

# Real Life Stories

University of Maryland School of Medicine

Department of Anesthesiology

Annual Report 2011/2012



## Living Quality, Safety, and Excellence

### Our Values

To accomplish our mission and achieve our vision, we focus on the five pillars of our specialty:

#### Healing

Delivering the highest quality perioperative clinical care.

#### Teaching

Education and training of students, residents, fellows, and other health care providers.

#### Discovering

Development of new knowledge regarding perioperative care.

#### Caring

Fostering an environment that values professionalism, civility, compassion, collegiality, teamwork, and collaboration.

#### Leading

Promoting and encouraging leadership activities and skills at all levels of the Department.

# From the Chairman



Like the years preceding it, 2011 was another successful one for the Department of Anesthesiology at the University of Maryland, characterized by significant growth and progress. Despite changes and uncertainty in the healthcare industry and ongoing discussion of healthcare reform, the future continues to look bright. In 2011, we expanded the implementation of the Anesthesia Information Management System (AIMS), the Department's electronic medical record, to more divisions and services. AIMS is essential to clinical research, quality assurance, and quality improvement, and gives us great insight into patient care. This achievement was a tremendous effort on everyone's part, and I would like to congratulate my colleagues on making it happen.

Anesthesiology is a technology-driven field, and we've been able to apply the latest technological advances to the care we provide. For example, today many of the procedures we perform, especially regional anesthesia and analgesia, rely

on ultrasound guidance that helps us fine-tune the way we perform techniques. This approach increases our success rate, makes the experience more comfortable for patients, and enhances their overall anesthetic experience.

Basic science and clinical research are also important components of our mission, and are vital for medical advances to be made. Today we have a number of innovative research projects under way to better understand the diseases and injuries we treat and to optimize the care of our patients. In 2011, extramural research support for the Shock, Trauma, and Anesthesiology Research – Organized Research Center approached \$10.6 million, while NIH funding increased 14 percent over the prior year, to over \$4.5 million. The number of research publications generated by the Department's staff increased as well.

Our educational programs improved, too, with expansion of simulation-based offerings. Simulation enables our residents to experience events they may not encounter on a regular basis in the hospital, including complex cases and emergencies, and prepares them to handle such challenges as leaders of crisis-management teams, should critical events arise. We also witnessed continued improvement in teaching performance among our educators.

The word is getting out about these and other programs in the Department, as we have had great success in recruiting top-notch residents and new faculty members to our ranks. These individuals have brought tremendous skill, experience, and compassion to the Department.

I'd like to take a moment to highlight the efforts of the Pain Medicine group, which in 2011 achieved a 22 percent

increase in the number of procedures and consults they provided to patients. Pain management specialists combine medication, psychological support, physical therapy, and other interventional procedures to care for patients with acute or chronic pain. Pain is a complex phenomenon, and its management can reduce disabilities and result in a significant improvement in an individual's quality of life.

Our staff continues to be a diverse group, something which has been pointed out to me by our newest recruits. The Department features a respectful team with people from all backgrounds, an enriching blend which benefits everyone.

Looking forward, we'll continue to enhance our ability to fulfill and advance our mission: to deliver state-of-the-art anesthesia services to patients; to educate students, residents, and fellows; to be recognized for our contributions to the specialty of anesthesiology through education, research, and scholarly activities; and to contribute to the success of the University of Maryland Medical School and Medical Center.

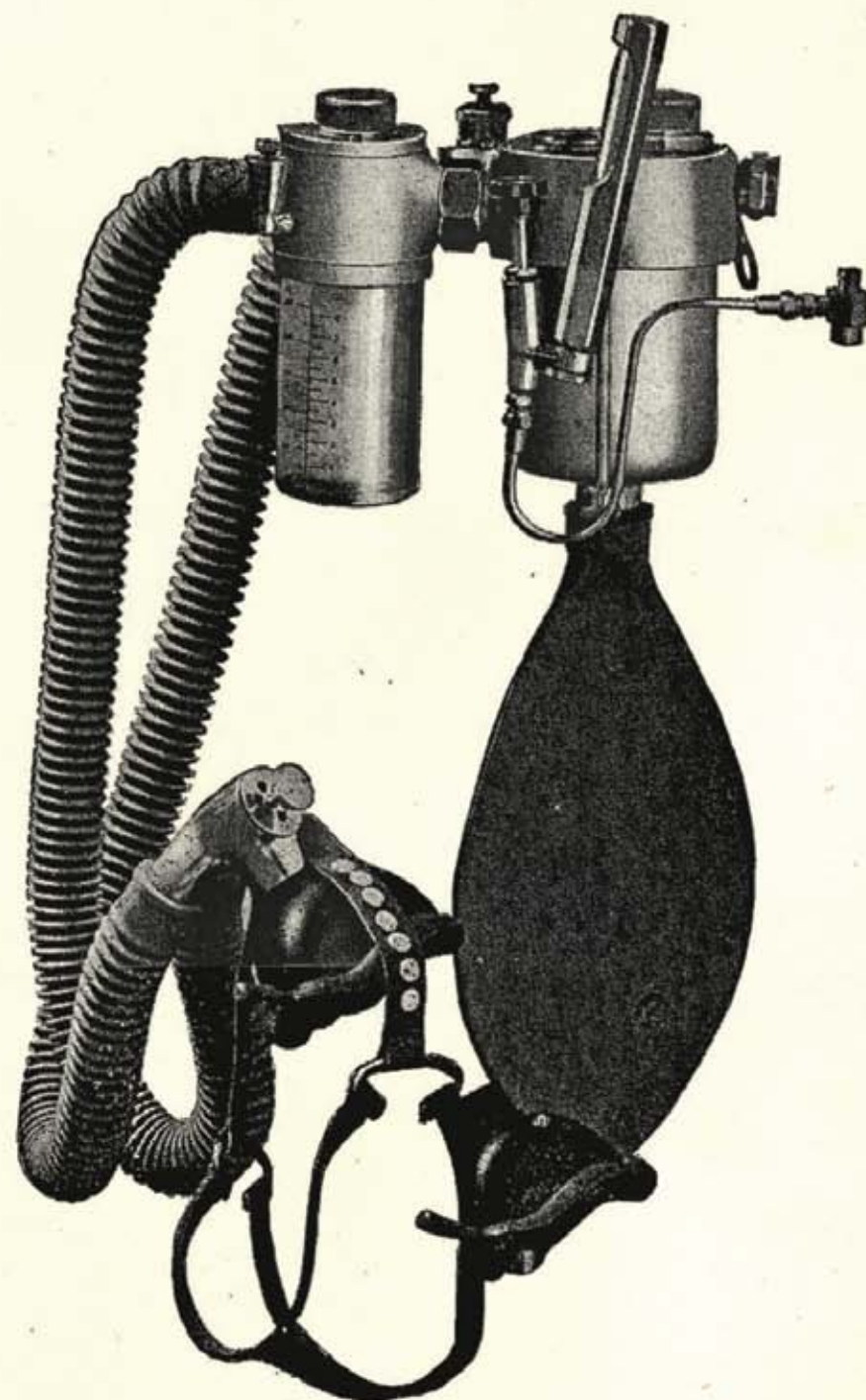
A handwritten signature in black ink, reading "Peter Rock".

Peter Rock, M.D., M.B.A., F.C.C.M.  
*Martin Helrich Professor and Chair  
Department of Anesthesiology  
University of Maryland School of Medicine  
Professor of Anesthesiology, Medicine  
and Surgery  
Anesthesiologist-in-Chief,  
University of Maryland Medical Center*



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# Our History

Anesthesiology as a medical discipline at the University of Maryland Hospital began in 1913, and was first practiced by Griffith Davis, M.D., the only physician in Baltimore who practiced anesthesiology full-time. The residency program was established in 1946 with a team of five residents and a single full-time faculty member, Fred Dye, M.D. In 1948, the University of Maryland Hospital appointed Albert Nelson, M.D., as Chief of Anesthesiology. In 1953, Thomas Dodd, M.D., succeeded Dr. Nelson.

The University of Maryland officially established the Department of Anesthesiology in 1956. The same year marked the recruitment of the first Chair, Martin Helrich, M.D., who came to Baltimore from the University of Pennsylvania. Dr. Helrich had completed his anesthesiology training at Bellevue Hospital in New York City under the tutelage of E.A. Rovenstine, M.D., a world-renowned pioneer in the field of anesthesiology. Dr. Helrich established a robust research effort, strengthened the residency program, and expanded clinical services into areas such as the Shock-Trauma Institute (now known as the R Adams Cowley Shock Trauma Center).

Dr. Helrich served as Department Chair for 31 years, until his retirement in 1987, when Jane Matjasko, M.D., became Acting Chair. At that time, there were 18 faculty members and 18 residents. All services were delivered primarily at the University of Maryland Medical Center

(UMMC). Dr. Matjasko became the official Chair in 1990, a position she held for the next 15 years. During her tenure, the breadth and scope of the Department's services grew tremendously.

Today, 77 faculty members, 44 residents, and eight fellows provide anesthesiology, pain management, and critical care services at UMMC, Baltimore Veterans Affairs Medical Center, The James Lawrence Kernan Hospital, and the R Adams Cowley Shock Trauma Center. Chronic pain management services are provided in a multidisciplinary clinic at Kernan Hospital. Departmental research is carried out in clinical settings and in the Anesthesiology Research Laboratories in the Medical School Teaching Facility, as well as through the interdisciplinary Shock, Trauma and Anesthesiology Research (STAR) Organized Research Center.

In December 2006, Peter Rock, M.D., M.B.A., became the Martin Helrich Professor and Chair of the Department of Anesthesiology. He has committed himself to maintaining the tradition of excellence established by his predecessors, while continuing to enhance the Department's ability to meet its missions and prepare for the future.

## Opportunities for Support

The Department of Anesthesiology is grateful to the many individuals who have contributed generously to support its education, research, and clinical mission. Private philanthropy continues to be integral to the ability to grow the research enterprise, enhance and expand training programs, and improve outcomes for patients.

- **Unrestricted support** allows the Department to direct funds to bolster critical areas and establish new initiatives that keep the Department at the cutting edge of clinical care and research.
- **Endowed Professorships** provide the Department with the resources necessary to attract and retain current and future leaders in anesthesiology. These endowments prove invaluable when recruiting well-established and highly-sought experts in the field of anesthesiology.
- **Endowed and Expendable Research Funds** allow the Department to reward faculty members who are exploring novel ideas and bringing new knowledge to the field.

To discuss how you can make a gift to support any of these important initiatives, please visit the Office of Development Web site ([www.fundformedicine.org](http://www.fundformedicine.org)) or call Shelia Young, Director of Development, Special Projects and Clinical Programs, at 410-706-0106 or [syoung@som.umaryland.edu](mailto:syoung@som.umaryland.edu)

Checks may be made payable to UMBF, Inc. and mailed to:

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We thank you in advance for your generosity.



# Expanding Minds, Nurturing Talent

The University of Maryland Department of Anesthesiology features popular residency and fellowship programs as well as training for medical students. Clinicians who train in the Department are exposed to an interesting and diverse range of cases, greatly enhancing the educational experience.

## Residents

Our residency program is fully accredited with a review cycle of four years. Residency training consists of supervised daily instruction in the care of patients requiring surgery, obstetric care, pain medicine, critical care services, preoperative evaluation, and postoperative care. Experience is provided in all anesthesia subspecialties — regional anesthesia, trauma, neuroanesthesia, cardiothoracic, pediatrics, obstetrics, vascular surgery, and transplantation — including complex subspecialty techniques.

The curriculum complies with the training requirements of the American Board of Anesthesiology and the Accreditation Council for Graduate Medical Education (ACGME). The program includes three clinical anesthesia years (featuring training in basic, subspecialty, and advanced anesthesiology). Four-year positions include an internship (PGY-1) and CA-1, CA-2, and CA-3 years. The CA-3 educational activities have been re-organized into a program specifically designed for the senior resident. Senior residents receive elective time to gain advanced experience in the care of seriously ill patients and complex procedures. Residents have the option of a six-month research track devoted to laboratory or clinical investigation.

Our residents participate regularly in professional meetings. Seven of the ten presentations at the Maryland Anesthesia Residents Congress in May 2011 were made by the Department's residents. Seven residents presented at the American Society of Anesthesiologists (ASA) meeting in Chicago in October 2011. Andrew Porter, M.D., and Andrew Walker, M.D., were the 2011 Maryland Society of Anesthesiologists representatives to the ASA Resident Component House of Delegates. Dr. Porter also presented at the American Society of Regional Anesthesia and Pain Medicine meeting in New Orleans in November 2011. In addition, Jing Tao, M.D., was chosen as one of 63 Foundation for Anesthesia Education and Research (FAER) 2011 Resident Scholars. This program is designed to help recruit academic leaders of the future.

In 2011, ten residents completed training, six began their PGY-1 training, and 12 started their CA-1 year. For more information about the residency program, visit us online at <http://medschool.umaryland.edu/anesthesiology/residency.asp>.

## Fellows

Individuals may choose to complete subspecialty fellowship training (12-24 months) beyond the three clinical anesthesia years. There are three ACGME-accredited fellowship programs in cardiothoracic anesthesiology, critical care medicine, and pain medicine. Fellowships in neurosurgical anesthesiology, obstetric anesthesiology, trauma anesthesiology, regional anesthesiology and transplant anesthesiology are also offered.

In 2011, seven fellows completed training. For more information about fellowship training, visit [http://medschool.umaryland.edu/anesthesiology/fellowship\\_training.asp](http://medschool.umaryland.edu/anesthesiology/fellowship_training.asp).

## Medical Students

The Department of Anesthesiology takes an active role in training fourth-year medical students at the University of Maryland School of Medicine through a four-week anesthesiology elective in the Department of Anesthesiology, based at the University of Maryland Hospital, including general and subspecialty services (ANES 541); a four-week pain management elective (ANES 542); and a four-week subinternship in Surgical Critical Care Anesthesiology (ANES 548). Four-week and eight-week externships for students between the first and second years of medical school are also available in many anesthesia subspecialties. Third-year medical students rotate in the Department for a one-week multispecialty experience during the surgical subspecialties rotation. The Department is also a host site for the FAER Medical Student Anesthesia Research Fellowship Program.

In March 2011, ten University of Maryland medical students who completed anesthesiology rotations in the Department matched into anesthesiology residencies, including two who started residencies in the Department. In October 2011, three University of Maryland medical students presented their work at the ASA annual meeting.

For more information about opportunities available to medical students, visit [http://medschool.umaryland.edu/anesthesiology/med\\_students.asp](http://medschool.umaryland.edu/anesthesiology/med_students.asp).



Katie Goergen, M.D.  
2012 Chief Resident



# All Too Real



A group of observers sits in the darkened conference room, watching a large screen that carries a live video feed from the operating room next door. Everyone is silent as they wait for the medical emergency that's about to happen. In the OR, a surgical team of residents, fellows, nurses, and technicians is in the process of performing a delicate tracheostomy. As the surgeon applies electrocautery around the edges of the incision, there's a sudden flash of light and a puff of smoke. "Airway fire!" a gowned team member shouts as more smoke pours out of the incision, where alcohol prep fumes were ignited by the electrocautery.

The atmosphere is thick with tension and even more smoke, as the team struggles in a blur to extinguish the fire in the patient's throat. The room's fire alarm lights start flashing. The illusion is complete.

Welcome to the Maryland Advanced Simulation, Training, Research and Innovation (MASTRI) Center at the University of Maryland Medical Center, known commonly as the "Sim Center." It's one part high-fidelity stagecraft, one part skills validation, and one part pressure cooker. "There's a lot of theater involved, but no one is acting — it's real," admits Wendy Bernstein, M.D.,

Associate Professor in the Department of Anesthesiology. "I don't think anyone anywhere does as good a job as we do."

That realism has paid off. The MASTRI Center is one of the first simulation programs in the country to achieve Level 1 Certification from the American College of Surgeons, and is also a certified Fundamentals of Laparoscopic Surgery training site. Since its launch in 2008, the Center has continued to raise the bar on the quality of its OR simulations for perioperative services, some of which take months to plan.

The point? It's not enough simply to validate the task training of resident physicians, who are required to attend up to four simulations a year. "My feeling is that you won't see how residents truly react unless you create the same feeling they will have in an actual OR," says Dr. Bernstein. "So we've learned how to create the same levels of anxiety and adrenalin rush."

After the simulation is complete, the smoke-smudged residents file into the conference room for a debriefing and supportive discussion. Though relieved, they know they've been tested in more ways than one. "We only have one rule here," Bernstein tells them. "You can't discuss this scenario after you leave. You don't want to spoil it for the next group."



Wendy Bernstein, M.D., right



# Simulation as an Educational Tool

Across the country, simulation is being used to advance medical education and patient safety. At the University of Maryland Department of Anesthesiology, simulation plays a vital role in training residents to manage complex clinical cases and challenging perioperative situations, especially those that they may not encounter regularly in the hospital.

Over the past year, the Department of Anesthesiology has greatly expanded its simulation course offerings. Three different multidisciplinary courses have been developed, using high-fidelity, ultra-realistic scenarios that truly evoke real-world responses. These events are “free form,” in which learners are allowed to perform much as they would in the real world, with minimal constraints. For example:

- ▶ A module on venous air emboli focuses on the perioperative management of two different patients who suffer embolic events during either arthroscopic shoulder surgery or laparoscopic hysterectomy. Residents are encouraged to respond promptly to sudden changes in hemodynamic parameters after air unintentionally enters the vasculature through the surgical field or is entrained in a vessel.
- ▶ An obstetrics scenario gives obstetrics and anesthesiology residents, labor and delivery suite nurses, anesthesia technicians, and ancillary staff an opportunity to engage together in the complex perioperative team management of a mother experiencing a uterine rupture, requiring an emergency C-section and subsequent neonatal resuscitation of her baby.

- ▶ The last module focuses on an airway fire. Operative staff, anesthesia technicians, ENT residents, nurses, and anesthesia residents manage a child undergoing an elective tracheostomy. Hospital safety is actively involved, allowing OR personnel to actually call a “Code Red,” pull the fire alarm, and even utilize fire extinguishers to put out the fire. (See the story “All Too Real.”)

All of these scenarios place increased focus on perioperative team training and communication, in accordance with ACGME core competencies.

A day-long introduction to simulation and AIMS (Anesthesia Information Management System) training is conducted for incoming first-year anesthesiology residents, which provides crucial instruction on the use of the electronic medical record system. A difficult airway management course for these residents trains and reinforces, in a small group setting, the use of the American Society of Anesthesiologists’ (ASA) difficult airway algorithms. Simulation is also an integral part of teaching for cardiothoracic anesthesiology residents and fellows. Courses address scenarios such as anaphylaxis, malignant hyperthermia, hypotension on induction, anesthesia stat calls, and neuroanesthesia.

Over the past year, additional courses have been developed which focus on task training. All anesthesia residents have already been certified as competent in performing a variety of anesthesia technical skill sets, including placement of central venous, arterial, and pulmonary artery catheters; sterile technique for procedures; use of ultrasound guidance for regional blocks and intravascular catheters; and difficult airway training. One goal for the next

year is to be able to expand the role of simulation to Certified Registered Nurse Anesthetists (CRNAs) and faculty anesthesiologists, as part of efforts to ensure quality and safety for patients through periodic training and evaluation of our practitioners.

Simulation team members have also increased their academic productivity. They presented a challenging simulation case at the 2011 ASA Annual Meeting, and planned a workshop for the 2012 ACGME conference. Presentations were also made at the International Anesthesia Research Society Annual Meeting, the Maryland Committee on Trauma Symposium, and the Annual International Meeting on Simulation in Healthcare.

The Department would like to offer training and evaluation to community anesthesiologists and intensivists. To accomplish this goal, the Department is submitting the Anesthesia Simulation Program for certification by the ASA. This certification will enable us to provide opportunities to board-certified anesthesiologists as they enter into the Maintenance of Certification in Anesthesiology (MOCA) process.

