

*Annual Report 2014*



University of Pittsburgh

**UPMC** LIFE  
CHANGING  
MEDICINE

# Department of Anesthesiology



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# Message from the Interim Chair



**MARSHALL W. WEBSTER, MD**  
Interim Chair, Department of  
Anesthesiology; Senior Vice  
President, UPMC

The University of Pittsburgh/UPMC Department of Anesthesiology is widely considered the largest academic anesthesiology program in the country, with 198 faculty and 386 Certified Registered Nurse Anesthetist full-time equivalents who support more than 300,000 procedures, including over 90,000 chronic/acute pain visits and 14,000 obstetrical deliveries, at 303 anesthetizing locations annually. We rank in the top ten anesthesiology departments nationally in federally funded grants, with total research awards exceeding \$4.5 million. Our residency program is ranked as one of the best in the nation, and we have ten active fellowship programs.

The growth of our department along with UPMC and the University of Pittsburgh drives an extraordinary renaissance of medical and technological innovation, economic prosperity, and cultural renewal. As we expand each year in size and significance, the department continues to recruit outstanding scientists and physicians to contribute innovative ideas and maintain our role as one of the world leaders in all aspects (anesthesiology, pain medicine, and critical care) of our specialty's role in research and clinical care.

## Department Goals

The mission of the Department of Anesthesiology is to provide superlative service, achieve excellence in education, and conduct world-renowned research. In short, this translates into our motto of the **three Es** — Enhance, Excel, and Enlighten

**CLINICAL** The clinical goals of the department are to enhance patient care by focusing on pain management, management of nausea or vomiting, and rapid reintegration into society. We strive to emphasize patient safety, which is not only a rational basis for the practice of medicine, but also serves as the foundation upon which all of our other goals are built.

**EDUCATIONAL** We strive to excel in the education of medical students, nurses, paraprofessionals, residents, fellows, and faculty. We achieve this goal through consistently applying our core teaching principles: every student is different, every student is capable, and every student deserves our best. These three principles guide our training programs at all levels and serve as a beacon for both our faculty and our students.

**SCIENTIFIC** Our current research focus is the search for the molecular basis of anesthesia. Even though man has been administering anesthetics for well over 150 years, we are only now beginning to understand this basis. We also have a large clinical trials program and have initiated a serious and sustained effort to not only address the unknown issues surrounding pain mechanisms, but also to explore the genetic underpinnings of pain. We continue to enlighten our colleagues not only in Pittsburgh, but also around the world, with our focused effort on patient safety.

# Vice Chairs, Chiefs, and Directors

Marshall W. Webster, MD

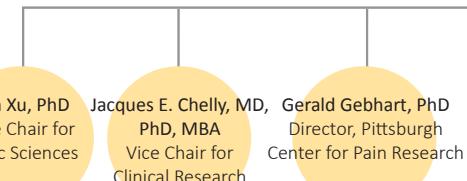
Interim Chair, Department of Anesthesiology; Senior Vice President, UPMC

Mark E. Hudson, MD, MBA  
Executive Vice Chair

## CLINICAL



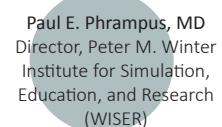
## RESEARCH



## EDUCATION



## SIMULATION



## Clinical Sites/Divisions



# Clinical Division Reports



**MARK E. HUDSON, MD, MBA**  
Executive Vice Chair  
Vice Chair for Clinical Operations

## Executive Summary

The UPMC/University of Pittsburgh Department of Anesthesiology serves 15 hospitals:

- **UPMC Presbyterian** is a Level I Regional Resource Trauma Center, as well as a renowned center for organ transplantation and a recognized leader in cardiology and cardiothoracic surgery, critical care medicine and trauma services, and neurosurgery. **UPMC Montefiore** is part of the UPMC Presbyterian system and specializes in ambulatory services and liver transplantation.
- **Children's Hospital of Pittsburgh of UPMC (CHP)** is devoted solely to the care of infants, children, and young adults and is one of the few hospitals in the nation to go completely paperless. In 2014, CHP was again named in *U.S. News & World Report's* Honor Roll of America's Best Children's Hospitals.

