includes six clinical research personnel and all faculty members.

The Division's Director of Research, Dr. Joseph Solomkin, is an internationally recognized leader in the study of surgical and ICU infections in addition to his years of experience as a critical care physician. This year, he has returned to China in his role as principal investigator of the first double-blind and randomized clinical trial of anti-infective therapy to be performed there. As the Program Director for the NIH-funded trauma training grant, now in its 15th continuous year of funding, Dr. Solomkin is leading a team of surgical residents and other post-doctoral trainees in studying the molecular mechanisms of immunologic and other organ dysfunction following injury.

Dr. Timothy Pritts has become Principal Investigator on a research grant from the Shriners Hospitals for Children. Under this grant, which is funded through December 2010, Dr. Pritts will study the effects of thermal injuries on intestinal, toll-like, receptor-mediated inflammation. Dr. Pritts is also serving as Co-Investigator on another Shriners research grant, the interaction of the MAPK and JAK-STAT pathways in the regulation of the gut inflammatory response after thermal injury. This grant is also funded through December 2010.

Dr. Karyn Butler's research on hypertrophic hearts has not only led to exciting new discoveries but also national recognition. Early in 2008, she found that when the human heart muscle experiences stress (such as reduced blood flow or hypertension), it activates a JAK-STAT molecular pathway that actually helps to condition the muscle and to protect the heart during major stress events such as heart attack. This discovery will be of great value to researchers who are developing drugs that will make use of the protective benefits of the JAK-STAT pathway to help patients survive heart attacks with less damage.

Dr. Betty Tsuei received the 2007 Anthem Hospital Quality Program Meritorious Award for her development and evaluation of a patient-focused sedation protocol in a surgical intensive care unit. This work was also recognized by the Society of Critical Care Medicine, where Dr. Tsuei was named a Research Citation Finalist at the 2008 annual meeting.

Additional clinical research trials in the developmental phases include the use of novel technologies to analyze blood pressure variation as a manifestation of hypovolemic shock. In addition, the Division is undertaking an initial investigation into the safety and efficacy of inhaled aminoglycosides in the management of ventilator-associated pneumonia.

A few of the significant research grants awarded to the Division of Trauma are as follows:

- Clinical Trial of Closed Loop Control of Oxygenation in Mechanically Ventilated Trauma Patients

Office of Naval Research, March 2006 – ongoing

Develop and test an algorithm for autonomous control of inspired oxygen concentration (FIO₂) using continuous pulse oximetry in critically injured trauma patients. This system will prevent hypoxemia while minimizing oxygen use. This technique can eliminate hypoxemia associated with changes in altitude regardless of caregiver skill or proximity.

- Effects of Altitude on the Performance of Oxygen Concentrators

National Space Biomedical Research Initiative, April 2008 – April 2009

Oxygen concentrators utilize a Zeolite membrane and pressure swing absorption to produce 3-5 liters of oxygen from room air using electricity. These devices may have a role in austere environments (space, military operations) where liquid oxygen and compressed gas cylinders are unavailable. This project evaluates the effects of decreased gas density at altitude on concentrator performance.

- Oxygen Utilization in Hypobaric Environments

National Space Biomedical Research Initiative, March 2007 – March 2008

Determine oxygen requirements during the first week of hospitalized patients with illness and or injury most likely to occur in spaceflight. Define oxygen requirements and risk of hypoxemia of critically ill/injured soldiers requiring mechanical ventilation and transport in hypobaric / hypoxic environments.



Trauma, Sepsis and Inflammation Research Group

The Trauma, Sepsis and Inflammation Research Group (TSIRG) is a multidisciplinary research group devoted to delineating the basic mechanisms of the response to injury. TSIRG Director Alex Lentsch, PhD, works with bench scientists, trauma surgeons, respiratory therapists, and basic and clinical research staff. The group's mission is to merge their outstanding clinical and basic science expertise to develop translational research initiatives.

Dr. Lentsch also is the Research Division Director and Vice Chair for Research. His primary research interest is regulation of inflammatory responses by cytokines, chemokines and adhesion molecules. He is also exploring angiogenesis in prostate tumors. Dr. Lentsch has been awarded a five-year renewal of his R01 grant from the National Institutes of Health to study the regulation of liver ischemia/reperfusion injury. He also has an NIH R01 grant to study the effects of aging on the body's response to acute trauma. In addition to his busy research schedule, Dr. Lentsch serves on the Editorial Boards of two scientific journals, *Hepatology* and the *World Journal of Gastroenterology*.