*“The Simulation (Sim) Center is a valuable tool. It gives us a great opportunity to run through scenarios in safe training sessions. They are very good at creating realistic cases that we see day-to-day in the OR. I think the Sim Center is really one of the best training tools that Maryland has to offer.”*  
- Alwafaa Khatib, M.D.,  
Second-Year Resident

## Professors Martin Helrich and M. Jane Matjasko Lecture in Anesthesiology

Each year, we celebrate the Department’s history and heritage during the Professors Martin Helrich and M. Jane Matjasko Lecture in Anesthesiology. Leading anesthesiologists from across the nation are invited to present their latest research and to speak about the field before the Department, alumni, and guests. In October 2011, the 25th invited Lecturer was Thomas J.J. Blanck, M.D., Ph.D., Chair of Anesthesiology at New York University Langone Medical Center, who spoke in the University of Maryland Medical Center Auditorium on “Clinical Research: Past and Present.”



Andrew Malinow, M.D. and Thomas J.J. Blanck, M.D., Ph.D.



Mrs. Ina Helrich, Martin Helrich, M.D., and Alan Faden, M.D.



# From the Bench to the Bedside



Gary Fiskum, Ph.D., wants to know how high-altitude flights affect the human brain. So does the U.S. Air Force — and they’ve given him funding to find out.

In the early 1980s, Dr. Fiskum first became interested in the traumatic effects of physical force on what he calls “the most sensitive organ to injury.” As the M. Jane Matjasko Professor for Research in Anesthesiology and Vice Chair for Research at the University of Maryland’s Department of Anesthesiology, he sees a clear connection between his preclinical research and anesthesiology. “Anesthesiology includes critical care medicine, keeping critically ill people alive, and that means keeping their brains alive,” Dr. Fiskum notes. “I try to understand what causes the brain to fail, and then protect against that failure.”

His research turned toward military-relevant brain injury in 2010, when he became engaged in a study of the potential brain trauma caused by “underbody” blasts — explosions underneath military vehicles or ships. Through his relationships with physicians at the R Adams Cowley Shock Trauma Center’s Center for Sustainment of Trauma and Readiness Skills Program, (C-STARS) which offers real-time training and research opportunities for U.S. Air Force trauma personnel, Dr. Fiskum learned of a new problem on the front lines: When brain-injured soldiers are evacuated by air from Afghanistan to Germany, they tend to decline medically.

“No real research has been done on this emerging condition, so there’s clearly a knowledge gap,” says Dr. Fiskum. He notes that today’s airplanes, including military aircraft, are only pressurized to an altitude of 8,000 feet. This condition of hypobaria (low atmospheric pressure and low oxygen content at high altitudes) can cause even a healthy brain to swell slightly. In a brain already swollen by traumatic injury, serious complications can arise. Due to security issues, however, military evacuation aircraft cannot fly at lower altitudes. Dr. Fiskum is determined to solve this complex problem.

In September 2010, the U.S. Air Force awarded him and his research team a three-year, \$2.6 million grant to study “Prolonged Hypobaria during Aero-medical Evacuation and the Effects on Traumatic Brain Injury (TBI).” As the Principal Investigator, Dr. Fiskum is hoping to perform research to delineate the optimal time for evacuating brain-injured personnel, leading to therapies to limit hypobaric-related inflammation and improve outcomes.

“Gary Fiskum has been a key member of our research group for years. Part of what makes him special is that he has always recognized the importance of his research to changing the way we practice medicine,” said Department of Anesthesiology Chairman Peter Rock, M.D., M.B.A., “So although he is doing basic research, he focuses on how the results of his work can positively impact patient care. This research on hypobaria is a perfect example of the intersection between what we can learn in the lab and how we can apply it to improving the care of critically ill individuals — in this case, wounded soldiers being evacuated from a combat zone to a place where they can receive definitive care.”

“I am excited about this research for several reasons,” notes Alan Faden, M.D., Professor of Anesthesiology and Director of the Center for Shock, Trauma and Anesthesiology Research. “It addresses a major military-relevant clinical question. It strengthens our partnership with the Air Force C-STARS program. And it represents the first major collaboration between Shock, Trauma, and Anesthesiology Research – Organized Research Center (STAR-ORC) laboratories, which allows for unique synergies with regard to experimental models, outcomes, and therapeutic approaches.”

Dr. Fiskum, who was named the 2011 University of Maryland Founders Week Researcher of the Year, is eager to take the next step. “The University of Maryland School of Medicine is one of the pre-eminent centers for brain injury research in the world,” he says. “There’s got to be more that we can do.”



*Colin Mackenzie, M.B., Ch.B.*

## Quick Thinking

During the first hour of trauma care, first responders must make a critical decision on average every 72 seconds. Put that in the context of a combat situation, and the need for supportive technology becomes imperative. Through the work of Department of Anesthesiology researchers Colin Mackenzie, M.B., Ch.B. and Peter Hu, M.S., that technology is now taking shape under a three-year, \$2.2 million U.S. Air Force grant. When attached to a patient by a simple finger clamp, a portable three-pound device they developed uses light wavelengths to detect a patient’s hemoglobin concentrations and reveal heart rate and the blood’s oxygen saturation in real time. The device helps users determine vital needs, such as blood transfusions or other life-saving interventions. By monitoring a patient during the first hour of resuscitation, the device’s software can predict additional patient outcomes up to 48 hours into the future. “Having this life-saving information,” says Dr. Mackenzie, “means we can get the patient to the right place at the right time, with the right care.”



# Eyes on the Sky

All it took was one helicopter landing on the roof of a five-story building in downtown Baltimore in 1969. When that Maryland State Police Medevac touched down atop the Center for the Study of Trauma, history was made, marking the first time a civilian agency transported a critically injured trauma patient by helicopter. Today, over 40 years later, a new generation of physician researchers is viewing that event in an even greater light: as the beginning of an “Aeromedical Age” that continues to make a life-saving difference in trauma care.

For Josh Tobin, M.D., it’s all about filling a needed gap in battlefield care. As a lieutenant commander in the U.S. Navy Reserves, Dr. Tobin spent seven years in the Air Force, flying critical care air transport missions aboard giant C-17 cargo planes converted into “flying ICUs.” But as a critical care anesthesiologist and Assistant Professor in the Department of Anesthesiology, what has impressed him even more is the effectiveness of Air Medevac Program at the Shock Trauma Center. In January 2011, Dr. Tobin co-authored a paper in *Military Medicine* entitled “Tactical Evacuation: Extending Critical Care on Rotary Wing Platforms to Forward Surgical Facilities.” In the paper, he expands upon a new military concept he calls “tactical evacuation.” As he explains it, “A wounded warfighter will receive great care from medics at the point of injury, and later at the combat trauma center itself. But what needs to happen between points A and B is aggressive resuscitation, which I see performed by an intensivist on a helicopter.”

Dr. Tobin’s tactical evacuation model attracted a good deal of attention — so much so that Jonathan Woodson, M.D., the Assistant Secretary of Defense for Health Affairs, visited Shock Trauma in May 2011 for a briefing on the concept and a look at the Center’s Medevac Program. While he’s hopeful that the military may adopt this model, Dr. Tobin is more focused on the ultimate outcome

— improving critical care practices on the front lines. “I’m just hoping that our paper moves the discussion forward on this topic,” he says.

Meanwhile, Sam Galvagno, D.O., Ph.D., an Assistant Professor in Anesthesiology, is crunching numbers to save lives. “My research applies state-of-the-art statistical methods to large data sets in order to look at measurable outcomes for patients transported by helicopters or fixed-wing aircraft,” he explains. “It all has to do with advancing the science of aeromedical critical care. I’m looking at the helicopter as a means of healthcare intervention. Obviously, we’re sitting on top of the best system in the world here at the University of Maryland School of Medicine.”

In this regard, Dr. Galvagno is involved in two major projects. In the first, he has evaluated and assembled the best literature to date on helicopter emergency medical services (EMS). His paper, entitled “Helicopter Emergency Medical Services for Adults with Major Medical Trauma,” has been reviewed and approved for publication by the Cochrane Reviews, which are recognized as the highest standard in evidence-based health care.

In a second initiative, Dr. Galvagno is analyzing helicopter EMS data from the National Trauma Data Bank (NTDB), the largest repository of trauma data in the world. His study, which will be published in the Journal of the American Medical Association, focuses on outcomes, survival, and disposition for 200,000 patients transported by helicopter versus ground. Dr. Galvagno says this is the largest patient cohort ever studied with regard to helicopter EMS outcomes. “These studies are a prelude to getting to the point where we can say that helicopter EMS really does work best,” concludes Dr. Galvagno. “It’s a question of interest not only for the aeromedical community, but also for the entire pre-hospital emergency medicine and trauma community.”



Jeffrey Haugh, M.D.

## Prepping for Combat

Even after they’ve completed their basic training, how do Army medics know that they’re ready to perform under combat situations? For nearly 20 years, anesthesiologist Jeffrey Haugh, M.D., has been putting them to the test. Dr. Haugh, an Assistant Professor in the Department of Anesthesiology and a Colonel in the Army National Guard, directs one-day practicums for field medics twice a year at the University of Maryland School of Medicine’s anatomy lab. Funded through the Maryland Army and Air National Guard, the program allows medics to work together in small, supervised groups to evaluate rapidly and “treat” traumatized cadavers. Through such skills-validation training, says Dr. Haugh, “they learn quickly if they’re ready for the battlefield.”

Yvette Fouché-Weber, M.D., Robert Sikorski, M.D., Joshua Tobin, M.D., Samuel Galvagno, DO, Ph.D., and Christopher Stevens, M.D., M.S.



# Keeping the Faith



Al Stokes' nightmare began when he woke up late one night in early March 2010. Walking downstairs in the darkness, he tripped in his kitchen and fell forward. As his head struck the edge of the counter, he recalls, "I heard my neck break."

Paralyzed and helpless, Mr. Stokes called out to his wife, LaVerne, who immediately dialed 911. Emergency responders whisked him to the Shock Trauma Center at the University of Maryland. Amazingly, only one week after surgery that fused vertebrae to stabilize his neck, Mr. Stokes was able to walk with a hard plastic collar and leave the Shock Trauma Center for home and rehabilitation. Later that July, he returned to the hospital for a second surgery to fuse additional vertebrae in the back of his neck. That's where the next chapter of his story began.

"When you have a second surgery, it's like going all the way back down to ground zero again," Mr. Stokes asserts. "You have to start all over." For this self-described "man of faith," the prospect of taking debilitating medication to manage his chronic pain was discouraging. But his perspective soon changed.

Referred to the University of Maryland Pain Management Center (PMC) at Baltimore's Kernan Hospital, Mr. Stokes met with Seung Lee, M.D., an anesthesiology pain specialist. "When I first saw Mr. Stokes, he really didn't want to take his pain medication," recalls Dr. Lee, an Assistant Professor in the Department of Anesthesiology. "But



*Seung Lee, M.D.*

more importantly, he had the desire to get better. So we shared the same goal and worked together as a team."

For Al Stokes, his encounter with the PMC was, in his words, "life-changing." The Center's multidisciplinary approach to pain management embraces a variety of therapies — even alternative medical therapy like acupuncture. "We want to help people to regain their functionality in life," says Dr. Lee. "Obviously, when you are in too much pain, you cannot function. But if you are on too much pain medication, you cannot function either. So we try to create a balance between the two."

As a part of his therapeutic treatment program, Mr. Stokes met with PMC clinical psychologist Natasha Durant, Ph.D., to learn relaxation techniques to manage his pain. "The word 'remarkable' doesn't even begin to describe Mr. Stokes," says Dr. Durant. "He is a highly motivated individual — and motivation always brings much better outcomes in therapy."

"When you experience a physical trauma that changes your life in seconds, you need someone else to be a part of the rebuilding process," she continues. "At the PMC, we approach the patient from a much more comprehensive perspective, including their physical, emotional, and spiritual changes. Addressing all of these needs at the same time maximizes a patient's recovery."

Eighteen months after Mr. Stokes' initial visit to the PMC, that outcome is clearly apparent. He is taking only minimal medication, is fully back to work, and is completing his doctoral degree in theology.

"I'm a very positive person," concludes Mr. Stokes. "I believe you can get yourself up and move forward, regardless of your condition. I just happened to find a doctor who believed the same thing. I have my independence back and I feel whole again. I have been blessed abundantly."



*Yvette Fouché-Weber, M.D.*

## Bravo, Rio!

With its world-class trauma care standards, it's no wonder that the R Adams Cowley Shock Trauma Center has become the world's leading model for critical care. Still, it was a surprise when the world came calling, notes Yvette Fouché-Weber, M.D., Director of the Division of Trauma Anesthesiology. Specifically, the inquiry came from hospital representatives in Rio de Janeiro, Brazil. With that city hosting both the 2014 World Cup and the 2016 Summer Olympics, there is a growing concern that municipal medical facilities there are not prepared to provide the best care for multiple or mass trauma patients. As a result, Rio turned to the R Adams Cowley Shock Trauma Center for guidance and support. "While Shock Trauma has a presence in other countries," says Dr. Fouché-Weber, "this is the first time that a country has reached out and asked us to help them develop a trauma center."



# A First Step to Managing Pain

Yvette Scrip still doesn't know how it happened. As she walked out of a Philadelphia restaurant with her husband just after Christmas in 2010, "something snapped" in her ankle, followed instantly by a wave of excruciating pain. As a nurse who specializes in IV therapy, Mrs. Scrip knew immediately that her ankle was broken, and assumed it was a "nasty fracture."

In fact, it was far worse — three separate fractures in all. After consulting with an orthopaedic specialist near her home in Bloomsburg, Pennsylvania, Mrs. Scrip started on what was to become a difficult path to recovery, undergoing two surgeries in 2011 to repair her injured ankle. While two of the fractures healed successfully, one did not. The resulting continuous pain not only made working difficult, but also put her whole life under a cloud. By early 2012, as she recalls, "I was physically and emotionally stressed out. I had been in constant pain for over a year."

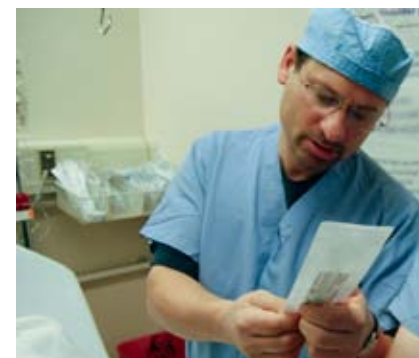
Finally referred to Daniel Farber, M.D., an orthopedic surgeon at University of Maryland Orthopaedics, Mrs. Scrip learned that the best surgical course was an ankle fusion procedure. But as she prepared for her surgery in March 2012, her chief concern was how she would handle the postoperative pain without the use of mind-numbing

narcotic drugs. As part of her preoperative consultation, she met with Eric Shepard, M.D., Assistant Professor in the Department of Anesthesiology. "He made my surgery the most positive experience it could be," she recalls.

"She was undergoing a relatively painful procedure, where we needed to focus as much on postoperative pain management as on intraoperative management," says Dr. Shepard. "That is one of the unique capabilities we offer here in the Department of Anesthesiology." In Yvette Scrip's case, postsurgical pain treatment included the use of a perineural nerve catheter connected to a custom ambulatory pump, allowing her to move freely while still keeping her healing ankle relatively numb — and without the use of narcotics. "This approach, in combination with the use of other medications, provided a good level of pain relief," Dr. Shepard adds.

Mrs. Scrip has nothing but praise for her successful ankle fusion procedure — and for the effective pain management she received from Dr. Shepard and his team. "It was amazing how well Anesthesiology and Orthopedics worked together," she says. "As a nurse, I was really impressed by how all of the members of Anesthesiology's Acute Pain Management Service were on the same page about my treatment plan at every step of my recovery."

"It's very easy from an anesthesia standpoint to put somebody to sleep, wake them up at the end, and let the pain management be someone else's problem," says Dr. Shepard. "But here at the University of Maryland, we've put together a coordinated program involving not only the anesthesiologist, but also the surgeons and the nursing staff, so that the whole pain management process is handled proactively. Pain is just not an acceptable outcome for us."



*Eric Shepard, M.D., F.C.C.M.*



*(L) Malinda Boyd, M.D., and (R) Marnie Kommalan, R.N., B.S.N., C.N.O.R*

## Going Green in the OR

Despite their reputation as antiseptic spaces, operating rooms generate a lot of trash. But thanks to the efforts of a green-minded anesthesiologist and nurse, things may well get sorted out for the better. Malinda Boyd, M.D., Clinical Assistant Professor in the Department of Anesthesiology and Medical Director of the Ambulatory Surgery Operating Rooms, took notice of a pilot recycling program in the hospital's North Operating Room, started by Senior Clinical OR Nurse Marnie Kommalan. Segregating OR trash into "red bags" (regulated medical waste) and "clear bags" (unregulated medical waste) brought a clear savings in waste disposal costs. Working together, Dr. Boyd and Ms. Kommalan have added paper recyclables in green trashcans to the pilot initiative, and they hope to roll out the program to other ORs in the coming year.



# Warming Hearts on Ice



Like any dedicated physician, Dr. Bob Sikorski works long hours in the University of Maryland's Shock Trauma unit as an anesthesiologist. An Assistant Professor, he teaches in the School of Medicine. He's engaged in statistical research to establish benchmarks for the clinical effectiveness of Shock Trauma's aeromedical program. But on any given Sunday, he's no longer Dr. Sikorski or even Prof. Sikorski. He's simply "Coach Bob."

For "Coach Bob," Sunday means up to six hours on the ice at Baltimore's Patterson Park Ice Rink, where he coaches and works with three different groups of aspiring hockey players and skaters. Even if he is on duty the night before, he'll sleep in his office for a few hours and then be out on the ice in time for Sunday practice. "I look forward to it," says Dr. Sikorski. "If you see these kids and see how happy they are, it makes you feel pretty good."

His coaching career began by chance in 2005. "One early Sunday morning, I was sitting with a cup of coffee watching the local TV news, when a story came on about an inner-city youth hockey team at Patterson Park that was in need of volunteers," he recalls. "Since I've played hockey all of my life, I called and then went down to visit the team." When he met the Patterson Park Stars, about 40 boys and girls aged 10 to 14, he was hooked. Today, as one of the team's six coaches, Dr. Sikorski helps manage a growing team of 70 players, divided into beginner, intermediate and advanced groups.

When the Stars leave the ice at 11 AM, Dr. Sikorski turns to coaching his next team, the Bennett Blazers from Baltimore's Kennedy Krieger Institute, a sled hockey team of boys aged 11 to 16 who are mostly wheelchair-bound or challenged by other disabilities. "We actually travel together up and down the East Coast, playing other teams," says Dr. Sikorski. "Last year, we won the Junior Division of the Invitational Disabled Hockey Tournament in

Springfield, Massachusetts, beating teams from throughout the Northeast!"

Early afternoon brings star power, as Dr. Sikorski works with skating legend Dorothy Hamill and her I-Skate adaptive skating program. The program, which is also part of Kennedy Krieger, helps children with physical disabilities learn and enjoy recreational ice skating.

By 3 PM, it's time for "Coach Bob" to hang up his skates, but like every Sunday, it's been a good day. "I've gotten involved with this big family that helps inner-city kids and children in need," he says, "and they've become a big part of me."

## Serving the Community

"Most of the time, my job is just reassuring the injured athlete and their parents, relieving their anxiety! Though by far, the greatest reward is a 'thank you' from a worried mom or dad, I also get an opportunity to 'get out of the box,' to supplement basic skills accumulated back in medical school/ internship by learning from the superb certified athletic trainers and sports medicine physicians who work at the school. I am proud to represent, even in some small way, the physicians of the School of Medicine and the Department."

- Andrew Malinow, M.D., *Game Day Physician, Gilman School*

"I am passionate about volunteering my time to the Muscular Dystrophy Association, because one of my best friends lost her daughter to the disease at the age of 15. This little girl was happy every time I saw her. I just want these kids to live happy lives, and being a part of that makes me feel good!"

- Debbie McFadden, *Volunteer, Muscular Dystrophy Association*

"As a parent volunteer, I saw firsthand how this demanding sport shaped my daughters as people. In the riding ring, you always lose more than you win, so sportsmanship is paramount. You accept the judges' outcome gracefully, congratulate your competitors, and ALWAYS take care of your equine partner, who tried hard to do well with and for you."

- Anne Savarese, M.D., *Parent Volunteer, High School Equestrian Team*

"Volunteering allows me to contribute my education and love of teaching to benefit the community as a whole."