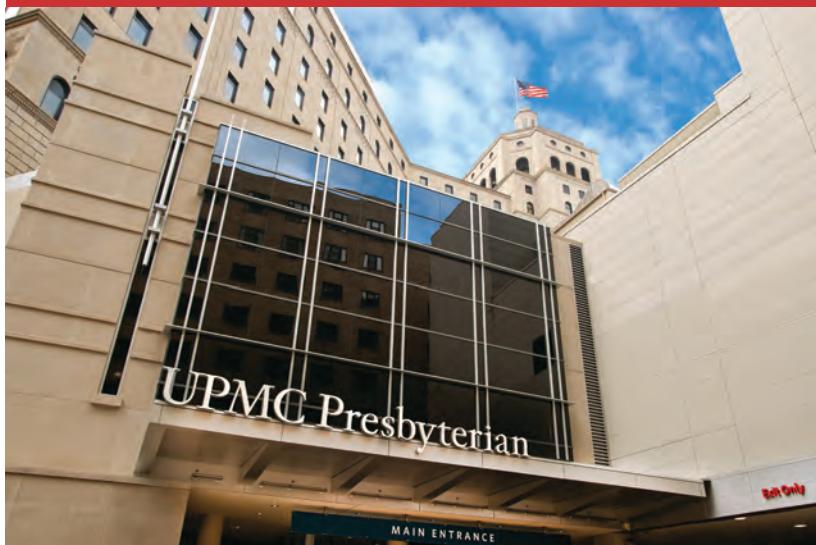
- **Magee-Womens Hospital of UPMC** is ranked among the top 12 hospitals in the nation for gynecological care and is a National Center of Excellence in Women's Health, one of the first recognized by the U.S. Department of Health and Human Services. Their Neonatal Intensive Care Unit is the largest in Pennsylvania and one of the largest in the country.
- **UPMC St. Margaret**, a 249-bed acute care and teaching hospital in Aspinwall, is a Magnet™ designated hospital. Magnet status is the highest international recognition for nursing excellence and leadership.
- **UPMC Shadyside** also holds Magnet™ status and is home to the Hillman Cancer Center, one of the nation's largest and most advanced cancer research and patient care facilities.
- The **Veterans Affairs Pittsburgh Healthcare System** serves as an acute care facility and major surgical tertiary care facility for veterans of the United States military.
- **UPMC McKeesport** is an acute care community hospital and an approved site for the Program of All-inclusive Care for the Elderly (PACE).
- **UPMC Mercy** is Pittsburgh's only Catholic hospital with specialized services, including Level I trauma and burn services, the neurosciences, physical medicine and rehabilitation, and women's health.
- **UPMC Mercy South Side Outpatient Center** is an ambulatory surgical center that serves as a one-stop location for diagnostic and routine outpatient services such as x-rays, lab work, and same-day surgery.
- **UPMC Passavant** is a tertiary care center north of Pittsburgh with two campuses in McCandless and Cranberry Township (Butler County), focusing on specialties such as cancer, cardiac care, orthopedics, and spine surgery.

# Anesthesiology Clinical Sites in Western Pennsylvania



- **UPMC South Surgery Center**, located in Pittsburgh's South Hills, accommodates outpatient procedures such as dental surgery, gastroenterology, general surgery, gynecology, neurosurgery, ophthalmology, orthopedics, otolaryngology, pediatrics, plastic surgery, podiatry, and urology.
- **UPMC Northwest**, located in Seneca, Cranberry Township (Venango County), has 96 private rooms, including 30 that can be converted for semi-private occupancy, yielding as many as 126 beds.
- **UPMC East** is a brand new 300+ bed hospital with seven state-of-the-art operating rooms and 140 medical-surgical patient rooms equipped with specially designed SmartRoom software to help monitor, track, and document patient care.
- **UPMC Bedford Memorial** is an acute care general hospital in Everett, PA with units for telemetry services and medical, surgical, obstetrical, intensive, and coronary care. The hospital also operates a cardiac-pulmonary rehabilitation program and outpatient and ambulatory surgical units.
- **UPMC Palermo (ISMETT)** serves as a major transplantation center for Southern Italy and other countries in the Mediterranean region.

# UPMC Presbyterian/Montefiore



UPMC Presbyterian



UPMC Montefiore

Institute and Clinic [WPIC]), electrophysiology suite, cardiac catheterization lab, and MRI suite. Major clinical initiatives during the year included efforts to improve efficiency; the frequency of on-time starts for the first case of the day continued to improve (peaking at 79% in the last month of FY14). The electronic anesthesia record was increasingly utilized, especially in locations outside the OR, including the ECT suite at WPIC. Almost 95% of the FY14 cases were documented electronically, a 6% increase over FY13.