Charles Caldwell, PhD, continues his growing role as an influential leader in the field of white cell function. Over the past year, Dr. Caldwell's laboratory has successfully begun to characterize the white cell response and signaling pathways in traumatized patients. This work has resulted in successful peer-reviewed publications as well as podium presentations.

Faculty

Jay A. Johannigman, MD, FACS

Associate Professor of Surgery
Chief, Division of Trauma and Critical Care

Dr. Johannigman specializes in general surgery, mechanical ventilation, ARDS, mobile medical care for military, disaster preparedness, EMS training, and ATLS education. He is certified by the American Board of Surgery, with Added Qualifications in Surgical Critical Care.

Kenneth Davis, Jr., MD, FACS

Professor of Surgery and Clinical Anesthesia
Assistant Dean for Medical Education
Vice-Chairman for Faculty Development and Diversity

Dr. Davis specializes in mechanical ventilation and ARDS. He is certified by the American Board of Surgery, with Added Qualifications in Surgical Critical Care.

Joseph S. Solomkin, MD, FACS

Professor of Surgery
Director of Research

Dr. Solomkin specializes in surgical infectious diseases, directs the Trauma Training Grant, and serves as medical director of the Trauma Research Group. He is certified by the American Board of Surgery, with Added Qualifications in Surgical Critical Care.

Richard D. Branson, RRT, MS, MBA

Associate Professor of Surgery
Director, Clinical Research

Mr. Branson is a Registered Respiratory Therapist responsible for clinical trials research in the Department of Surgery and critical care research in the Division of Trauma and Critical Care. He specializes in mechanical ventilation of the patient with acute respiratory distress syndrome (ARDS), mechanical ventilation during transport, humidification of inspired gases, and evaluation of new mechanical ventilator technology.

Gina R. Dorlac, MD

Associate Professor of Surgery

Dr. Gina Dorlac specializes in pulmonary and critical care medicine.

Warren C. Dorlac, MD, FACS

Associate Professor of Surgery
Director, C-STARS Cincinnati

Dr. Warren Dorlac specializes in trauma/surgical critical care and military medical education. He is certified in general surgery by the American Board of Surgery with Added Qualifications in Surgical Critical Care.

Alex Lentsch, PhD

Associate Professor of Surgery
Director, Trauma, Sepsis and Inflammation Research Group
Research Division Director
Vice Chair for Research

Dr. Lentsch specializes in regulation of inflammatory responses by cytokines, chemokines and adhesion molecules, as well as the mechanisms governing angiogenesis in prostate tumors. Dr. Lentsch is also the principal investigator on an NIH study on hepatic ischemia/reperfusion-induced lung injury.

Peter Muskat, MD, FACS

Associate Professor of Surgery

Dr. Muskat specializes in the care of injured and critically ill adult patients, surgical education, gastrointestinal and minimally invasive surgery. He is certified by the American Board of Surgery, with Added Qualifications in Surgical Critical Care.

Betty Tsuei, MD, FACS, FCCM

Associate Professor of Surgery
Director, Surgical Intensive Care Unit
Program Director, Surgical Critical Care Fellowship

Dr. Tsuei specializes in the care of injured and critically ill adult patients, with interests in ARDS, sepsis, multi-system organ failure, ventilator mechanics, and surgical education. She is certified in general surgery by the American Board of Surgery with added qualifications in Surgical Critical Care.

Timothy A. Pritts, MD, PhD, FACS

Assistant Professor of Surgery
Director, Division of Surgical Education
Vice Chair, Education
Program Director, Residency Education Program in General Surgery

Dr. Pritts specializes in the care of injured and critically ill adult patients, general surgery, surgical education, and the inflammatory response to injury. He is certified in general surgery by the American Board of Surgery with added qualifications in Surgical Critical Care.



Bryce R. H. Robinson, MD

Assistant Professor of Surgery

Dr. Robinson specializes in ARDS, sepsis, multi-organ failure, sedation and delirium care, and surgical education. He is certified in general surgery by the American Board of Surgery.

Krishna P. Athota, MD

Assistant Professor of Surgery
Associate Director, Surgical Student Education

Dr. Athota joined the Division in July 2008 after completing his Fellowship in Trauma and Surgical Critical Care. He received his M.D. degree from the Medical College of Ohio in Toledo and completed his general surgery residency at William Beaumont Hospital in Royal Oak, Michigan. His interests include cardiac hypertrophy, mechanical ventilation and surgical education. Dr. Athota is certified in general surgery by the American Board of Surgery.

Further information on the Division of Trauma and Critical Care can be viewed on our website <http://surgery.uc.edu>.