- John Blenko, M.D., *Chair, Regional Emergency Cardiovascular Care Committee, Maryland/DC Region, American Heart Association*



## Birds of a Feather

Over the past year, the Department of Anesthesiology's Hugh Simmons, M.B.A, Senior Administrator has seen his over 20 years of involvement in the Audubon Society take off. In January 2012, he was elected to the National Audubon Society's Board of Directors, serving as the Regional Director for the South Atlantic Flyway. As he explains it, "Essentially, that means I am the communications link between the Board of Directors and the Audubon grassroots organization along the East Coast, from Maryland to Florida, representing more than 90 chapters." Mr. Simmons is enthused about his new volunteer responsibilities. "It's very exciting to be setting policy and direction on a national level with Audubon, and to help Audubon communicate and implement its strategic plan," he says. "My long-time interest in birds and environmental issues has always made Audubon a very good fit for me."



# Heeding the Call

“Every now and then,” says Jasjit Atwal, M.B.B.S., “you come to a place in your life where you feel like something is lacking. That’s when I make a change.” For Dr. Atwal, who has been an Assistant Professor in the Department of Anesthesiology for the last 15 years, that “change” could be interpreted as her impending retirement this year. But Dr. Atwal definitely has bigger changes in mind.

Over a decade ago, she and her husband, Manmohan Singh Atwal, Ph.D., M.B.A., M.P.H., a biochemist and educator, were introduced to the work of the Kalgidhar Trust, a non-profit organization in India dedicated to developing a range of educational and healthcare initiatives in rural, resource-limited areas of that country. “We were inspired by their efforts and thought we could help by fundraising here in the U.S.,” recalls Dr. Atwal. “We never intended to go back to India.” But by 1995, her husband did return to India to work full-time for the Kalgidhar Trust as Vice Chancellor of a new network of universities under development across the country.

In the meantime, Dr. Atwal set her sights on making a different kind of contribution. In the village of Baru Sahib, located in the state of Himachal Pradesh in northern India, the Trust runs the 200-bed Akal Charitable Hospital. To supplement its healthcare services to the surrounding region, the hospital organizes onsite “medical camps” four times a year, where physicians and clinical specialists from the U.S., Canada, and several states of India volunteer their services. Approximately 2,000 patients are treated at each of these camps, and more than 100 operations are performed free of charge.

Over the past nine years, Dr. Atwal has used her vacation time to volunteer at these camps twice a year, serving as an anesthesiologist for the participating surgery team. “They are very good surgeons and very nice human beings,” she explains, “so I enjoy spending time

with them.” With more than 40 percent of India’s population living below the international poverty level, the need for free healthcare is acute, which is why at these medical camps, no patient is refused treatment. “Some patients arrive at the hospital carried on the backs of their relatives all the way from their mountain villages, because they have no other transport,” Dr. Atwal adds.

Now that she is retiring from her academic post in the Department of Anesthesiology, Dr. Atwal is taking on a new assignment — to oversee a new medical college that will be built in Baru Sahib with support from the Kalgidhar Trust. “It’s a very exciting opportunity. I will be organizing everything from scratch — and praying a lot!” she says. But before ground can be broken for the new medical school, government requirements specify that the adjoining Akal Charitable Hospital must expand to be a fully functioning hospital with 400 beds, a project that Dr. Atwal will also lead. “It’s going to be a lot of work,” she nods. Still, it is a change that she welcomes. “I feel like it’s a new start for me. I love working, and I hope to continue — I want to help in my own way to do good.”

## Serving the Community

“I give my time to the Big Brothers Big Sisters program as a way to give back to my community. It is a way for me to reach out to troubled and disadvantaged young people to show them that they can make it despite hardships and obstacles. It helps them to see the ‘nuts and bolts’ – the day to day perseverance and commitment required to do more than just survive. I want to teach young people the value of an education and the payoff of sacrifice and delayed gratification. Volunteering for Big Brothers Big Sisters has allowed me to positively influence a child’s life, even though my schedule is limited.”

– Yvette Fouché-Weber, M.D., Mentor, Big Brothers Big Sisters Program

“I enjoy the opportunity to get involved with the community one on one to address concerns around the anesthesia side of surgery, and to provide reassurance.”

– Alwaffa Khatib, M.D., Resident, Volunteer at Islamic Society of Baltimore



Jake Shearer, Julie Utz, Alice Davis-Lifsey, Judith Hallinger, Shelly Kizina

## Department of Anesthesiology Creates Big Smiles During the Holiday Season

During the 2011 holiday season, Department of Anesthesiology staff opened their hearts — and wallets — and shopped till they dropped to fulfill everything on the wish lists of six needy children identified by the Big Brothers Big Sisters organization, plus a few extra goodies for their families. Departmental “elves” delivered the presents right before the holidays. Department staff personally contributed \$545 in cash, and the Department added another \$1,000. Donations of clothing, toys, school supplies, and gift wrap rounded out the bounty. With smiling faces, the recipients let us know they were touched by our generosity, and extended a heartfelt thank you to all!



# A Day in the Life

## ANESTHESIOLOGY RESIDENCY

### Patient Care: Comfort, Compassion, and Safety

As the number of patients the Department cares for continues to rise, their comfort and safety remain paramount. Providing perioperative, critical care, and pain management services based on the latest medical evidence is a vital component of the Department's mission. Team members are subspecialized, enabling the Department to meet patients' varied and often complex needs while advancing the field.

Subspecialty anesthesiology at the University of Maryland Medical Center is provided through the following Divisions and Programs:

- Adult Multispecialty Anesthesiology
- Cardiovascular and Thoracic Anesthesiology
- Critical Care Anesthesiology
- Neurosurgical Anesthesiology
- Obstetric Anesthesiology
- Pain Medicine
- Pediatric Anesthesiology
- Regional Anesthesiology
- Transplantation Anesthesiology
- Trauma Anesthesiology

*Cristalle Cox, MD, Chief Resident 2012*

Review OR postings for the next day  
and discuss anesthesia plan for next  
day's patients with the attending.  
Anticipating an awake fiberoptic  
intubation and thoracic epidural.

15:30

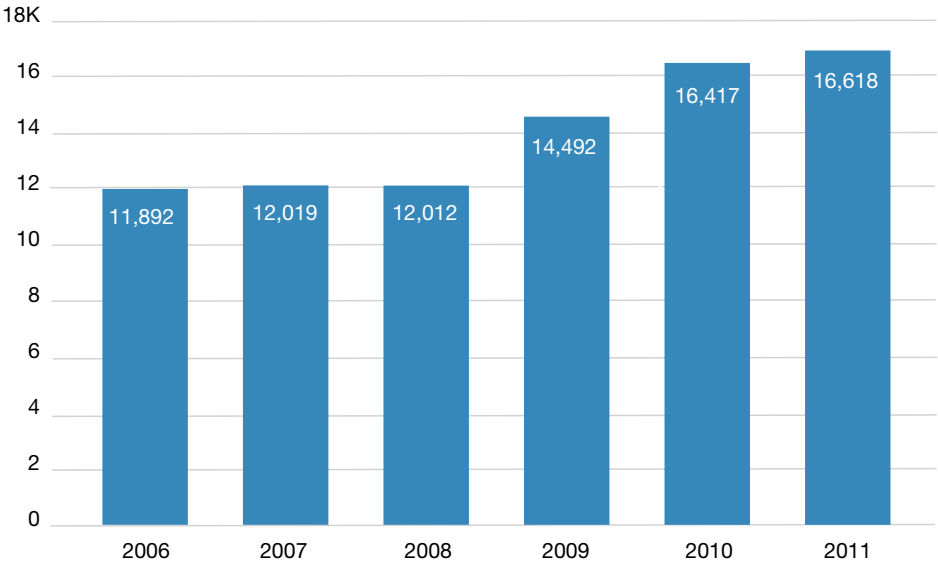


Adult Multispecialty  
Anesthesiology Division Faculty

Douglas G. Martz, M.D.  
*Vice Chair for Clinical Affairs  
Director, Adult Multispecialty  
Anesthesiology Division  
Associate Professor*

Beatrice M. Afrangui, M.D.  
Jasjit B. Atwal, M.B.B.S.  
Shobana Bharadwaj, M.B.B.S.  
Paul E. Bigeleisen, M.D.  
Malinda T. Boyd, M.D.  
Kathleen M. Davis, M.D.  
John P. Drago, D.O., J.D.  
Stephanie Esposito, M.D., M.S.  
Ileana Gheorghiu, M.D.  
Ashanpreet Grewal, M.D.  
Caron M. Hong, M.D., M.Sc.  
Chinwe A. Ihenatu, M.B., Ch.B.  
Gauri Joshi-Turner, M.B.B.S.  
Jeremy Kaplowitz, M.D.  
Arthur V. Milholland, M.D., Ph.D.  
Sheryl Nagle, M.D.  
Mary J Njoku, M.D.  
Robert J. Noorani, M.D.  
Patrick N. Odonkor, M.B., Ch.B.  
Shelley Ohliger, M.D.  
John Pallan, M.D.  
Amer A. Quaddoura, M.D.  
Peter Rock, M.D., M.B.A.  
Philip E.F. Roman, M.D., M.P.H.  
Ron E. Samet, M.D.  
Sanyogeeta Sawant, M.B.B.S.  
David L. Schreibman, M.D.  
Maurice R. Sheppard, M.D.  
Baekhyo Shin, M.D.  
Daniela Smith, M.D.  
Victoria W. Smoot, M.D., M.S.  
Shafonya M. Turner, M.D.  
Obi R. Udekwu, M.B.B.S.

Adult Multispecialty OR Case Volumes



Adult Multispecialty Anesthesiology

As the largest Division in the Department, the Division of Adult Multispecialty Anesthesiology provides care for patients at the University of Maryland Medical Center in the Weinberg and North Hospital operative suites. These state-of-the-art facilities contain 25 surgical and two endoscopy suites, serving all surgical subspecialties with equipment and supplies to support the clinical care of the Division’s diverse patient population.

These operating rooms are supported by a continually growing team of faculty members dedicated to the clinical care of patients and the education of fellows, residents, medical students, student nurse anesthetists, and paramedics. For most clinical cases, anesthesiologists direct and

supervise residents or CRNAs; other cases have anesthesia provided solely by faculty anesthesiologists.

The Division’s growth has been facilitated by the implementation of the Anesthesia Information Management System (AIMS), an electronic system for recording dynamic data during surgery. In addition to supporting anesthetic care in the operating rooms, there has been significant growth of anesthetic cases in “non-operative” areas, such as gastrointestinal endoscopy, pulmonary medicine, the electrophysiology lab, neuro- and body angiography, radiation oncology, and the MRI/CT scanning areas. The development of newer nonsurgical procedures will drive continued expansion of anesthetic care of patients undergoing such procedures outside of the operating rooms at the University of Maryland Medical Center.

Cardiovascular and  
Thoracic Anesthesiology

The Division of Cardiovascular and Thoracic Anesthesiology provides comprehensive, innovative perioperative anesthetic services to patients with significant cardiac, vascular, and pulmonary diseases. The Division’s faculty members provide care to patients undergoing cardiac, thoracic, and vascular surgery. They also perform and interpret transesophageal echocardiography for patients in the operating rooms and ICUs.

The Division has witnessed a steady annual increase in the total number of cardiac cases over the past five years. In fact, Cardiac Services at the University of Maryland Medical Center moved up in rank from 40th to 31st in the U.S. News & World Report “Best Hospitals” 2011-2012 edition.

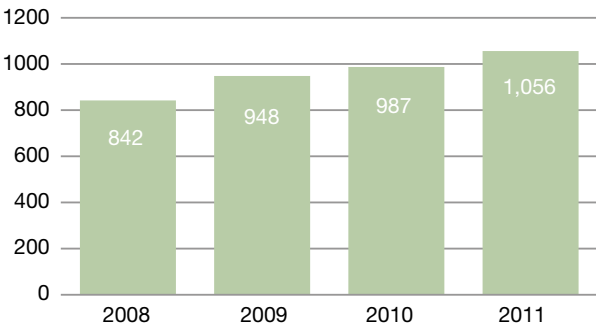
Between June 2010 and July 2011, the team provided anesthetic care for 1,170 cardiac cases. There was a 25 percent increase in the number of totally endoscopic coronary artery bypass (TECAB) grafts during this time. Simultaneously, the group’s efforts have

contributed to a 50 percent reduction in reoperation for bleeding, prolonged ventilation, perioperative stroke, and renal failure among patients undergoing coronary artery bypass surgery.

Division faculty are benefiting from a new hybrid room for multispecialty integrated cardiac care involving cardiac surgery, cardiology, cardiac anesthesia, and interventional radiology services. Procedures performed in this facility include TECAB, endovascular aortic stents, minimally invasive aortic valve replacement, and minimally invasive atrial septal defect closure.

The Division has introduced protocols to reduce costs and improve patient outcomes, including perioperative management of spinal drains, and intraoperative management of aortic dissections and thoracic endovascular aortic repairs. A number of research efforts

Transesophageal Echos

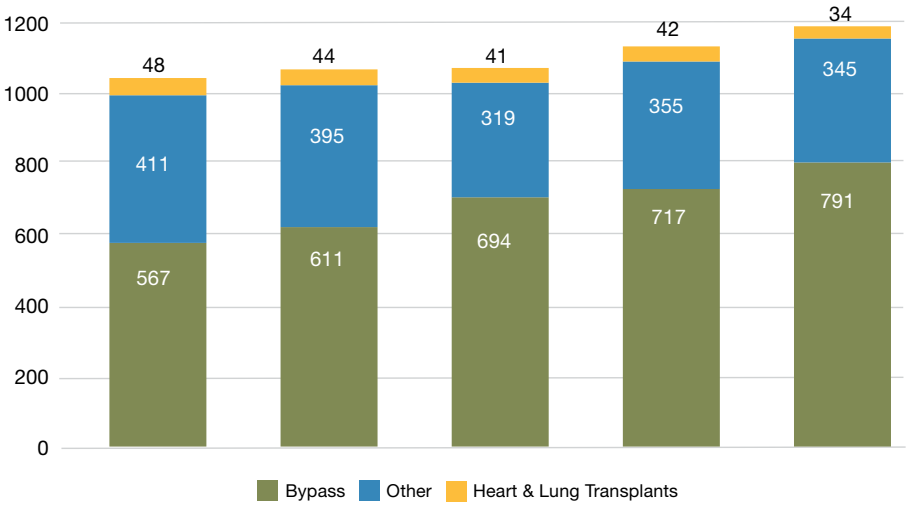


Cardiovascular and Thoracic  
Anesthesiology Division Faculty

Alina Grigore, M.D., M.H.S., F.A.S.E.  
*Director, Cardiothoracic  
Anesthesiology Division  
Associate Professor*

Wendy K. Bernstein, M.D.  
Seema P. Deshpande, M.B.B.S.  
Molly Fitzpatrick, M.D.  
Ileana Gheorghiu, M.D.  
Ashanpreet Grewal, M.D.  
Patrick Odonkor, MB, ChB  
Philip E.F. Roman, M.D., M.P.H.

Cardiovascular and Thoracic Surgical Cases



*“I strongly recommend the University of Maryland School of Medicine residency program to aspiring anesthesiologists because of the strong clinical exposure and balanced didactic schedule.”*  
- Kiarash Paydar, M.D.,  
Third-Year Resident

Wake up. Grab coffee to go.

06:00

In the OR. Set up room. Go through anesthesia machine checkout. Ask anesthesiologist to get fiberoptic tower for the awake fiberoptic intubation.

06:30 - 07:00

Tuesday mornings: attend Chairman's conference

Meet the patient and discuss anesthesia plan, difficult airway concerns and plan for post operative pain control. Obtain patient consent.

07:00

Thursdays: Attend Grand Rounds

Patient in OR. Apply monitors and place thoracic epidural at T5-T6. Confirm it is functioning.

07:15



Critical Care Anesthesiology  
Division Faculty

Vadivelu Sivaraman, M.B.B.S.  
*Director, Critical Care Division*  
*Assistant Professor*

Samuel M. Galvagno Jr., D.O., Ph.D.  
Thomas E. Grissom, M.D., F.C.C.M.  
Caron M. Hong, M.D., M.Sc.  
Mary J Njoku, M.D.  
Peter Rock, M.D., M.B.A., , F.C.C.M.  
David L. Schreiberman, M.D.

“One of the qualities that drew me to pursue an anesthesiology residency at the University of Maryland was the breadth of comprehensive care and training. I wanted to learn at an institution that takes an active role in the development of medical innovations.”

- Ilene Lewis, M.D.,  
Chief Resident 2012

are also under way. The University of Maryland Medical Center is a site for the national multicenter FOCUS (Flawless Operative Cardiovascular Unified Systems) initiative of the Society of Cardiovascular Anesthesiologists — a complementary and cooperative effort designed to improve patient safety through human factors engineering.

Division faculty members have been active at the local, state, and national levels, making presentations at major medical meetings (including the American Society of Anesthesiologists annual meeting) and participating on committees of professional organizations such as the Association of University Anesthesiologists and the Society of Cardiovascular Anesthesiologists. Goals for the future include enhanced training in intraoperative echocardiography using advanced computer simulations, development of a perioperative blood conservation program, expansion of the Division’s educational program, and increased participation in clinical research protocols.

Education:

Anesthesiology residents rotate through the Division of Cardiothoracic Anesthesiology. In addition, the Division features a fellowship in Cardiothoracic Anesthesiology. Both residents and fellows benefit from lectures and presentations as well as Grand Rounds on a variety of topics. Simulation is also an integral part of teaching.

Critical Care Anesthesiology

The Division of Critical Care Medicine collaborates in directing and supervising the Neurosurgical and Surgical Intensive Care Units. Intensivists also manage critically ill postoperative patients in the Post-Anesthesia Care Unit (PACU) who are waiting to be transferred to an intensive care unit. Along with the Pain Medicine Division, the Division of Critical Care Medicine serves as the face of the Anesthesiology Department outside of the operating rooms.

Neurosurgical ICU

Surgical Critical Care and Anesthesiology Critical Care share supervision of the Neurosurgical Intensive Care Unit, which is managed around the clock by an intensivist. The University of Maryland Medical Center is one of only a few centers equipped to provide thrombolytic therapy to patients who have had acute strokes, who are cared for in the Neurosurgical ICU. Patients with subarachnoid hemorrhages and brain tumors also benefit from this expertise. The Division’s capacity is expected to increase to 22 beds — a more than 50 percent increase, which will require two teams of critical care providers.

Surgical ICU

The Division’s 19-bed Surgical Intensive Care Unit is also managed by an intensivist. Supervision of this unit is shared equally with faculty from the Department of Surgery’s Division of Surgical Critical Care. Patients undergoing liver, kidney, and pancreas transplants, plastic surgery, oral maxillofacial surgery, thoracic surgery and major vascular surgical procedures, and those being treated for pancreatitis, receive care in this unit. The

bed capacity is scheduled to increase by 25 percent, to 24 beds by 2013, requiring an increase in the number of critical care teams: two teams during the day and one team to cover nights. The volume of patients cared for in the Surgical ICU during 2011 was 643, representing an increase of 9.7 percent over the 2010 academic year.

Education:

The Critical Care Anesthesiology Fellowship provides an in-depth experience in the care of seriously ill surgical, trauma, oncology, and pediatric patients. All aspects of critical care are encountered, including cardiopulmonary therapy, extracorporeal gas exchange, long-term mechanical ventilation, fluid and electrolyte abnormalities, invasive and non-invasive hemodynamic monitoring, transthoracic and transesophageal echocardiography, renal and hepatic failure, continuous renal replacement therapy, the treatment of infections, and nutritional failure. The fellowship program is accredited by the ACGME.

In 2011, the Division presented a talk on the “Use of Airway Pressure Release Ventilation in the Setting of General Anesthesia” at Grand Rounds. Lectures have covered topics such as liver disease and transplantation, Acute Respiratory Distress Syndrome, and adrenal insufficiency. In addition, medical students and residents in Anesthesiology and other disciplines — such as ENT Surgery, Orthopedic Surgery, Neurosurgery, and General Surgery — rotate through the Surgical and Neurosurgical ICUs. During these rotations, they gain valuable experience in the management of critically ill patients while being supervised by Anesthesiology Department intensivists.