Anesthesiology services at UPMC Presbyterian/Montefiore are highly subspecialty-oriented. Many of the advanced subspecialty anesthesiology resident rotations (liver transplantation, cardiac, ENT, thoracic, trauma, and neuroanesthesia) are based here. Many novice residents and SRNAs perform their first cases at UPMC Presbyterian. The UPMC Presbyterian faculty is very active in medical student and resident education; they not only teach in the OR, but also deliver lectures, coordinate problem-based learning discussions, design and implement rotation curricula, serve on medical student and resident education committees, interview resident applicants, and teach at the Peter M. Winter Institute for Simulation Education and Research (WISER).

**JOSEPH J. QUINLAN, MD**  
Chief Anesthesiologist

UPMC Presbyterian/Montefiore is the largest quaternary care hospital site of the UPMC Health System and the largest in western Pennsylvania. It is the department's core hospital in terms of clinical activity and resident education and is a nexus for clinical research.

The site is larger than many entire academic departments found elsewhere in the country. It comprises 52 faculty members who cover 42 operating rooms (ORs) and up to 14 additional, non-OR anesthetizing locations. The site is staffed by almost 100 full-time-equivalent Certified Registered Nurse Anesthetists (CRNAs). Up to 15 residents and 10 student nurse anesthetists (SRNAs) rotate at the site at any one time. Four Certified Registered Nurse Practitioners (CRNPs) provide care throughout the site as well as at the Pre-Anesthesia Evaluation and Testing Center.

In FY14, UPMC Presbyterian/Montefiore anesthesiology faculty supervised 40,269 anesthetics. Of these cases, 24,764 were performed in the ORs and 15,505 were performed outside the ORs. Anesthesia was provided for the entire spectrum of surgical and special procedures, from combined thoracic and abdominal transplantation to electroconvulsive therapy. Transplants increased for the second consecutive year to 390 during FY14, 22 (6%) more than in FY13. Locations where services were provided included the gastroenterology lab, bronchoscopy suite, electroconvulsive therapy (ECT) suite (at Western Psychiatric

## Subdivisions of UPMC Presbyterian/Montefiore



**RAYMOND M. PLANINSIC, MD**  
Director

## Transplantation Anesthesiology

The UPMC Presbyterian/Montefiore Division of Transplantation Anesthesiology (TA) is responsible for the care of patients undergoing liver, intestinal, multivisceral, kidney, pancreas, and composite tissue allograft (CTA) transplantation. TA also provides anesthesiology care and work-up for patients undergoing major hepatic resections. During FY14, 263 solid organ transplants were performed at UPMC Presbyterian/Montefiore, approximately 13% more than in FY13. These included 183 kidney (97 deceased-donor, 86 live-donor), five combined kidney/liver, 55 liver (45 deceased-donor and 10 live-donor), 16 pancreas-kidney/pancreas, and two intestinal/multivisceral transplants.

TA's primary responsibilities include preoperative assessment of transplant candidates, participation in candidate selection, intraoperative management, and postoperative visits. Preoperative consultation of transplant candidates is the main strength of the service. As true consultants, transplant anesthesiologists provide hepatologists and surgeons with valuable information on extrahepatic organ function.

Anesthetic management of hepatic, intestinal, multivisceral, kidney, pancreatic, and CTA transplantation requires both highly sophisticated monitoring and tight control of physiologic variables. For hemodynamic monitoring, TA staff members routinely determine right ventricular ejection fraction, right ventricular end-diastolic volume, and mixed-venous oxygen saturation using a pulmonary artery catheter. Two-dimensional transesophageal echocardiography also plays an important role in determining and optimizing cardiac contractility and preload.

UPMC Presbyterian/Montefiore continues to serve as the referral center for high-risk patients because of our diverse expertise and multidisciplinary approach to managing patients with multiple organ dysfunction. As a result, an increasing number of patients over 65 years of age and those with significant cardiopulmonary disease and/or a complicated surgical history (often rejected as candidates by other programs) underwent successful organ transplantation. Several Jehovah's Witness patients have undergone successful liver transplantation without the use of blood products at UPMC. In addition, UPMC Presbyterian/Montefiore is one of the only centers that performs liver transplantation on patients with known HIV disease.