Critical Care Research

Critical Care Medicine faculty participate in major multicenter studies evaluating innovative approaches to advance the care of critically ill patients. Examples include:

Acute Respiratory Distress Syndrome (ARDS)

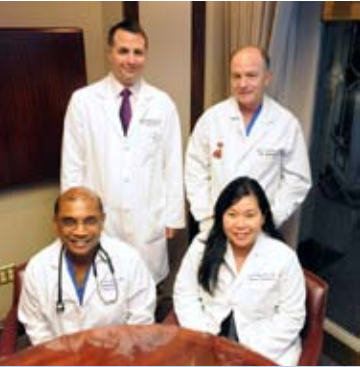
• Division members participate in clinical trials conducted by the NIH-funded Acute Respiratory Distress Network (ARDSNet). ARDSNet studies this past year found that beta agonists and nutritional supplements do not benefit ARDS patients, and shouldn’t be used in clinical practice for this indication; another showed that there is no harm in delaying full feeding of ARDS patients. A current study is assessing the potential benefit of statins in ARDS. Through the Return of Muscle Function in ARDS Study (ROMA), Division members are evaluating muscle weakness in ARDS patients.

Subarachnoid Hemorrhage

• Division members are conducting laboratory studies to see if the diabetes medication glyburide may reduce brain injury in patients with subarachnoid hemorrhage.

Delirium

• Division members are participating in a multicenter, NIH-funded trial called “Dexlirium” which hypothesizes that dexmedetomidine



Clockwise from top left: Samuel Galvagno, D.O., Ph.D., David Schreiberman, M.D., Caron Hong, MD, M.Sc., Vadivelu Sivaraman, M.B.B.S,

given during and after surgery may prevent delirium and cognitive dysfunction in elderly patients who require operative interventions and anesthesia.

• The NIH-funded, multicenter, MIND-USA study is evaluating antipsychotic medications for the prevention and treatment of ICU-delirium. The Division expects to begin enrollment soon in this study, as the University of Maryland is a participating site.

Genetic Markers of Increased Risk

• The GeneTICS study is investigating the risk of surgical site infections and thrombotic events after elective surgery to identify genetic markers of increased risk for these complications. The Division is partnering with Johns Hopkins in this important work.

Transfusion Medicine

• The Red Cell Storage Duration Study (RECESS) is a multicenter, NIH-funded clinical trial determining whether the use of fresh red blood cell units (stored 10 days or less) versus older units (stored 21 days or more) after cardiac surgery affects outcomes.

Performed awake fiberoptic intubation. Patient tolerated it well and the airway is secured.

Smooth IV induction. Radial arterial catheter and internal jugular central venous catheter placed.

15 minute break. Run to Au Bon Pain for coffee and a bagel.



CRNAs

Linda Goetz, MHS, C.R.N.A.  
*Director, Nurse Anesthetists*

Obinna Adogu, C.R.N.A.  
Chris Amoroso, C.R.N.A.  
Bonjo Batoon, C.R.N.A.  
Lionel Best, C.R.N.A.  
Kate Billington, C.R.N.A.  
William Boyden, C.R.N.A.  
Mike Broussard, C.R.N.A.  
Christina Burgess, C.R.N.A.  
Robyn Ciurca, C.R.N.A.  
Cheryl Cline, C.R.N.A.  
Carmen Colbert, C.R.N.A.  
Marisa Conry, C.R.N.A.  
Erika Dick, C.R.N.A.  
Dale Downey, C.R.N.A.  
Leanne Downey, C.R.N.A.  
Emilene Drager, C.R.N.A.  
Ron Ejanda, C.R.N.A.  
Victorine Esak, C.R.N.A.  
Rebeca Fiet, C.R.N.A.  
Matt Fox, C.R.N.A.  
Amy Frattaroli, C.R.N.A.  
Michelle Gonzalez, C.R.N.A.  
Stacy Harrison, C.R.N.A.  
Bill Howie, D.N.P., C.R.N.A.  
Emily Irish, C.R.N.A.  
Leslie Jackson, C.R.N.A.  
Ashley Lacy, C.R.N.A.  
Kristina Ludwig, C.R.N.A.  
Chuck Magich, C.R.N.A.  
Heather McDonald, D.N.P., C.R.N.A.  
Sharee Miller, C.R.N.A.  
Anne Muntuerto, C.R.N.A.  
Gina Muscara, D.N.P., C.R.N.A.  
Rochelle Parker-McKenzie, C.R.N.A.  
Amanda Prisant, C.R.N.A.  
Tara Ritchie, C.R.N.A.  
Cindy Sampson, C.R.N.A.  
Kristine Santos, C.R.N.A.  
Adam Shaughnessy, C.R.N.A.  
Alex Sigalovsky, C.R.N.A.  
Natalie Sigalovsky, C.R.N.A.  
Joey Sliwkowski, C.R.N.A.  
Krystle Thomas, C.R.N.A.  
Tracey Trainum, C.R.N.A.  
Deverie Turner, C.R.N.A.  
Jessica Webster, C.R.N.A.  
Tracy Wood, C.R.N.A.  
Theresa Young, C.R.N.A.

Certified Registered Nurse Anesthetists (C.R.N.A.s)

Certified Registered Nurse Anesthetists (C.R.N.A.s) at the University of Maryland Medical Center work and train as a team in a dynamic environment that is challenging and diverse. These highly skilled and compassionate professionals collaborate with anesthesiologists to deliver anesthesia care throughout the operating rooms of the Medical Center and in the R Adams Cowley Shock Trauma Center.

The tasks of C.R.N.A.s are comprehensive. They help coordinate the preoperative evaluation of patients, including ordering and interpreting diagnostic tests. Patients undergoing induction, maintenance, and emergence from general and regional anesthesia benefit from their care. C.R.N.A.s are also skilled in specialized procedures such as airway management and invasive catheter placement.

University of Maryland Medical Center C.R.N.A.s are leaders in their field. Locally, several are members of boards and committees in the Maryland Association of Nurse Anesthetists. Nationally, some University of Maryland C.R.N.A.s hold leadership positions as committee members in the American Association of Nurse Anesthetists.

Education:

C.R.N.A. students come to the University of Maryland Medical Center from across the nation. During the 2011 academic year, the Department’s C.R.N.A.s trained 35 students.

Six programs in nurse anesthesia use the General Operating Rooms and Trauma

Operating Rooms as clinical sites: the University of Maryland, Georgetown University, University of Pennsylvania, Old Dominion University, Columbia University, and Uniformed Services University of the Health Sciences. Several of our C.R.N.A.s are faculty members in the University of Maryland School of Nursing in the Program for Nurse Anesthesia, and many others serve as guest lecturers throughout the year.

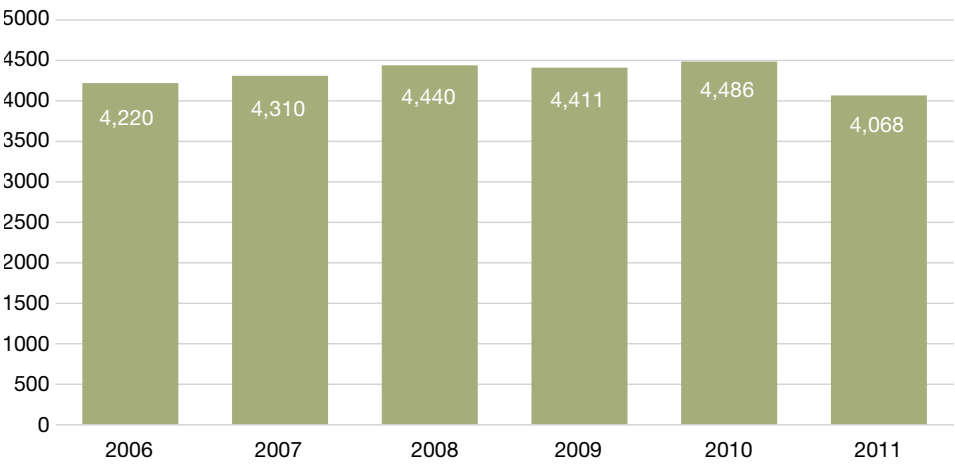
The University of Maryland Medical Center hosts a quarterly lecture series called “Trends in Nurse Anesthesia.” It is free and open to all C.R.N.A.s, including those within and outside of the medical center. For more information, visit our website at: <http://medschool.umaryland.edu/anesthesiology/crna.asp>.

Kernan Hospital Anesthesiology

The Division of Anesthesiology at Kernan Hospital in Woodlawn, Maryland (seven miles from the Medical Center) specializes in orthopedic surgery and is the main rehabilitation facility for the University of Maryland Medical System. The Kernan team has specialized expertise in regional anesthesia and uses advanced techniques to achieve highly effective pain control during and after surgery.

About 70 percent of the procedures performed at Kernan Hospital are orthopedic operations. More than half of surgical procedures are completed using only regional anesthesia. With 4,400 cases annually, Kernan Hospital is an excellent facility to teach regional anesthesia. Faculty are also responsible for maintaining a 24-hour acute

Kernan OR Cases



inpatient and pain service, assuring comfort and optimal continuity of care for surgical patients who are in the hospital.

Kernan Hospital faculty have led the field in the use of ultrasound-guided peripheral nerve blockade. The group has been gathering data to support the improved safety and effectiveness of this technique as compared to older peripheral nerve blockade approaches. Kernan faculty and residents have presented these data and their clinical experience with ultrasound-guided regional techniques at national and local professional meetings. Andra D. Distefano, M.D., delivered a poster presentation at the annual American Society of Regional Anesthesia meeting, showcasing a positive clinical experience with ambulatory continuous interscalene nerve blocks following rotator cuff surgery. Eric K. Shepard, M.D., F.C.C.M., mentored two anesthesiology residents who made poster presentations pertaining to ultrasound-guided regional anesthesia at the Maryland Society of Anesthesia annual meeting. In September 2012, demonstrating the group’s growing international reputation, a

Kernan Anesthesiology Division Faculty

Edwin J. Villamater, M.D.  
*Director, Kernan Anesthesiology Division Assistant Professor*

Lise R. Asaro, M.D.  
Mark D. Dimino, M.D.  
Andra D. DiStefano, M.D.  
Jeffrey T. Haugh, M.D.  
Emily Joe, M.D.  
Patrick L. Lee, M.D.  
Eric K. Shepard, M.D., F.C.C.M.

team of Kernan anesthesiology faculty and an acute pain care nurse will present additional clinical data and two provocative case reports at the European Society of Regional Anesthesia meeting in Bordeaux, France.

Education:

Because of the high volume and exceptional quality of regional anesthetic techniques performed at Kernan Hospital, the Division has created best-practice models for teaching and performing ultrasound-guided peripheral nerve blocks. As part of its commitment to education, the faculty make educational presentations on regional anesthesia topics to anesthesiology residents rotating at Kernan Hospital.

A monthly morbidity and mortality conference hosted by the Division addresses complications and aims to further improve the quality of care. A weekly journal club reviews current literature to enhance the application of evidence-based techniques to patient care. Several faculty members conduct weekly mock oral examinations for our

“Patient care is very complex, but I definitely feel prepared to take care of any patient.”

- Cristalle Cox, M.D.,  
Chief Resident 2012

Back to my patient

Call Pain Service to notify them that the patient will have a thoracic epidural in place for post-operative pain management.

Grab lunch in the cafeteria and return to the resident lounge where we talk about the liver transplant that started last night.

Back to the OR. Operation nearly complete.



Neurosurgical Anesthesiology  
Division Faculty

David L. Schreiberman, M.D.  
*Director, Neurosurgical  
Anesthesiology Division  
Assistant Professor*

Beatrice M. Afrangui, M.D.  
Douglas G. Martz, M.D.  
Mary J. Njoku, M.D.  
Baekhyo Shin, M.D.  
Vadivelu Sivaraman, M.B.B.S.

residents rotating through Kernan Hospital. An intimate working environment (faculty members and residents work in a one-to-one ratio) and a plethora of ultrasound machines make Kernan Hospital an ideal environment to learn regional anesthesia.

Residents also benefit from an annual workshop on ultrasound-guided regional anesthesia and acute pain management, which enables them to hear lectures and participate in direct demonstration of techniques on live human models and phantoms. Simulation of ultrasound-guided regional anesthesia is also an integral part of training.

A fellowship program enables a regional anesthesia fellow to learn, practice, and participate in clinical research at Kernan Hospital, the University of Maryland Medical Center, and the R Adams Cowley Shock Trauma Center. The first regional anesthesia fellow is scheduled to graduate in 2013.

Neurosurgical Anesthesiology

Patients with neurological diseases receive innovative high-quality perioperative care from the team in the Division of Neurosurgical Anesthesiology. Specialized care is provided for complex cases of cerebral vascular disorders, including peripheral nerve injuries, hydrocephalus, intracranial aneurysms, diseases of the spine, brain tumors, and epilepsy and other functional disorders.

Patients with neurological diseases receive care in the neurosurgical operating rooms, Neuroradiology Suite, and the Neurosurgical Intensive Care Unit. Collaborating with other members of the patient’s care team (such as neurosurgeons, otolaryngologists, and orthopedic surgeons), anesthesiologists with expertise in intraoperative neurologic

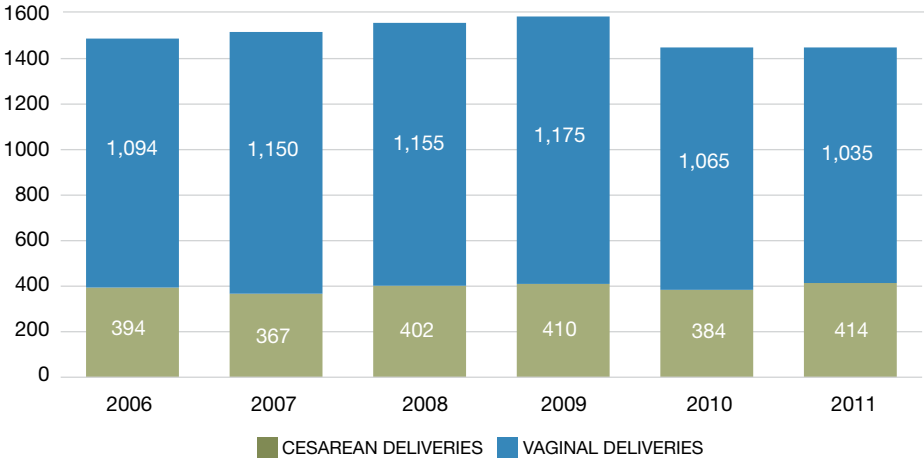
and cardiovascular monitoring provide extraordinarily specialized care.

Staff in the Division provide medical direction of the Intraoperative Neurophysiologic Monitoring Service at University of Maryland Medical Center, Shock Trauma, Kernan Hospital and the Veterans Administration Medical Center. Surgical services such as Neurosurgery, Orthopedics, Otorhinolaryngology, and Cardiothoracic and Vascular Surgery receive intraoperative neurophysiologic monitoring services for more than 1,100 cases each year. Monitoring modalities include brainstem auditory evoked potentials, somatosensory and transcranial motor evoked potentials, nerve conduction studies, brain mapping, electroencephalography, cranial and peripheral electromyography, and transcranial Doppler. Such monitoring enables anesthesiologists to quickly identify new neurologic impairments and suggest prompt correction and functional guidance to surgeons, thereby optimizing patient outcomes.

Obstetric Anesthesiology

The Division of Obstetric Anesthesiology includes ten faculty members who provide subspecialty care around-the-clock in the Labor and Delivery Suites. Over the past year, the Division provided care to 1,449 parturients; 29 percent were cesarean deliveries. Seventy-eight percent of the vaginal deliveries required neuraxial labor analgesia. Members of the Division cared for an additional 53 patients undergoing gynecologic surgery performed in Labor and Delivery (mainly cerclage and evacuation and curettage procedures).

Vaginal and Cesarean Deliveries



The obstetric anesthesiology team is exceptionally skilled in the care of high-risk pregnancy. Because UMMC serves as a transport hospital for the rest of the state, approximately 90 percent of the Division’s obstetric patients are considered to be high-risk. In addition to patients with complex fetal problems that often require fetal surgery or preterm delivery, the Division’s maternal population includes many patients with co-existing cardiac, neurosurgical, and respiratory diseases. Increasingly, obstetric anesthesiologists encounter patients with previous anesthetic problems due to super-morbid obesity or other issues. The Division of Obstetric Anesthesiology also provides bedside critical care services for critically ill parturients, collaborating with the Department of Obstetrics and Gynecology.

Recent improvements in the Division include implementation of the AIMS electronic medical record system, and hospital approval for additions and upgrades

of physical space. Faculty members also serve in leadership roles at the state level. For example, Division Director Andrew Malinow, M.D., is on the Perinatal Review Board, which sets the standards of care for parturients and their neonates in hospitals throughout Maryland; and Shobana Bharadwaj, M.B.B.S., and Shafonya Turner, M.D., sit on the Maryland Department of Health and Mental Hygiene Maternal Mortality Review Committee.

Education:

The Division of Obstetric Anesthesiology offers a fellowship in Obstetric Anesthesiology and provides educational opportunities for the one Maternal-Fetal Medicine fellow and seven residents per year during a one-month formal rotation on the service.

The Division conducts a daily 30-45 minute educational session that is very popular among the junior and senior anesthesiology residents who rotate on

Obstetric Anesthesiology  
Division Faculty

Andrew Malinow, M.D.  
*Vice Chair for Faculty Affairs  
Director, Obstetric  
Anesthesiology Division  
Professor of Anesthesiology  
and Obstetrics/Gynecology  
and Reproductive Sciences*

Beatrice M. Afrangui, M.D.  
Shobana Bharadwaj, M.B.B.S.  
Kathleen M. Davis, M.D.  
Chinwe A. Ihenatu, M.B., Ch.B.  
Douglas G. Martz, M.D.  
Sheryl Nagle, M.D.  
John Pallan, M.D.  
Amer A. Quaddoura, M.D.  
Shafonya M. Turner, M.D.  
Edwin J. Villamater, M.D.

Patient extubated and transported to the PACU. Epidural working well to control the patient's pain.

Setting up for the next case. Patient is coming from the Trauma ICU already intubated for a cervical spine stabilization.

Patient arrives. Total intravenous anesthesia without muscle relaxants is administered due to anticipated use of neurophysiologic monitoring during the procedure.

Entire OR team works together to position the patient in the prone position.



“Not only have I had great training at Maryland, but I have also found great friends in both the residents and attendings of the program.”  
- Katie Goergen, M.D.,  
Chief Resident 2012

Pain Medicine Division Faculty

Thelma B. Wright, M.D.  
Director, Pain Medicine Division  
Fellowship Director  
Assistant Professor

Natasha Durant, Psy.D.  
Kanchana Gattu, M.B.B.S.  
Seung J. Lee, M.D.

the service. Residents consistently do very well on the obstetric anesthesiology-specific parts of the American Board of Anesthesiology in-training and American Board of Anesthesiology written exams. On average, residents provide anesthesia for approximately 100 parturients each during their training. Dr. Bharadwaj regularly presents small group sessions on regional anesthesia for medical students who rotate on the service. She has also brought to fruition a robust simulation scenario that involves Anesthesiology and Obstetric residents as well as Labor and Delivery nurses.

Pain Medicine

Chronic pain affects one in five Americans, and the costs of treatment and lost productivity are profound. Those who suffer from chronic pain often seek treatment from multiple providers to obtain relief. The challenges of treatment include the negative stigma associated with opioid therapy for the treatment of pain.

All faculty in the Division of Pain Medicine are board-certified in Pain Medicine and are uniquely qualified to care for this population. Dedicated Pain Management Center staff — including Pain Medicine faculty and fellows, a pain psychologist, nurses, radiographers, and physical therapists — work together to create a treatment plan to facilitate each patient’s return to a productive quality of life. While opioid medications are used for pain relief, a combination of adjunctive medications, interventional therapies, psychological support, and physical therapy is probably the best approach to treat many painful conditions. The team strives to provide patients with compassionate and comprehensive services to reduce pain, promote coping strategies, and improve their function and quality of life.

This past year, the Pain Division added percutaneous kyphoplasty to its armamentarium to complement standard fluoroscopic interventional therapies. Kyphoplasty is a spinal procedure where

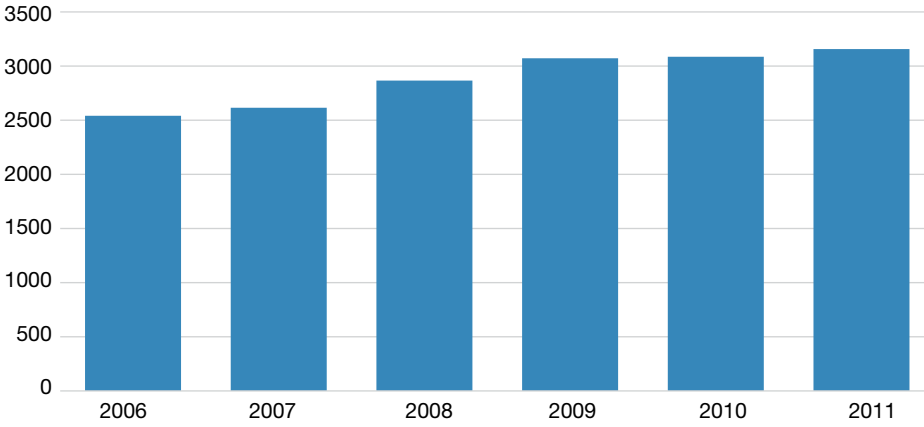
bone cement is injected through a needle into a fractured vertebra to alleviate pain. This procedure has the potential to restore bone height and reverse deformities caused by spinal compression fractures. Patients often feel immediate and lasting pain relief. The Pain Management Center’s fluoroscopic procedure area strives to provide a peaceful atmosphere, with relaxing music, soft lights, and calming words to alleviate the anxiety often associated with these types of procedures.

Education:

The Division of Pain Medicine offers an excellent opportunity for learning through an ACGME-accredited Pain Medicine Fellowship program directed by Thelma Wright, M.D. Each year, three new fellows interact with faculty and patients to learn about the management of chronic pain. By the end of the fellowship, they have mastered the many fluoroscopic and ultrasound-guided procedures used to treat chronic pain, as well as provide medical management. In the 2011 academic year alone, over 1,800 procedures were performed at the Pain Management Center. Residents in the Department of Anesthesiology spend one to two months rotating through Pain Medicine.

The Division also offers a weekly multidisciplinary pain management conference where a pain psychologist, physical therapist, and pain management faculty, fellows, and residents meet to discuss patients. This conference is followed by a didactic session on the pharmacology and pathophysiology of pain management and the various modalities used to treat pain. All residents take a test at the end of each rotation to insure they have mastered the didactic material relevant to pain medicine.

Pediatric Cases



Pediatric Anesthesiology

Children represent a special population of anesthesia patients. Staff members combine compassion and expertise to put both patients and their parents at ease — starting with the preoperative evaluation, throughout the operation, to postoperative care. All members of the Pediatric Anesthesiology Division are fellowship-trained. Pediatric patients are cared for in a separate child and family-centered area — the Pediatric Surgery Center. Last year, the Division administered 3,163 anesthetics.

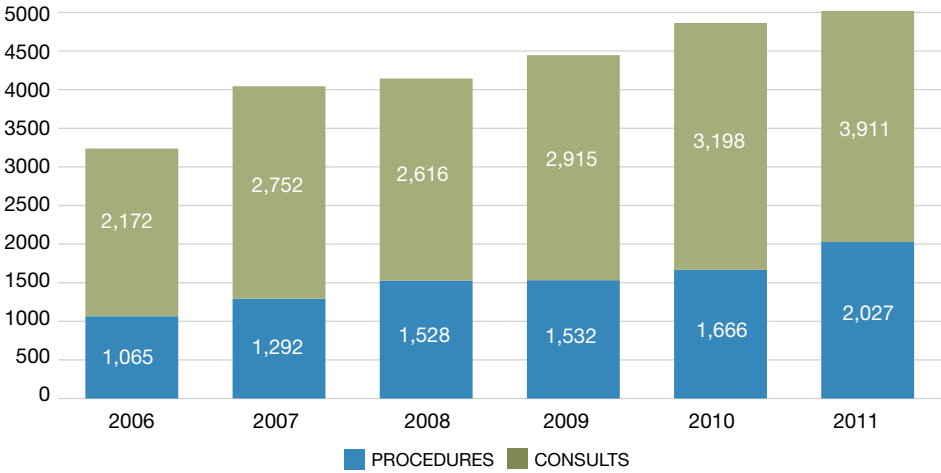
Clinical anesthesia services expanded to match the increase in the breadth and number of children’s services at the University of Maryland, including growth in pediatric cardiology, cardiovascular surgery, neurosurgery, radiation oncology, and orthopedics. A state-of-the art pediatric hybrid cardiac catheterization and surgery suite was opened this past year, where both conventional percutaneous cardiac catheterization and open-heart surgery may be performed in one

Pediatric Anesthesiology Division Faculty

Anne M. Savarese, M.D.  
Director, Pediatric Anesthesiology Division  
Assistant Professor

Monique Bellefleur, M.D., M.B.A.  
Isis Del Rio, M.D.  
Madhavi A. Naik, M.B.B.S.  
Teresa Niemiec, D.O.  
Shelley Ohliger, M.D.

Pain Procedures and Consults



Coordinate with the neurophysiologic monitoring team for intra-operative somatosensory and motor evoked potential monitoring.

15 minute break. Grab a snack, check email, check OR schedule for the next day, chat with friends in the PACU.

Mondays  
Group lecture, CA3 board review with classmates and friends in the anesthesiology library.

Back to the OR

Surgery complete. Patient is turned supine, remains intubated and is transported back to the ICU.



“We have a very comprehensive training program in Anesthesiology at the University of Maryland, with plenty of subspecialty as well as general case experience. I believe we are well trained and very capable anesthesiologists upon completion of this residency.”  
- Jessica Galey, M.D.,  
Chief Resident 2013

setting, offering cutting-edge therapeutic options to critically-ill infants with congenital heart disease.

Pediatric Anesthesiology faculty are committed to and recognized for evidence-based, top-quality anesthetic care for infants, children, and adolescents. Multidisciplinary conferences provide an opportunity for pediatric anesthesiologists to meet with their partners in pediatrics, surgery, and nursing to discuss individual cases, review literature, and refine pediatric perioperative clinical practice.

The Division helped implement the AIMS electronic medical record system with specialty-specific data capture screens and care algorithms, facilitating the monitoring and recording of data for every case. Pediatric AIMS designs encourage best practice, with screen prompts for total intravenous anesthesia, analgesics, anti-emetics, and antibiotics. New this year are age- and weight-based screens to guide the management of emergencies, such as cardiac arrest, allergy/anaphylaxis, local anesthetic toxicity, and malignant hyperthermia.

**Education:**

All anesthesiology residents rotate through the Division of Pediatric Anesthesiology. The Division delivers weekly morning pediatric anesthesiology lectures for rotating residents. It also offers a series of simulation-based educational pediatric scenarios using a SIMBABY interactive infant mannequin.

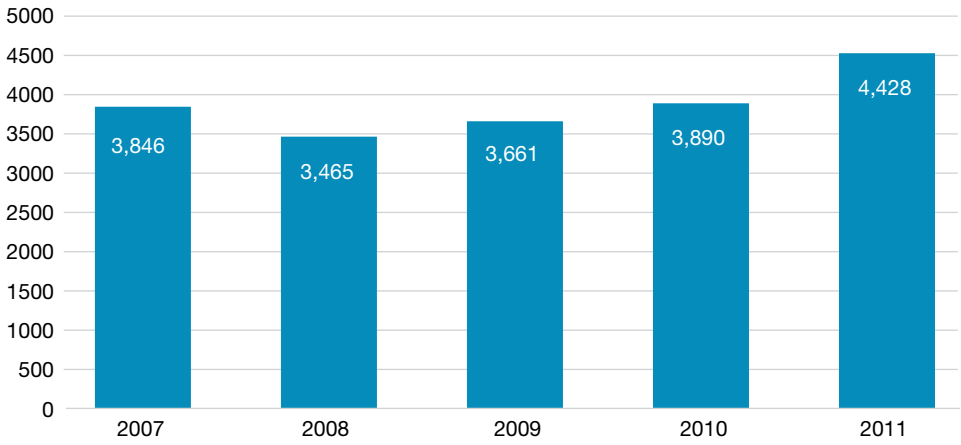
**Preoperative Readiness Evaluation and Preparation (PREP) Center**

The PREP Center provides preoperative history and physical documentation and performs pre-anesthesia evaluations for patients undergoing surgery at the University of Maryland Medical Center (with the exception of those who are already inpatients). About half of the patients are seen in the PREP Center, while the remaining patients are contacted by phone after gathering medical information to initiate and review a chart. The main goal of the pre-anesthetic evaluation is to improve the safety of patients undergoing surgery or procedures by minimizing risk. The PREP Center team accomplishes this goal by appropriately evaluating and managing medical conditions and identifying anesthetic risk factors.

The PREP Center team consists of an attending anesthesiologist, an anesthesiology resident, and several Certified Registered Nurse Practitioners (CRNPs), as well as nurses, patient care technicians, and clerical staff. Each patient’s case is presented to the anesthesiology attending, who discusses with other clinicians if a patient requires further testing or evaluation by other specialists (such as a cardiologist) before being approved to undergo surgery and anesthesia safely.

There have been a number of recent initiatives aimed at improving patient and surgeon satisfaction. Several new CRNPs have been hired and trained to work in the PREP Center, and they have been tremendously enthusiastic about their work. The hours the PREP Center is open have been extended, making it more convenient

PREP Center Visits



for patients to obtain appointments and be seen. New guidelines were developed and are being implemented to establish the need for forwarding necessary medical information (such as laboratory tests, history and physical exams, specialty evaluations, and electrocardiograms) to the PREP Center in a timely fashion, enabling patients to be approved for their procedures at least one week before surgery.

“My Medical File” (MMF) is a new Web-based initiative to facilitate the preoperative process. This program collects and files patient records that have been transmitted to a Web-based location, and also checks for chart completeness. Anyone with a role in the PREP Center, clinical anesthesia providers, and surgical offices will have access to the appropriate files for preoperative patients

and will be able to view secure medical information online.

This project has been initiated and is currently being piloted on four surgical services: Urology, ENT, Gynecology, and Orthopedics. This technology is expected to be implemented for all surgical services in the coming year. MMF will help track information and the timeliness of its arrival, helping to keep everyone involved in the preparation of surgical patients accountable — including surgical clinicians and office staff, as well as PREP Center clinicians and office staff. The PREP Center team is also developing a preoperative evaluation module containing pertinent patient information needed by the anesthesiologist in the operating room. This module will be part of the AIMS.

**PREP Center Faculty**

Beatrice M. Afrangui, M.D.  
*Medical Director, PREP Center*  
*Clinical Assistant Professor*

Kathleen M. Davis, M.D.  
Virginia E. Murphy, M.B., B.Ch., B.A.O.  
Sheryl Nagle, M.D.  
Robert J. Noorani, M.D.  
Victoria W. Smoot, M.D., M.S.

ON CALL BEGINS:  
Take over last cases of the day.

17:00

The three of us on call perform  
remaining preoperative evaluations  
on patients awaiting surgery.

18:30



Program in Regional Anesthesiology Faculty

Ron E. Samet, M.D.  
*Director, Program in Regional Anesthesiology Assistant Professor*

Lise R. Asaro, M.D.  
Paul E. Bigeleisen, M.D.  
Cynthia J. Bucci, M.D.  
Kathleen M. Davis, M.D.  
Mark D. Dimino, M.D.  
Andra D. DiStefano, M.D.  
Jeffrey T. Haugh, M.D.  
Emily Joe, M.D.  
Jeremy Kaplowitz, M.D.  
Patrick L. Lee, M.D.  
Arthur V. Milholland, M.D., Ph.D.  
Eric K. Shepard, M.D., F.C.C.M.  
Roger F. Shere-Wolfe, M.D., J.D., M.A.  
Shafonya M. Turner, M.D.  
Edwin J. Villamater, M.D.

Transplant Anesthesiology Division Faculty

Obi Udekwa, M.B.B.S.  
*Director, Transplant Anesthesiology*

Mary Njoku, M.D.  
Vadivelu Sivaraman, M.B.B.S.

Program in Regional Anesthesiology

The Program in Regional Anesthesiology at the University of Maryland was founded in August 2007 and continues to grow every year. The program features an increasing number of faculty members dedicated to providing advanced regional anesthetic techniques to a wide variety of patients undergoing surgery in the Trauma Operating Rooms, General Operating Rooms, or at Kernan Hospital. Faculty in the Program in Regional Anesthesia cross traditional divisional boundaries, giving this group true multidisciplinary expertise.

From July 1, 2009 to June 30, 2010 at University of Maryland Medical Center, the faculty administered roughly 450 peripheral nerve blocks, including upper extremity brachial plexus blocks in the interscalene, supraclavicular, infraclavicular, and axillary regions, as well as lower extremity femoral, sciatic, and saphenous nerve blocks. Faculty in the Program continue to offer patients truncal blocks, including thoracic paravertebral catheters and transverse abdominis plane blocks. More than 90 percent of regional anesthetics were performed with ultrasound guidance. With the purchase of new state-of-the-art ultrasound machines and lower frequency probes, regional anesthesia faculty are advancing the ability to perform deeper peripheral nerve blocks and ultrasound-guided neuraxial techniques.

The hospital and Program in Regional Anesthesiology opened a procedural block room, where regional anesthesia faculty can perform blocks on patients prior to their transport to the OR. The room is stocked with regional anesthesia equipment and a portable ultrasound machine for ultrasound-guided techniques, and is staffed with nurses familiar with peripheral nerve block procedures. This new resource has greatly enhanced the flow of operating room cases, improved efficiency, and increased patient comfort and satisfaction.

Education:

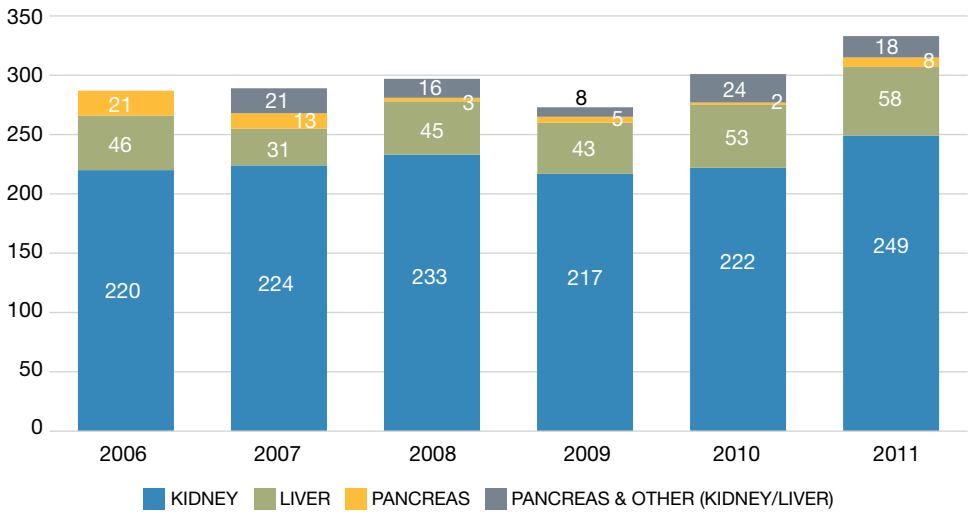
Program faculty present multiple lectures in regional anesthesia techniques to students, residents, fellows, and faculty via Grand Rounds presentations and resident lectures. This past year, resident workshops included a full-day hands-on training in regional anesthesia techniques, as well as a half-day workshop using simulation to perform ultrasound-guided vascular access and regional anesthesia techniques. The resident curriculum has been fully revised to reflect advances in ultrasound-guided regional anesthesia. Faculty also developed and present an annual lecture and workshop on regional anesthesia techniques for the University of Maryland Nurse Anesthesia Program.

Transplant Anesthesiology

The Transplant Division has experienced steadily growing volume, with more growth likely following the recruitment of two new transplant surgeons. In 2011, the Division completed 333 transplants (including transplants of organs from deceased and living donors, combined kidney/pancreas transplants, and combined liver/kidney transplants). New processes are being implemented to spend more time evaluating patients earlier in the transplant clinic. The Division participates in the greatest number of single-port laparoscopic kidney donations in the region. Through this procedure, the donor organ is able to be removed through one 5-cm incision in the navel.

Future plans include increasing the number of living liver donors. The Division is also working toward implementing a face transplant program in 2012 for patients with severe burns and facial trauma from combat injuries. These procedures are lengthy and complicated, and require the collaboration and expertise of a skilled team such as that found at the University of Maryland Medical Center.

Transplants



Trauma Anesthesiology

Staff in the Division of Trauma Anesthesiology care for patients at the R Adams Cowley Shock Trauma Center (STC) who require resuscitation and perioperative management. The STC, the world’s first free-standing trauma facility, is the primary adult trauma referral center for the entire state of Maryland, with capabilities exceeding a Level I trauma center designation.

The Division of Trauma Anesthesiology is one of the few groups in the world that specializes in trauma anesthesia, and is one of the largest. An attending anesthesiologist is present for every admission to the STC and plays a critical role in the initial management of the patient. Trauma anesthesiology faculty support six operating rooms every weekday and three to four each weekend, as well as holidays. In FY 2011, the Division cared for 5,746 patients in the OR (up 5.9 percent from FY 2010) and performed 759 intubations in the Trauma Resuscitation Unit.

In addition to patient care, the Division is committed to perform research to discover and develop more effective ways to care for critically ill and injured patients. Faculty are also members of national clinical and research committees and are well-represented at national and local symposia addressing trauma medicine, including the American Society of Anesthesiology annual meeting (where the Division presented four abstracts in 2011).

Goals for the Division include introducing innovative pain therapies, developing pain management guidelines for hip replacement patients, providing data to the American Society of Anesthesiologists Quality Institute, delivering anesthetic support for a new face transplantation program in close collaboration with the Division of Transplant Anesthesia, improving fluid and blood resuscitation through research and advanced point-of-care testing, and continuing to improve risk management approaches. Research that can improve pre-hospital provider care and triage to appropriate hospitals and trauma centers is also planned.

Trauma Anesthesiology Division Faculty

Yvette Fouché-Weber, M.D.  
*Director, Trauma Anesthesiology Division Assistant Professor*

John Blenko, M.D.  
Cynthia J. Bucci, M.D.  
Bianca M. Conti, M.D.  
Samuel M. Galvagno Jr., D.O., Ph.D.  
Thomas E. Grissom, M.D., F.C.C.M  
Mary L. Hyder, M.D.  
Ron E. Samet, M.D.  
Roger F. Shere-Wolfe, M.D., J.D., M.A.  
Sukhwant Sidhu, M.B.B.S.  
Robert A. Sikorski, M.D.  
Christopher T. Stephens, M.D., M.S.  
Joshua Tobin, M.D.

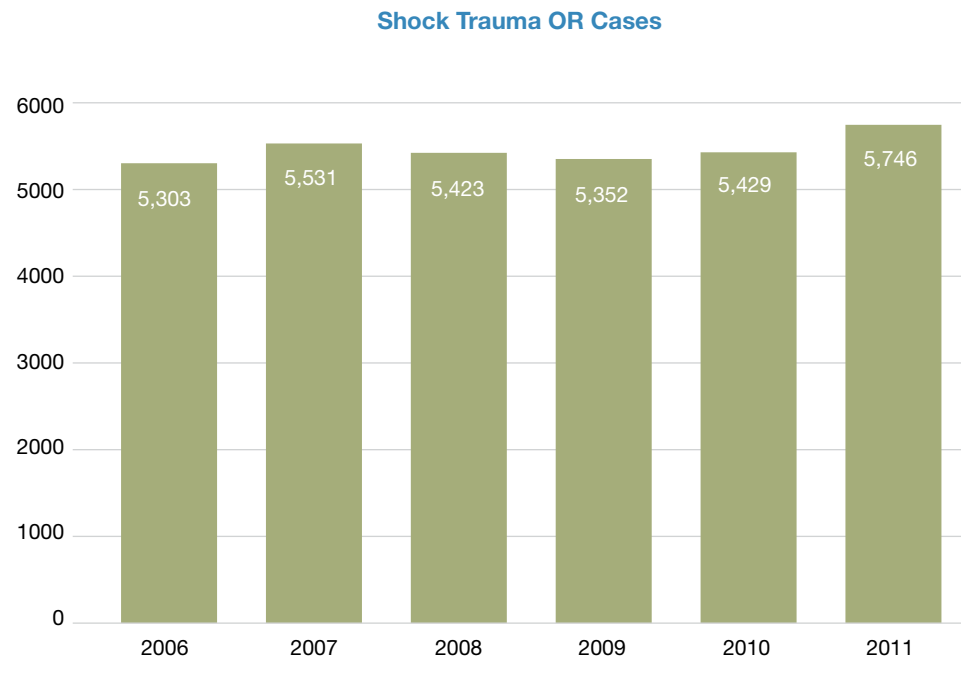
We all order dinner together.