Education in the UPMC Presbyterian/Montefiore TA service consists of a four week mandatory rotation for third year residents and an elective rotation (three to nine months) for fourth year residents and clinical fellows. Under TA faculty leadership, residents have the additional benefit of training at the Peter M. Winter Institute for Simulation, Education, and Research (WISER) in the "Anesthesia for Liver Transplantation" course.

TA members participate in diverse academic activities. During FY14, the TA faculty was very productive and participated in numerous meetings and symposiums, presenting their work related to organ transplantation. Ongoing TA research activities include: monitoring and treating cardiovascular problems and coagulopathy in transplant patients; effects of immunosuppression on coagulation in transplantation; mediators to minimize preservation/reperfusion injury in transplanted organs; the impact of expanding marginal organ use in transplantation; intraoperative management of CTA transplantation; and comparing epidural and paravertebral blocks for perioperative pain management in patients undergoing open liver resections.

## Subdivisions of UPMC Presbyterian/Montefiore

### Neuroanesthesiology & Supportive Care

FERENC E. GYULAI, MD, Director

The UPMC Presbyterian Neurosurgical Anesthesiology service provided anesthetic care for almost 5,000 neurosurgical procedures during FY14. Operations included expanded endonasal approaches, craniotomy for tumor, retromastoid craniectomy for microvascular decompression of various cranial nerves, and spinal surgery. Two separate Neurosurgical Intensive Care Units continued to facilitate innovative approaches to the acute care of cerebral vascular pathologies and promoted optimal care for patients with neurotrauma and other acute neurological injuries. UPMC Presbyterian provides anesthetic management at the Center for Neurointerventional and Neuroendovascular Therapy. Services provided by this combined interventional neuroradiologic practice include embolization of cerebral vascular aneurism; arterio-venous malformations; tumors and dural and cavernous sinus fistulae; treatment of refractory epistaxis; sclerotherapy; temporary balloon occlusion testing with blood flow evaluation; stroke thrombolysis and thrombectomy; dural sinus thrombolysis and thrombectomy; petrosal sinus sampling; carotid, vertebral artery, subclavian artery, and intracranial artery stenting; vessel sacrifice; Wada testing; vertebroplasty (methylmethacrylate vertebral body injections); alcohol sclerotherapy; and routine angiography. The rest of the clinical caseload continues to include various stereotactic procedures such as MRI-guided and CT-guided stereotactic surgery and three-dimensional localization. In addition, deep hypothermic circulatory arrest is being used in conjunction with cardiopulmonary bypass for the clipping of particularly inaccessible intracranial aneurysms.

The division's didactic program currently consists of a weekly and monthly subspecialty conference, intraoperative teaching, and a manual of guided reading. In addition, residents may now access a multimedia version of neuroanesthesiology instruction through the Internet. Increasing attendance at a monthly neuro-anesthesiology conference has fostered lively and informative discussion. Twenty lectures were given in the last academic year, eight by faculty members and sixteen by residents rotating through neuroanesthesiology. Faculty lectures included guest lectures by neurosurgeons, neurophysiologists, and neuroradiologists, which brought refreshing new perspectives and productive dialogue.

### Same Day Services

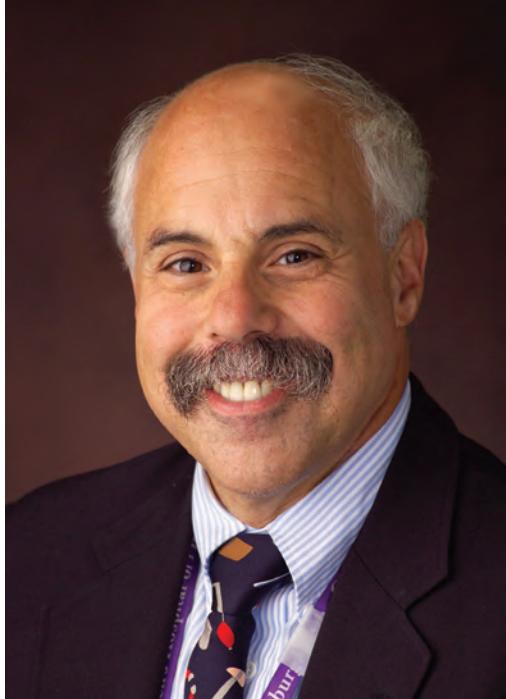
PATRICK J. FORTE, MD, Medical Director

Same Day Services at UPMC Presbyterian/Montefiore includes both Same Day Surgery (SDS) and the Preoperative Evaluation Center (PEC). In FY14, 15,008 patients were processed in the SDS, either as same day-admitted patients (8,163) or outpatient surgery patients (6,845); 5,683 patients were seen in the PEC.