19:00

Three residents on call in the GOR take turns covering emergency cases during the night.  
One other resident on call in OB. GOR call residents attend stat calls as a group.  
Hopefully get 3-4 hours sleep, but sometimes up all night!

10 p.m. – 7 a.m.





**VAMC Anesthesiology Department Members**

Edward Norris, M.D., M.B.A., F.A.H.A.  
*Clinical Professor and Associate Chair  
Department of Anesthesiology,  
Chief of Anesthesiology, VAMHCS*

Anila S. Bhatti, M.B.B.S.  
Daniel J. Bochicchio, M.D.  
Gregory Cheloff, M.D.  
Padmini Thomas, M.B.B.S.  
Kenneth Waters, M.D.  
Henry L. Wilson Jr., M.D.

Research projects in the Division include participation in the MASIMO ONPOINT study to identify changes in respiratory patterns that require intervention using a MASIMO noninvasive sensor placed on the neck. If validated, this approach could facilitate decision-making in the hospital, as well as warning before arrival at the hospital if intervention is required and whether it should be initiated prior to transport. This sensor could potentially be useful for personnel preparing to transport patients with cervical spinal cord injuries over significant distances. An effective sensor could become a standard monitoring device for these patients, and its use could also be extrapolated to the respiratory monitoring of sedated patients.

Other investigators in the Division are assessing the use of transesophageal echocardiography in patients with cervical spine injuries; comparing reintubation rates with the use of rocuronium compared with vecuronium; and determining the optimal patient position for visualizing the sciatic nerve in the popliteal fossa during ultrasonography.

**Education:**  
Trauma Anesthesiology staff are dedicated to hands-on and didactic instruction of paramedics, nurse anesthetists, medical students, residents, and fellows. The Division offers the only full-time fellowship in Trauma Anesthesiology in the country. Anesthesiologists from the Division teach every University of Maryland medical student in a special “hands-on” airway management course and lecture frequently in the Certified Registered Nurse Anesthetist (CRNA) program at the School of Nursing. The Division has made it a goal to develop simulation training for trauma anesthesia and trauma teams.

**Veterans Affairs Medical Center (VAMC) Affiliated Department**

The Baltimore Veterans Affairs Medical Center (VAMC) offers inpatient, outpatient, and primary care services for veterans living in Maryland and adjacent states. The VAMC maintains a close affiliation with the University of Maryland School of Medicine.

The VAMC Department of Anesthesiology provides perioperative, critical care, and pain management services to a diverse and complex population of veterans, including many patients with advanced cardiovascular, pulmonary, and metabolic diseases. The department’s clinical staff is expanding and currently includes 7 full-time, board-certified anesthesiologists, 10 CRNAs, and 2 anesthesia technicians. The VAMC perioperative environment includes 9 state-of-the-art operating rooms, a 12-bed Post-Anesthesia Care Unit, a 9-bed Same Day Surgical Unit, and a 10-bed Surgical Intensive Care Unit.

The department provides comprehensive clinical anesthesiology services to veterans undergoing a wide range of procedures, including major vascular, thoracic, neurosurgical, complex spine, orthopedic, plastic, urologic, ENT, gynecologic, and eye surgeries. Anesthesia services are

also provided to veterans undergoing electroconvulsive therapy and those requiring painful diagnostic and therapeutic procedures outside the operating room. Emergency airway management and intubation are provided by anesthesia staff around the clock.

In 2010, Dr. Edward J. Norris was named Chief of the VAMC Department of Anesthesiology, Associate Chair of the Department of Anesthesiology, and Clinical Professor at the University of Maryland School of Medicine. He was most recently Associate Professor in the Johns Hopkins School of Medicine and Director of Vascular and Endovascular Anesthesia at the Johns Hopkins Hospital. Dr. Norris is an accomplished clinical anesthesiologist whose expertise includes the care of patients undergoing complex aortic reconstruction and liver transplantation. He is also an accomplished teacher and has conducted landmark research into outcomes after vascular surgery.

**Education:**  
The department has a major teaching commitment involving residents, medical students, student nurse anesthetists, and numerous medical and allied health trainees. One to two anesthesiology residents rotate through the VAMC, which offers residents exposure to a consolidated perioperative program in a single, small-footprint, environment. One-on-one staffing with a board-certified attending anesthesiologist allows for optimal teaching contact hours and supervision. Case selection is tailored specifically to the resident level of training and interest, and the staffing model for residents emphasizes educational opportunities rather than service work requirements. In addition, the VAMC offers a robust clinical training environment, with representation from nine surgical divisions and many high-acuity patients.

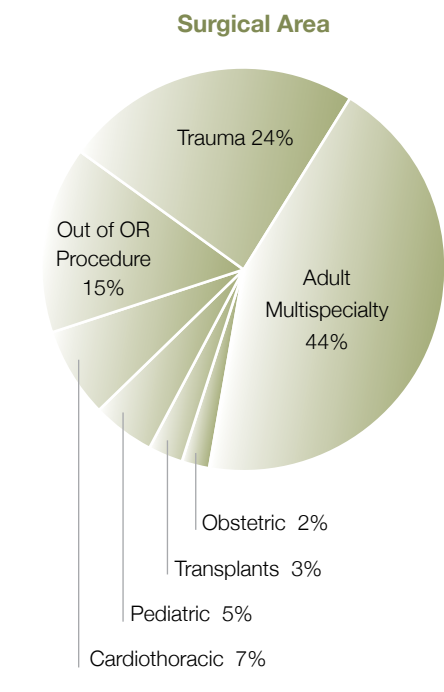
**Advancing Information Technology**

In addition to all of the main operating suites, the Anesthesia Information Management System (AIMS) has now been deployed in Obstetric Anesthesiology and all out-of-OR anesthetizing locations. ACLS protocol layouts and PALS layouts for pediatric cases have been implemented. AIMS implementation continues with the deployment of the system in the PREP Center in 2012. Once this is in place, there will be a completely electronic medical record for each patient’s unique operative or procedural encounter, from start to finish. In 2012, the Department will be upgrading Metavision OR (MVOR) to a version that will be certified for “meaningful use.” Meaningful use means that the system meets standards established by the Medicare and Medicaid Electronic Health Records (EHR) Incentive Program to track key clinical conditions, communicate that information to coordinate care, and report clinical quality measures and public health information.

An interface of MVOR to the GE-IDX Centricity Anesthesia will allow for faster and more accurate billing. Enhanced capture and reporting of Physician Quality Reporting System (PQRS) measures is also part of this interface. PQRS is a voluntary program authorized by the Tax Relief and Health Care Act of 2006. The goal of PQRS is to provide incentives to eligible professionals to improve patient care through evidence-based measures and to prepare for future pay-for-performance programs.

**AIMS by the Numbers**

243	Users
54	Number of sites currently wired for AIMS
54 gigabytes	Database size
40,967	Number of patients in database as of 5/1/12
265	Computers
2	Servers
SQL 2005	Database
Windows XP Windows Server	Workstation operating system
2003 Enterprise	Servers operating system
1 terabyte	Server storage
12 gigabytes of RAM	Server memory



**Key Patient Statistics Collected by AIMS**

**51.1 years**  
Average age, adult patients

**7.1 years**  
Average age, pediatric patients

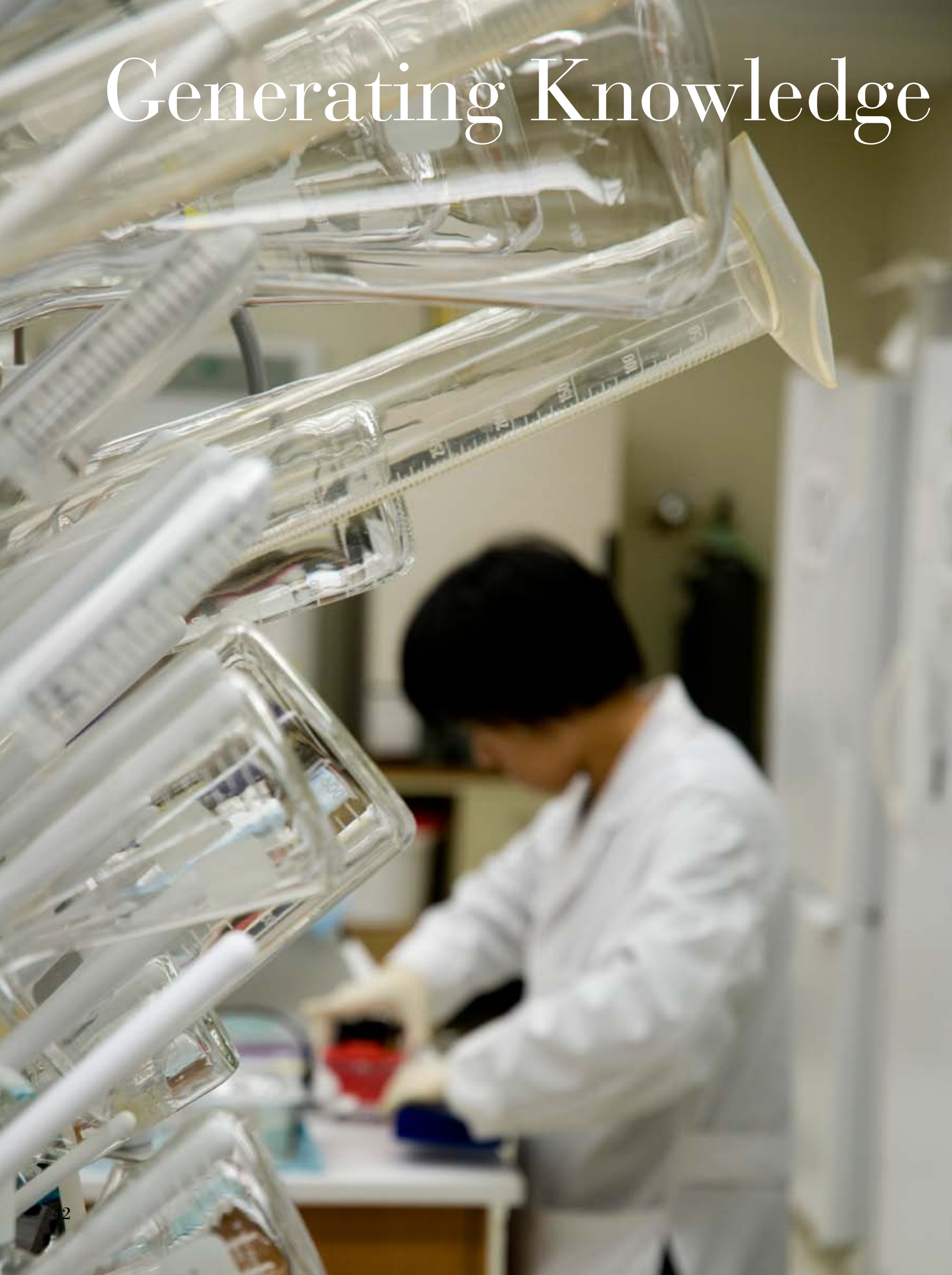
**54%**  
male

**46%**  
female

**86 kg (range 31 kg - 294 kg)**  
Average weight (adults)

**2.6**  
Average ASA Classification





# Generating Knowledge to Improve Outcomes

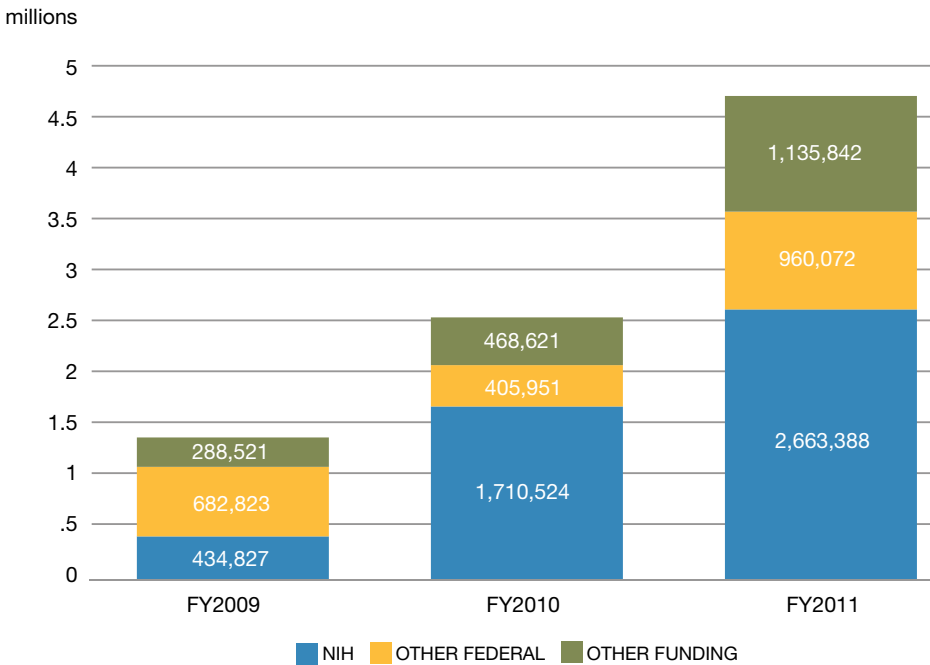
## RESEARCH

Basic science and clinical investigation provide for the basis for medical advances. Toward that goal, the University of Maryland Department of Anesthesiology supports vigorous basic and clinical research programs. These activities are conducted primarily under the umbrella of the Shock, Trauma and Anesthesiology Research Center for Sustainment of Trauma and Readiness Skills, an Organized Research Center (ORC) created in early 2008 which builds upon the Congressionally mandated Charles McC.Mathias National Study Center for Trauma and Emergency Medical Systems.

The mission of the STAR ORC is to facilitate translational research in areas related to trauma, tissue injury, critical care, and perioperative outcomes. The STAR Center includes 35 faculty members from multiple clinical and basic science departments. A goal has been to co-recruit faculty with other ORCs and Institutes and to reach out to investigators from other schools and campuses within the University of Maryland system. Collaborative interactions have been established or strengthened with the School of Pharmacy, School of Nursing, University of Maryland College Park, Uniformed Services University of the Health Sciences, and Georgetown University.

The STAR Center is developing multiple basic, translational, and clinical research initiatives, with the objective of creating nationally recognized programs of excellence focusing on neurotrauma (brain and spinal cord) and geriatric trauma and critical care. Renamed the Program in Aging, Trauma and Emergency Care (PATEC), this consortium includes STAR, the

Anesthesiology Department Faculty Funding



Department of Epidemiology and Public Health, the Center for Research on Aging, and the state-funded Geriatrics and Gerontology Education and Research Program. More than 30 faculty members from multiple campuses are actively involved in this effort.

Extramural research support in the STAR Center has grown rapidly, with this year's funding nearing \$10.6 million. NIH funding has increased 14 percent over the past year to \$4.5 million, including renewal of a National Child Health and Human Development program project grant with Gary Fiskum, Ph.D., as Co-Principal Investigator. Thomas Grissom, M.D., Colin Mackenzie, M.D., and Dr. Fiskum each received large multiyear grants from the Air Force this year. A multi-PI NIH RO1 award for Alan Faden, M.D., and Susan Dorsey of the School of Nursing will be also funded — all for FY 2012.

Internal scientific advisory committees have been established for

both preclinical and clinical research and meet semi-annually. In addition to selected STAR faculty, these committees each include three senior research leaders from other departments and research centers. An External Scientific Advisory Committee has also been convened, and includes six internationally recognized leaders in trauma, critical care medicine, and/or anesthesiology.

Several new members have joined the STAR full-time faculty. Bingren Hu, Ph.D., came to us with three active grants which he has transferred from the University of Miami. Marta Lipinski, Ph.D., was recently appointed as Assistant Professor of Anesthesiology by a joint faculty recruitment between STAR and the Center for Stem Cell Biology and Regenerative Medicine.



# STAR Faculty Research



The laboratory of Alan Faden, M.D., uses multidisciplinary approaches to examine the pathobiology of experimental brain and spinal cord injury and their treatment, focusing on cell cycle pathways, microglial activation, cell death pathways, metabotropic glutamate receptors, and the use of combination and multifunctional drug treatment strategies for neurotrauma. This research is supported by five NIH grants. There are active collaborations with the School of Pharmacy in medicinal chemistry and drug discovery, and with the School of Nursing in spinal cord injury.



Gary Fiskum, Ph.D., and his colleagues study the molecular mechanisms underlying ischemic and traumatic brain injury, using cell culture and animal models of adult and pediatric brain injury to understand how oxidative stress and mitochondrial dysfunction contribute to injury. They utilize both basic and translational research to decipher the molecular mechanisms of neural cell death, with the goal of improving survival and quality of life after brain injury. Investigators use tissue and fluid samples from patients with traumatic brain injuries to validate the mechanisms elucidated from animal models and to identify potential injury biomarkers.



The research interests of Alina Grigore, M.D. include temperature regimens and neuroprotection during cardiopulmonary bypass, spinal cord protection during thoracoabdominal aortic surgery, neuro-markers of spinal cord injury, perioperative right ventricular assessment and performance and correlation with outcomes in cardiac surgery.



Bingren Hu, Ph.D., and his colleagues study molecular mechanisms of ischemic and traumatic brain injury, using ischemia, traumatic brain injury, and neonatal hypoxia-ischemia animal models. Their research focuses on how synaptic plasticity and protein misfolding contribute to brain injury, as well as post-brain injury dysfunctions, complications, and recovery, and also on developing new therapies for brain injuries.



Tibor Kristian, Ph.D., investigates the role of mitochondrial dysfunction and catabolism of metabolic cofactors in ischemic brain injury. He has generated unique transgenic mice with fluorescently tagged neuronal mitochondria that enable visualization of morphological changes that precede cell death. His research is focused on the development of neuroprotective interventions utilizing compounds that protect cellular energy metabolism.



Marta Lipinski, Ph.D., uses in vivo and in vitro models to examine the role of autophagy after traumatic injury and to delineate the molecular mechanisms involved. Her long-term research goal is to define novel “drug-able” target molecules and pathways for the effective modulation of autophagy in traumatic brain injury and other neurodegenerative diseases.



David Loane, Ph.D., focuses on the mechanisms and modulation of chronic inflammation after experimental traumatic brain injury, and the impact of aging on outcome after such injury. He also studies common mechanisms underlying acute and chronic neurodegeneration.



Colin Mackenzie, M.B., Ch.B. (top) and Peter Hu, M.S., study predictions of trauma patient outcome using automated capture of vital signs data in the Trauma Resuscitation and Intensive Care Units of the Shock Trauma Center, as well as vital signs data during the pre-hospital care of these patients. By applying advanced signal-processing and machine-learning statistical techniques to the analysis of vital signs data, their goal is to predict the need for blood products and life-saving interventions during the first 48 hours of care in the Shock Trauma Center.



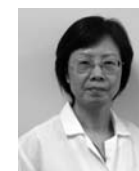
Brian Polster, Ph.D., examines subcellular mechanisms that govern neural cell death and survival in acute brain injury and neurodegenerative disorders, focusing on the role of mitochondrial proteases and nitric oxide. He is also developing unique methods to study mitochondrial bioenergetics in models of neuronal injury.