Most patients scheduled for both outpatient surgical procedures or same day admit procedures at UPMC Presbyterian and Montefiore receive care at the SDS unit at UPMC Montefiore. The PEC continues to receive referrals from surgeons for prior anesthetic problems, complex medical conditions, patient concerns, or pre-surgical histories and physicals. All preoperative testing and consults are then combined with a detailed pre-anesthetic evaluation and physical examination conducted by an anesthesiology resident or nurse practitioner. An attending anesthesiologist is available to review complicated patients or testing results with the PEC providers. The entire evaluation is then available to the patient's attending anesthesiologist on the day of surgery. Patients who are not seen in the PEC are called and evaluated the day before surgery by SDS nurses. The goal of the unit is 100% patient review prior to surgery, resulting in minimal unforeseen delays and cancellations on the day of surgery. Current data shows that the patients who are seen in the PEC are significantly less likely to have their scheduled surgeries delayed or cancelled.

Anesthesiology faculty members at UPMC Montefiore are active in resident education, teaching principles of ambulatory, ENT, orthopedic, and regional anesthesia. Residents participate in outpatient evaluations and learn a variety of regional anesthesia techniques and principles of outpatient anesthesia. The PEC continues to serve as the site of the second year resident preoperative evaluation rotation.

# Children's Hospital of Pittsburgh of UPMC



PETER J. DAVIS, MD

Dr. Joseph H. Marcy Endowed Chair in Pediatric Anesthesiology  
Chief, Children's Hospital of Pittsburgh of UPMC

The Children's Hospital of Pittsburgh of UPMC (CHP) anesthesiology clinical division comprises 30 faculty members, 13 FTE CRNAs, and eight CRNPs who provide both anesthesiology and surgical perioperative care. The main CHP hospital is one of the first fully-digital hospitals in the nation and sits on a 10-acre, environmentally sustainable campus in the Lawrenceville neighborhood of Pittsburgh. CHP also has an outpatient surgical center in Wexford (CHP North). The Wexford surgical center was specifically designed for family-centered surgical patient care.

In FY14, the division provided anesthesiology services for a total of 27,883 procedures. Of the total number of procedures, 7,246 were carried out at CHP North and 20,637 were carried out at the main hospital.

The CHP perioperative pain control service continued to serve a large number of patients. The use of patient-controlled analgesia, epidural narcotics, epidural local anesthetics, pediatric caudal anesthetics, and regional blocks is now routine. It has become increasingly common to provide paravertebral blocks with and without catheters and thoracic epidurals for postoperative analgesia in older patients following thoracic and upper abdominal surgery. In infants, it is possible to provide similar high thoracic epidural analgesia by using a caudal approach to place the catheter. Regional blocks involving nerve stimulation and/or ultrasound guidance are also frequently performed in appropriate patients. The CHP acute pain service has improved patient care and provides resident and fellow training opportunities. Presently, two fellows are assigned to the acute pain service on a daily basis.

CHP also has a chronic pain service that incorporates a multidisciplinary approach to patient care and involves the services of behavioral health, physical therapy, and physical medicine and rehabilitation. The chronic pain clinic program treats patients at both the Lawrenceville campus and at CHP North. Other specialty anesthesiology service divisions at CHP include transplantation, radiology, and cardiology.

CHP fellows participate in teaching activities, including mini-lectures, core lectures, and case conferences. Faculty members participate in medical student courses and provide special training for critical care medicine (CCM) fellows, pediatric dentists, emergency medical residents, and nurse anesthesia students. CHP Anesthesiology's launch of a new Accreditation Council for Graduate Medical Education (ACGME)-approved combined anesthesiology and pediatric residency program continued in FY14. The program will accept one resident per year and applicants will go through a match separate from the department's anesthesiology residency program.

Research efforts at CHP focus on pediatric anesthetic pharmacology, respiratory physiology, and outcomes-based protocols. Clinical trials are also conducted and are an active research component at CHP.