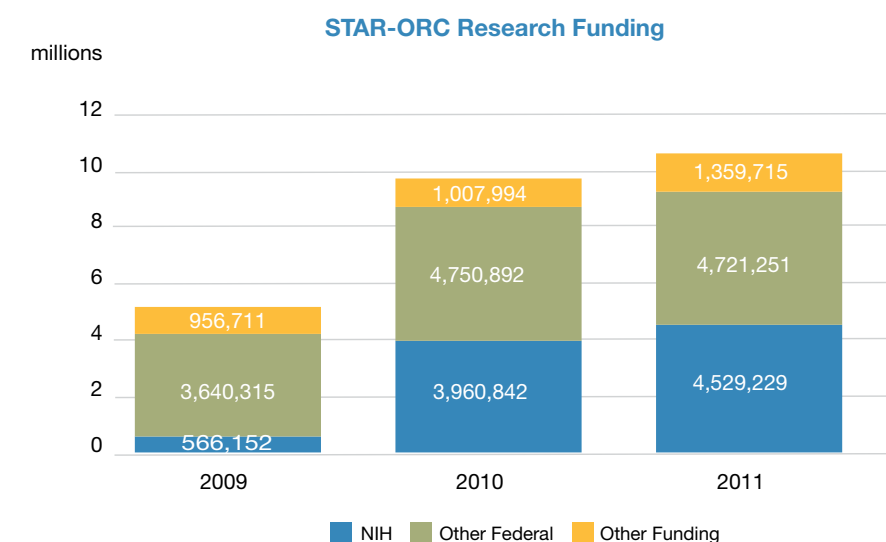
Peter Rock, M.D., M.B.A., leads the Program in Patient Safety and Clinical Outcomes. This program is involved in several large multicenter investigator-initiated clinical trials. These include reducing the incidence of ICU delirium, improving postoperative cognitive function in the elderly, evaluating genetic factors that impact postoperative deep venous thrombosis and infections, and improving outcomes in patients with Acute Respiratory Distress Syndrome.



Bogdan Stoica, Ph.D., studies mechanisms of neuronal cell death using both cell culture and animal neurotrauma models. One emphasis has been on the role of cell cycle pathways and apoptosis in the induction of secondary tissue loss after traumatic brain injury.



Junfang Wu, Ph.D., explores secondary damage after experimental spinal cord injury, as well as the role of glial cells in the response to injury, using both in vivo and in vitro models.





# Strengthening

## Organizational Structure



# Our Foundation

## 2011 Survey Supports Faculty Satisfaction

In 2011, the Department of Anesthesiology conducted its second faculty survey (the first was done in 2007). Both surveys were developed with the assistance of an external organizational development consultant. Questions were drawn from other external surveys, such as those administered by the Association of American Medical Colleges. The main topics surveyed included in the questions:

- broad dimensions of work
- areas of progress and those that need improvement
- clinical care
- educational development
- faculty development and research
- cohesiveness
- patient safety
- leadership
- administrative support

A notable 92% response rate gives confidence that the survey results represent the Department well.

### Four-Year Comparison

% Agree or Strongly Agree	2007	2011
Everyone "pushing wagon in same direction"	9.3%	33.8%
Have equipment/materials needed	21.4%	62.7%
Leadership paying attention to "right" issues	26.0%	62.0%

A comparison of the 2011 survey results with those from 2007 shows very significant improvements in key areas and illustrates the importance of ongoing efforts to strengthen the department.

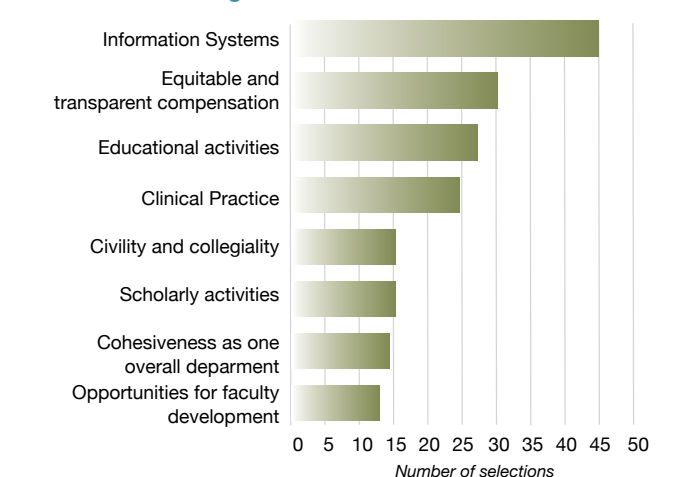
### Department Strengths



The quality of the culture of the Department dominated the responses about its greatest strengths. Teamwork, compassion, integrity, professionalism, cultural sensitivity, and civility were the top-listed strengths. As a testament to the individuals who make up the Department, the values and culture highlighted by the survey underscore the foundation of an effective Department.

We are very pleased with the areas recognized as having made the most progress in the last three years. Core issues that were recognized as having improved include compensation, educational and scholarly activities, civility, collegiality, cohesiveness, and faculty development. Information systems were highlighted as having made the most progress, due to the successful implementation of the Anesthesia Information Management System (AIMS) in all anesthetizing locations at the University of Maryland Medical Center.

### Areas of Most Progress in the Last 3 Years



The survey also identified areas of focus for the next three years. Faculty indicated that they would like more support with scholarly activities, career development, and the promotion process. They also cited a desire for improved work/life balance and stress reduction. The four-year comparison of important objectives is consistent with other aspects of the survey that indicate the progress that has been made improving cohesiveness, collegiality and civility. It also reflects the significant efforts dedicated to educational activities and that there is less need to focus on these activities compared to 2007. Action plans to address these goals have already been put into motion.



Faculty surveys are an important tool the Department is using for information-gathering and information-sharing. They are also helpful in achieving the goals of increasing transparency and providing more ways for faculty to have meaningful input in the shaping of Departmental priorities and decisions. The unedited results were shared at a faculty meeting, and they generated much positive discussion. The experience provided the opportunity for all to see the Department holistically, highlighting strengths and focusing attention on areas for improvement.



Administrative staff

Administration

The Department continues to identify and implement administrative process improvements. Drawing from the Anesthesia Information Management System (AIMS), an electronic information screen now notifies physicians when a chart needs more information for billing purposes, reducing the time for charges to be entered by several days. Webcasting and teleconferencing capabilities were upgraded to high-definition video, and conference space was renovated. Desktop scanners were installed at all administrative workstations; all critical documents are now scanned, saving significant administrative time related to document filing and retrieval and reducing paper use.

In spite of challenging economic times and payer pressures on reimbursement, by all metrics the Department performed very well in 2011. Volumes rose in nearly all clinical areas.

All financial targets and benchmarks for the year were met or exceeded. For example, the average number of days in Accounts Receivable was reduced by seven, and charge lag days decreased by five. These results demonstrate that the Department is operating efficiently, and continues to move forward from a position of strength.

Greening the Scene

The Department of Anesthesiology recognizes its responsibility to the environment and has made sustainable practices a priority. Below are some of the efforts aimed at reducing the environmental impact of Departmental activities, as well as new eco-friendly work habits that have been implemented.

Reducing Energy Consumption

- Updated lighting controls to include motion-activated sensors
- Copiers/printers set to “sleep” when not in use
- Installation of coffee makers with thermal brewers (no energy-using burner elements)
- Use of Energy Star monitors, computers, copiers

Reducing Paper Usage and Recycling

- Implemented document scanning and use of electronic “file cabinets,” thus reducing volume of printing and copying
- Posted signage at copiers/printers encouraging “think before printing or copying” — scan instead of print, print on both sides, multiple pages per sheet, eco-print (uses less toner), use black and white instead of color
- Placed paper recycling baskets in individual offices and recycling receptacles for paper, newspapers, cardboard, cans, and bottles in common areas
- Recycle printer cartridges and batteries
- Reuse scrap paper for note taking, etc.
- Sending documents electronically instead of printing (such as event invitations, announcements, and presentations)
- Post announcements on Departmental intranet page and screensavers, rather than printing
- Purchase eco-friendly, biodegradable kitchen supplies, and certain recycled paper office products
- Use refurbished/recycled products where possible (such as printer cartridges)

Our people make us the best.

Primary Faculty



Left to right  
Afrangui, Beatrice M., M.D., Clinical Assistant Professor  
Asaro, Lise R., M.D., Clinical Assistant Professor  
Atwal, Jasjit B., M.B.B.S., Clinical Assistant Professor  
Bellefleur, Monique, M.D., M.B.A., Assistant Professor  
Bernstein, Wendy K., M.D., Associate Professor

Bharadwaj, Shobana, M.B.B.S., Assistant Professor  
Bhatti, Anila S., M.B.B.S., Clinical Assistant Professor  
Bigeleisen, Paul E., M.D., Professor  
Blenko, John, M.D., Associate Professor  
Bochicchio, Daniel J., M.D., Assistant Professor

Boyd, Malinda T., M.D., Clinical Assistant Professor  
Bucci, Cynthia J., M.D., Assistant Professor  
Conti, Bianca M., M.D., Assistant Professor  
Darwish, Ribal S., M.D., Assistant Professor  
Davis, Kathleen M., M.D., Assistant Professor

Del Rio, Isis, M.D., Assistant Professor  
Deshpande, Seema P., M.B.B.S., Assistant Professor  
Dimino, Mark D., M.D., Assistant Professor  
DiStefano, Andra D., M.D., Assistant Professor  
Drago, John P, D.O., J.D., Clinical Assistant Professor

Durant, Natasha, Psy.D., Clinical Assistant Professor  
Esposito, Stephanie, M.D., M.S., Assistant Professor  
Faden, Alan I., M.D., Professor  
Fiskum, Gary M., Ph.D., Professor  
Fitzpatrick, Molly, M.D., Assistant Professor

Fouché-Weber, Yvette, M.D., Assistant Professor  
Galvagno Jr., Samuel M., D.O., Ph.D., Assistant Professor  
Gattu, Kanchana, M.B.B.S., Assistant Professor  
Gheorghiu, Ileana, M.D., Assistant Professor  
Grewal, Ashanpreet, M.D., Assistant Professor

Grigore, Alina, M.D., M.H.S., F.A.S.E., Associate Professor  
Grissom, Thomas E., M.D., F.C.C.M, Associate Professor  
Haugh, Jeffrey T., M.D., Assistant Professor  
Hong, Caron M., M.D., M.Sc., Assistant Professor  
Hu, Bingren, Ph.D., Professor

Hu, Fu M. (Peter), M.S., Assistant Professor  
Hyder, Mary L., M.D., Assistant Professor  
Ihenatu, Chinwe A., M.B., Ch.B., Clinical Assistant Professor  
Joe, Emily, M.D., Assistant Professor  
Joshi-Turner, Gauri, M.B.B.S., Assistant Professor

Kaplowitz, Jeremy, M.D., Assistant Professor  
Kristian, Tibor, Ph.D., Assistant Professor  
Lee, Patrick L., M.D., Instructor  
Lee, Seung J., M.D., Assistant Professor  
Lipinski, Marta, Ph.D., Assistant Professor





*Left to right*  
Loane, David J., Ph.D., Assistant Professor  
Mackenzie, Colin F., M.B., Ch.B., Clinical Professor  
Malinow, Andrew M., M.D., Professor  
Martz, Douglas G., M.D., Associate Professor  
Milholland, Arthur V., M.D., Ph.D., Clinical Assistant Professor



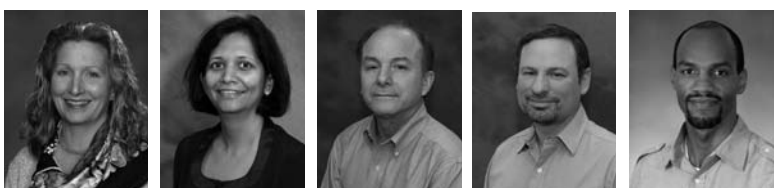
Murphy, Virginia E., M.B., B.Ch., B.A.O., Clinical Assistant Professor  
Nagle, Sheryl, M.D., Clinical Assistant Professor  
Naik, Madhavi A., M.B.B.S., Assistant Professor  
Niemiec, Teresa, D.O., Assistant Professor  
Njoku, Mary J., M.D., Associate Professor



Noorani, Robert J., M.D., Assistant Professor  
Norris, Edward, M.D., M.B.A., Clinical Professor  
Odonkor, Patrick N., M.B., Ch.B., Assistant Professor  
Ohliger, Shelley, M.D., Assistant Professor  
Pallan, John, M.D., Assistant Professor



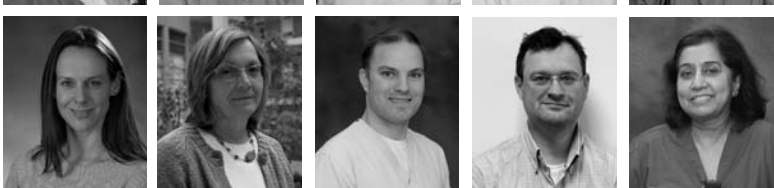
Polster, Brian M., Ph.D., Assistant Professor  
Quaddoura, Amer A., M.D., Clinical Assistant Professor  
Rock, Peter, M.D., M.B.A., Professor  
Roman, Philip E.F., M.D., M.P.H., Assistant Professor  
Samet, Ron E., M.D., Assistant Professor



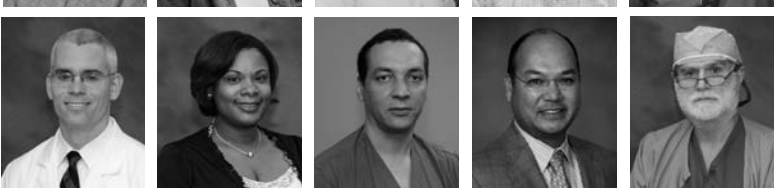
Savarese, Anne M., M.D., Assistant Professor  
Sawant, Sanyogeeta, M.B.B.S., Clinical Assistant Professor  
Schreibman, David L., M.D., Assistant Professor  
Shepard, Eric K., M.D., F.C.C.M., Assistant Professor  
Sheppard, Maurice R., M.D., Instructor



Shere-Wolfe, Roger F., M.D., J.D., M.A., Assistant Professor  
Shin, Baekhyo, M.D., Clinical Professor  
Sidhu, Sukhwant, M.B.B.S., Instructor  
Sikorski, Robert A., M.D., Assistant Professor  
Sivaraman, Vadivelu, M.B.B.S., Assistant Professor



Smith, Daniela, M.D., Assistant Professor  
Smoot, Victoria W., M.D., M.S., Assistant Professor  
Stephens, Christopher T., M.D., M.S., Assistant Professor  
Stoica, Bogdan A., M.D., Assistant Professor  
Thomas, Padmini, M.B.B.S., Assistant Professor



Tobin, Joshua, M.D., Assistant Professor  
Turner, Shafonya M., M.D., Assistant Professor  
Udekwu, Obi R., M.B.B.S., Assistant Professor  
Villamater, Edwin J., M.D., Assistant Professor  
Wilson Jr., Henry L., M.D., Assistant Professor



Wright, Thelma B., M.D., Assistant Professor  
Wu, Junfang, B.M., Ph.D., Assistant Professor

**Secondary Faculty (Primary Department)**

Abrams, Thomas W., Ph.D., Associate Professor  
(Pharmacology and Experimental Therapeutics)  
Coop, Andrew, Ph.D., Professor (School of Pharmacy)  
Dorsey, Susan G., Ph.D, R.N., Associate Professor (School of Nursing)  
Fengtiam Xue, Ph.D., Assistant Professor (School of Pharmacy)  
Frost, Douglas O., Ph.D., Clinical Professor  
(Pharmacology and Experimental Therapeutics)  
MacKerell, Alexander D., Ph.D., Professor (School of Pharmacy)  
Rosenthal, Robert E., M.D., Professor (Emergency Medicine)  
Sears, Andrew L., Ph.D., Professor (Information Systems)  
Sheth, Kevin N., M.D., Assistant Professor (Neurology)

**Volunteer Faculty**

Ashman, Michael N., M.D., Clinical Assistant Professor  
Durant, Natasha, Psy.D., Clinical Assistant Professor  
Goldstein, Larry J, Ph.D., Adjunct Professor  
Helrich, Martin, M.D., B.S., Professor Emeritus  
Masur, Henry, M.D., Clinical Professor  
McAreavey, Dorothea, B.M.,B.Ch., Adjunct Assoc Professor  
Natanson, Charles, M.D., Adjunct Professor  
Ognibene, Frederick, M.D., Adjunct Assoc Professor  
Shelhamer, James H., M.D., Adjunct Professor

**Pain Management Center**

Bower, Cathy, B.S.N., R.N.-B.C. – Clinical Nurse, Acute Pain  
Clyde, Christina, M.S., R.N.-B.C. – Director of Practice Operations  
Collins, Norma, R.N. – Clinical Nurse  
Cohen, Vicki, B.S.N., R.N. – Clinical Nurse  
Conaway, Cheryl – Medical Practice Representative III  
Denbow, Bernice, B.S.N., R.N. – Clinical Nurse  
Durant, Natasha, Ph.D. – Licensd Clinical Psychologist II  
Duren, Elease – Medical Practice Representative  
Elder, Jonathan, R.T. – Radiographer  
Fitzsimmons, Karen, B.S.N., R.N. – Clinical Nurse  
Garcia, Candy – Medical Practice Representative II  
O'Connor, Karen, R.N. – Clinical Nurse  
Ryan, Stefanie, P.T. – Physical Therapist  
Stallings, Della, R.N. – Clinical Nurse  
Watts-Gibson, La-Vett – Medical Practice Representative III, Team Leader  
Williams, Christina – Administrative Assistant III

**Transesophageal Echo Sonographers**

Ezzati, Babak  
Nguyen, Trinh, R.C.S  
Salinas, Maria .  
Shats, Inna, M.A., B.S, RDCS, FASE - Supervisor

**Neurophysiologic Monitoring Technologists**

Babaran, Richie Cae C.N.I.M., B.S.M.T., R.M.T.  
Berlin, Samantha, B.S.  
Del Rosario, Mary, B.S.  
Ferguson, Bryan B., R.E.P.T., C.N.I.M., M.C.S.E. - Supervisor  
Irle, Kary, B.S., J.D.  
Saxe, Mark, B.S.  
Singson, Hy-D, C.N.I.M., B.S.P.H.  
Smith, Courtney, M.S.  
Striano, Michele, B.S.

**Anesthesia Techs**

Beaver, Ryan  
Bolling, David  
Burroughs, Bryan - Supervisor  
Bwamu, Douglas G  
Charles, Clark  
Emerson, Sarah  
Emich, Jessica  
Fanning, Maura  
Fine, Jessica  
Franks, Rosalyn J  
Garrett, Roger  
Green, Tavon  
Grimm, Melissa  
Hubbard, Jeff  
Johnson, Shaun  
Johnson, Tonya  
Maxwell, Matthew  
Moore, Corey  
Palmer, Myrona  
Parson, Lauri  
Pittman, Tagressa  
Lewis, Melvin  
Sonza, Lyno Jay  
Sheppard, Lanell

Terry, Keith  
Wells, Jeremy  
Weller, Alexandra  
Young, Nicole

**Research Staff**

Akintola, Titilola, Technician  
Balan, Irina, Post-Doctoral Fellow  
Berger, Stephanie, Lab Manager  
Cabatbat, Rainier, Technician  
Cangelosi, Peter, UMBC Student  
Cardiff, Katherine, Technician  
Chen, Bo, Post-Doctoral Fellow  
Clerc, Pascaline, Post-Doctoral Fellow  
Dinizo, Michael, Technician  
Gettings, Alyse, UB Student  
Guanciale, Kelsey, Technician  
Gupta, Emily, Lab Assistant  
Hanscom, Marie, Technician  
Kabadi, Shruti, Ph.D., Post-Doctoral Fellow  
Liu, Chunli, Lab Specialist  
Luo, Tao, Ph.D., Post-Doctoral Fellow  
Skovira, Jacob, Ph.D., Post-Doctoral Fellow  
Kumar, Alok, Ph.D., Post-Doctoral Fellow  
Laird, Melissa, Post-Doctoral Fellow  
Maduka, Richard, UMBC Student  
Mehrabyan, Zara, Lab Manager  
Nzonlie Lowe, Marie-Claude, Vol  
Ohanna, Victoria, Research Asst.  
Pan, Yan, Research Assistant  
Park, Yujung, Research Assistant  
Piao, Chunshu, Ph.D., Post-Doctoral Fellow  
Proctor, Julie, Lab Supervisor  
Sabirzhanov, Boris, Ph.D., Post-Doctoral Fellow  
Sabirzhanova, Inna, Post-Doctoral Fellow  
Sanchez, Jonathan, Lab Assistant  
Scutella, Dominique, Research Asst.  
Skopin, Mark, Ph.D., Post-Doctoral Fellow  
Smith, Stuart, UMBC Student  
Sullivan, Deborah, Lab Helper  
Tianfei Luo, Post-Doctoral Fellow  
Teixeira, Cristina, Research Asst.  
Wang, Weiwei, Post-Doctoral Fellow  
Zhao, Jingwei, Post-Doctoral Fellow  
Zhao, Zaorui “Jerry”, Ph.D., Post-Doctoral Fellow  
Zhang, Fan, Post-Doctoral Fellow

**Professional Billing Office**

Dixon-Proctor, Nakia - Patient Account Representative II  
Gray, Sherman - Patient Account Manager  
Clayton, Tracy - Patient Account Representative II  
Davis-Lifsey, Alice – Certified Coder  
Hallinger, Judith - Billing Coordinator  
Kizina, Shelly - Patient Account Representative II  
Nicholson, Tammy - Patient Account Representative III  
Roehm-Tornell, Eta – Patient Account Representative II  
Sizemore, Judy - Certified Coder  
Wintering, Tara - Patient Account Representative II

**Administration**

Armiger, Josephine – Administrative Manager  
Brooks, Timothy – Manager of Information Technology  
Brown, Denise, Administrative Assistant II  
Burcham, Betsy – Sr. Faculty Coordinator  
Cashwell, Wanda – Administrative Assistant III  
Earle-Jackson, Pamela – Project Manager  
Felton, Gabriela - Executive Administrative Assistant  
Flayhart, Kim, C.M.P.E., C.P.C. - Associate Administrator  
Hebert, Leah, Executive Administrative Assistant  
Jones, David – Desktop Engineer  
Leshinskie, Vickie – Office Assistant  
Levi, Michael –Residency/Fellowship Assistant  
McFadden, Debbie, B.A. – Financial Coordinator  
Moon, Terri – Administrative Assistant III  
Plunkett, Susan – Residency & Fellowship Coordinator  
Pompanio, Emily – Administrative Assistant III  
Samuels, Lolita, Clinical Database Analyst  
Shearer, Jake – Finance & Projects Analyst  
Simmons, Hugh, M.B.A. – Sr. Administrator  
Stubbs, La Toya, B.S. – Lead Clinical Research Specialist  
Tchuenbou, Josie, M.B.A. – Finance Manager  
Utz, Julie, AS – AIMS System Administrator  
Webb, Taryn – Administrative Assistant III





Goetz, Linda, M.H.S., C.R.N.A.,  
*Director, Nurse Anesthetists*  
Adogu, Obinna, C.R.N.A.  
Amoroso, Chris, C.R.N.A.  
Batoon, Bonjo, C.R.N.A.  
Best, Lionel, C.R.N.A.  
Billington, Kate, C.R.N.A.

Boyden, William, C.R.N.A.  
Broussard, Mike, C.R.N.A.  
Burgess, Christina, C.R.N.A.  
Ciurca, Robyn, C.R.N.A.  
Cline, Cheryl, C.R.N.A.  
Colbert, Carmen, C.R.N.A.

Conry, Marisa, C.R.N.A.  
Dick, Erika, C.R.N.A.  
Downey, Dale, C.R.N.A.  
Downey, Leanne, C.R.N.A.  
Drager, Emilene, C.R.N.A.  
Ejanda, Ron, C.R.N.A.

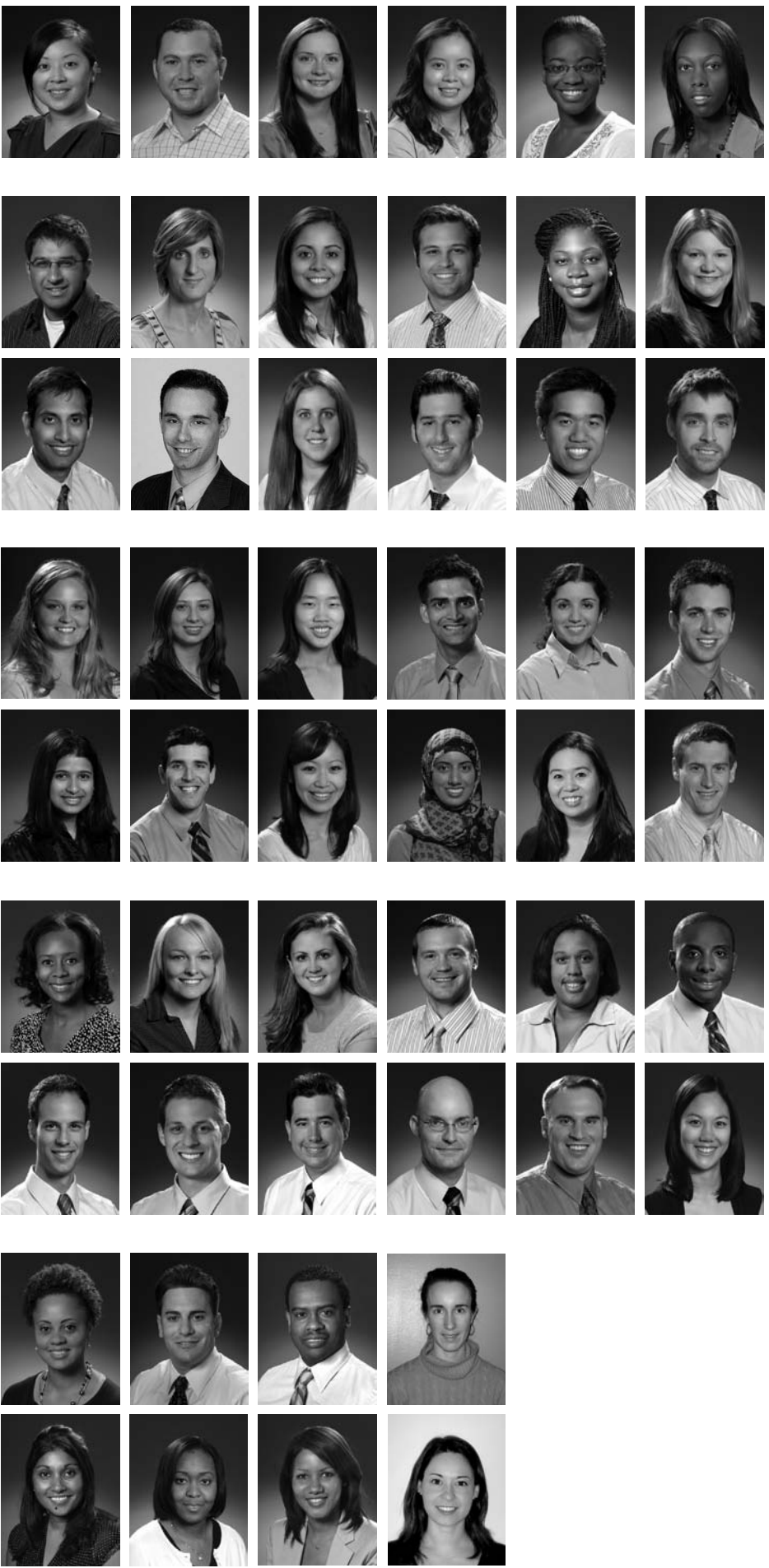
Esaka, Victorine, C.R.N.A.  
Fiet, Rebeca, C.R.N.A.  
Fox, Matt, C.R.N.A.  
Gonzalez, Michelle, C.R.N.A.  
Harrison, Stacy, C.R.N.A.  
Howie, Bill, D.N.P., C.R.N.A.

Irish, Emily, C.R.N.A.  
Lacy, Ashley, C.R.N.A.  
Ludwig, Kristina, C.R.N.A.  
Magich, Chuck, C.R.N.A.  
McDonald, Heather, D.N.P., C.R.N.A.  
Miller, Sharee, C.R.N.A.

Muntuerto, Anne, C.R.N.A.  
Muscara, Gina, D.N.P., C.R.N.A..  
Parker-McKenzie, Rochelle, C.R.N.A.  
Prisant, Amanda, C.R.N.A.  
Ritchie, Tara, C.R.N.A.  
Sampson, Cindy, C.R.N.A.

Santos, Kristine, C.R.N.A.  
Shaughnessy, Adam, C.R.N.A.  
Sigalovsky, Alex, C.R.N.A.  
Sigalovsky, Natalie, C.R.N.A.  
Sliwkowski, Joey, C.R.N.A.  
Thomas, Krystle, C.R.N.A.

Trainum, Tracey, C.R.N.A.  
Turner, Deverie, C.R.N.A.  
Webster, Jessica, C.R.N.A.  
Wood, Tracy, C.R.N.A.  
Young, Theresa, C.R.N.A.



**Class of 2015**  
Kim, Michelle, M.D.  
Levi, Todd, M.D.  
Neely, Amy, M.D.  
Nguyen, Wendy, M.D.  
Ofosu, Nana, M.D.  
Williams, Brittney, M.D.

**Class of 2014**  
Bansal, Vikram, M.D.  
DuPuis, Kate, M.D.  
Geng-Ramos, Giuliana, M.D.  
Goehner, Nicholas, M.D.  
Gyebi-Foster, Juliet, M.D.  
Hobbs, Jessica, M.D.

Jassal, Vineet, M.D.  
Lebow, Brandon, M.D.  
Piercy, Jessica, M.D.  
Shander, Benjamin, M.D.  
Siu, John, M.D.  
Smith, Chase, M.D.

**Class of 2013**  
Galey, Jessica, M.D.  
Gimshteyn, Yelena, M.D.  
Huang, Andrea, M.D.  
Khan, Ansar, M.D.  
Khatib, Alwafaa, M.D.  
Mazur, Jordan, M.D.  
Naquib, Dahlia, M.D.

Shah, Sneha, M.D.  
Siegel, Alexander, M.D.  
Tao, Jing, M.D.  
Tirmizi, Henna, M.D.  
Villacin, Maria Karla, M.D.  
Walker, Andrew, M.D.  
Wilson, Earl, M.D.

**CA-1 Class of 2012**  
Cox, Cristalle, M.D.  
Goergen, Katie, M.D.  
Kahntroff, Stephanie, M.D.  
Lange, Aaron, M.D.  
Lewis, Ilene, M.D.  
Montgomery, Maurice, M.D.  
Mun, Kevin, M.D.

Paydar, Kiarash, M.D.  
Porter, Andrew, D.O.  
Sappenfield, Joshua, M.D.  
Steele, John, M.D.  
Strauss, Erik, M.D.  
Yu, Corinna, M.D.

**Fellows (Specialty)**  
Asike, Deondra P., M.D. (Pain)  
Barack, Justin, M.D. (Cardiothoracic)  
Franklin, Christopher, M.D. (Critical Care)  
Greco, Karla, M.D. (Trauma)

James, Shaka, M.D. (Cardiothoracic)  
Karunwi, Omolara, M.D. (Pain)  
McIntosh, Ayana, M.D. (Pain)  
Sterling, Alena, M.D. (Trauma)



# Dept. of Anesthesiology

FISCAL YEAR 2011

(includes 2010 publications which did not appear in the 2010-2011 Annual Report)

# Publications

## Peer-reviewed

1. Aslakson RA, Romig M, **Galvagno SM**, Colantuoni E, Cosgrove S, Pronovost PJ. Accounting for multiple concurrent catheters increases central line associated bloodstream infection rates - practical data supporting a theoretical concern. *Infect Control Hosp Epidemiol*. 2011 Feb; 32(2):121-124.

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3. Bonatti J, Rehman A, Schwartz K, **Deshpande S**, Kon ZN, Lehr EJ, Zimrin D, Griffith BP. Robotic totally endoscopic triple coronary artery bypass grafting on the arrested heart: report of the first successful clinical case. *Heart Surg Forum*. 2010 Dec; 13:346-348.

4. Byrnes KR, Fricke ST, **Faden AI**. Neuropathological differences between rats and mice after spinal cord injury. *J Magn Reson Imaging*. 2010 Oct; 32(4):836-846.

5. Byrnes KR, Washington PM, Knoblach SM, Hoffman E, **Faden AI**. Delayed inflammatory mRNA and protein expression after spinal cord injury. *Journal of Neuroinflammation*. 2011 Oct; 8(1):130.

6. Byrnes KR, **Loane DJ**, **Stoica BA**, Zhang J, **Faden AI**. Delayed mGluR5 activation limits neuroinflammation and neurodegeneration after traumatic brain injury. *J Neuroinflammation*. 2012 Feb 28; 9:43.

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11. **Faden, AI**. Microglial activation and traumatic brain injury. *Ann Neurol*. 2011 Sep; 70:345-346.

12. **Faden, AI**. Transitions and transformations. *Neurotherapeutics*. 2011 Jan; 8(1):1.

13. Fitzgerald M, Cameron P, **Mackenzie CF**, Farrow N, Scicluna P, Gocentas R, Bystrzycki A, Lee G, O'Reilly G, Andrianopoulos N, Dziukas L, Cooper DJ, Silvers A, Mori A, Murray A, Smith S, Xiao Y, Stub D, McDermott FT, Rosenfeld JV. Trauma resuscitation errors and computer assisted decision support. *Arch Surg*. 2011 Feb; 146(2):218-225.

14. Furuya T, Kim M, **Lipinski M**, Li J, Kim D, Lu T, Shen Y, Rameh L, Yankner B, Tsai L, Yuan J. Negative regulation of Vps34 by Cdk mediated phosphorylation. *Mol Cell*. 2010 May; 38:500-511.

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16. **Galvagno SM**. Assessing health-related quality of life with the EQ-5D. *Air Med J*. 2011 Sep-Oct; 30(5):258-263.

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52. Piao CS, **Loane DJ, Stoica BA**, Li S, Hanscom M, Cabatbat R, Blomgren K, **Faden AI**. Combined inhibition of cell death induced by apoptosis inducing factor and caspases provides additive neuroprotection in experimental traumatic brain injury. *Neurobiol Dis*. 2012 Mar 9. [Epub ahead of print]

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57. Scafidi S, Racz J, **Hazelton J**, McKenna MC, **Fiskum G**. Neuroprotection by acetyl-L-carnitine after traumatic injury to the immature rat brain. *Develop Neurosci*. 2011; 32:480-487.

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61. Stein DM, **Hu P**, Brenner M, Sheth K, Liu K, Xiong W, Aarabi B, Scalea TM. Brief episodes of intracranial hypertension and cerebral hypoperfusion are associated with poor functional outcome following severe traumatic brain injury. *J Trauma*. 2011 Aug; 71(2):364-373.

62. **Tobin JM**, Via DK, Carter T. Tactical evacuation: extending critical care on rotary wing platforms to forward surgical facilities. *Mil Med*. 2011 Jan; 176(1):4-6.

63. **Tobin JM**. Usage and efficacy of airway adjuncts in an emergency intubation kit. *Emerg Med Australas*. 2011 Aug; 23(4):514-515.

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65. Toman J, **Fiskum G**. Influence of aging on membrane permeability transition in brain mitochondria. *J Bioenerg Biomembr*. 2011 Feb; 43:3-10.

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#### Invited Publications

1. Djainai G, Ramakrishna H, **Grigore AM**. Temperature and Brain Protection in Cardiac Surgery. In: Bonser RS, Pagano D, Haverich A (eds.) *Brain Protection in Cardiac Surgery*. London: Springer-Verlag; 2011; 141-157.

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4. **Galvagno SM**. Patient Monitoring Outside of the OR. In: Urman R, Gross W, Philip B, (eds). *The Textbook of Clinical Anesthesia Practice Outside of the Operating Room*. New York: Oxford University Press; 2011; 3:20-27.

5. **Galvagno SM**, Sikka, KK. Management Aspects of Anesthesia Practice: Statistics for Anesthesiology Researchers. In: Sikka P, Urman R, Vacanti CA (eds). *Essential Clinical Anesthesia*. Cambridge, MA: Cambridge University Press; 2011; 142:874-880.

6. **Galvagno SM**. Intensive Care Unit: Cardiopulmonary Resuscitation. In: Sikka P, Urman R, Vacanti CA (eds). *Essential Clinical Anesthesia*. Cambridge, MA: Cambridge University Press; 2011; 153:947-954.

7. **Grigore AM**, Thunberg CA, Savage RM, Smedira NJ. Surgical Considerations and Assessment in Heart Failure Surgery. In: Savage R, Aronson S, Sherman S (eds). *Comprehensive Textbook of Perioperative Transesophageal Echocardiography 2nd Edition*. Philadelphia: Lippincott Williams and Wilkins; 2011; 622-660.

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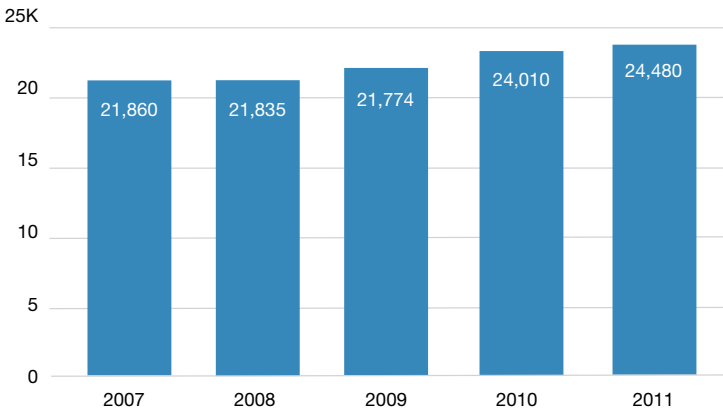
10. Soane L, **Polster BM, Fiskum G**. Mitochondrial Mechanisms of Neural Cell Death in Cerebral Ischemia. In: Reed JC, Green D (eds). *Apoptosis: Physiology and Pathology of Cell Death*. Cambridge, MA: Cambridge University Press. 2011; pp 153-163.

11. **Stoica B, Faden AI**. Programmed Neuronal Cell Death Mechanisms in CNS Injury. In: Fujikawa DG (ed). *Acute Neuronal Injury: The Role of Excitotoxic Cell Death Mechanisms*. New York: Springer Science and Business Media, LLC.; 2010; pp169-199.

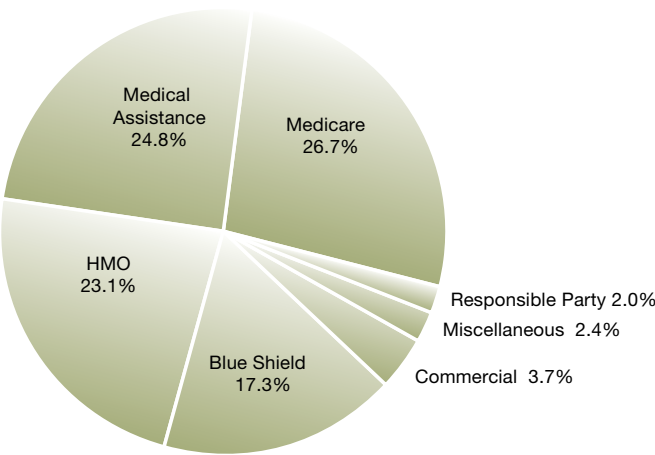


# End of Year Summary

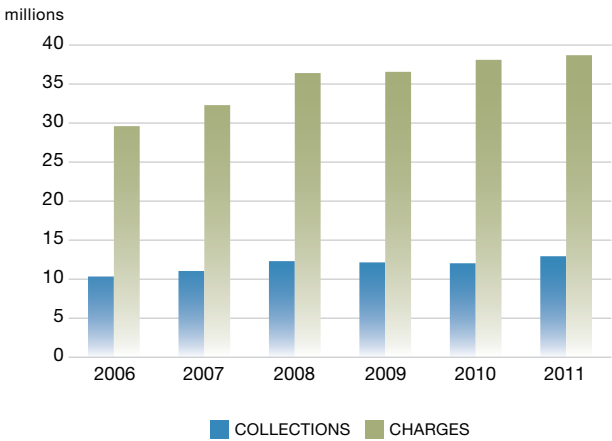
Total OR Case Volumes



2011 Payer Mix



Fiscal Year Charges and Collections







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