## Subdivisions of Children's Hospital of Pittsburgh of UPMC

### Transplantation Anesthesiology

JAMES G. CAIN, MD, MBA, FAAP, Director

Anesthesiologists in the Division of Transplantation Anesthesiology (TA) at Children's Hospital of Pittsburgh of UPMC (CHP) are responsible for the care of pediatric patients undergoing liver, intestinal, multivisceral, kidney, pancreas, and composite tissue allograft transplantation. Anesthetic management of these transplants requires both highly sophisticated monitoring and tight control of physiologic variables. An anesthesiologist carries out this management with the assistance of fellows, CRNAs, and anesthesia technicians.

During FY14, both living donor and cadaveric donor transplants were performed. The total number of pediatric transplants completed by CHP TA faculty in FY14 was 44, an approximate 25% increase from FY13. Of these cases, 19 were liver, 13 were pediatric living-donor liver, six were pediatric kidney, four were pediatric living-donor kidney, and two were pediatric intestine transplants.

### Certified Registered Nurse Anesthetists

The Certified Registered Nurse Anesthetist (CRNA) professional staff recruited strong candidates to remain at full capacity in FY14 to meet patient care delivery needs. Three hundred and eighty-six FTE CRNAs covered all service lines at our UPMC facilities.

Our nurse anesthesia professionals were actively involved in quality improvement projects at the hospital, enterprise, and national level to benefit both the efficiency and quality of care delivery. The CRNA leadership team proactively and continuously ensured that these professionals are well-positioned to respond to the dynamic changes in healthcare delivery in the United States while maintaining a tight team focus with our physician colleagues. Many of our CRNAs utilized the Peter M. Winter Institute for Simulation Education and Research (WISER) for continuing education and advanced training.

The relationship between UPMC and the University of Pittsburgh's Nurse Anesthesia Program, which prepares registered nurses to become advanced practice nurses, continued to strengthen in FY14. All of our CRNAs are clinical instructors for the program. With excellent clinical education from UPMC nurse anesthetists and anesthesiologists, the program has a stellar national reputation for graduating new CRNAs who excel in clinical practice; it has ranked as a top five nurse anesthesia program in *U.S. News and World Report's* "Best Graduate Schools" for the past decade. In FY14, 42 CRNAs graduated from the program.

Mentoring continues to be a key component in the socialization and success of new CRNAs. Given the complexity of UPMC and the many other demands on our graduate students, the work of active CRNA mentors has been invaluable in assuring student success.



**BRENT DUNWORTH, MSN, CRNA**  
Senior Director, Nurse Anesthesia

# Magee - Womens Hospital of UPMC



**JONATHAN H. WATERS, MD**  
Chief Anesthesiologist

The Magee-Womens Hospital (MWH) of UPMC anesthesiology clinical site comprises 19 faculty members, 33 CRNAs, and one full-time CRNP who provide care within the operating and delivery suites, in the pre-anesthesia evaluation and testing center, and in off-site locations such as Radiation Oncology, MRI, and Invasive Radiology. The division also provides emergency management in conjunction with members of the Department of Critical Care Medicine for all cardio-respiratory arrests (Condition A), as well as in conjunction with our obstetricians for all maternal emergencies (Condition O). MWH anesthesiologists' primary focus is providing in-house, 24-hour anesthesia coverage in two primary anesthetizing locations: the Womancare Birth Center (WCBC) and the main Surgical Services Center.

MWH anesthesiologists provide state-of-the-art anesthesia and obstetric care to their patients. Most services are provided in the WCBC. MWH Obstetric Anesthesiology oversaw 10,678 deliveries in FY14, a 2.4% decrease from FY13. Of these deliveries, 7,539 were vaginal births (a 2.1% decrease from FY13) and 3,139 (29.4%) were cesarean deliveries, which is unchanged relative to FY13. Because the birth numbers have exceeded capacity, the WCBC is currently undergoing an expansion, expected to be complete in November of 2014. This expansion will increase capacity by two operating rooms and increase our postanesthesia care unit from three beds to 10.

Additional procedures performed on the unit include combined cesarean/abdominal hysterectomy, external cephalic version (ECV), percutaneous umbilical blood sampling (PUBS), manual placental extraction, urogenital laceration repair, and postpartum tubal ligation (PPTL). Fetal surgery continues to increase as the hospital focuses more resources on this activity.

Beyond the birthing suite, MWH provided anesthetic management for 16,151 cases in the Surgical Services Center. The FY14 site total (including deliveries) was 26,408 cases. The Surgical Services Center consists of 14 general operating rooms, a cystoscopy suite, and two minor procedure rooms. Of these, four state-of-the-art minimally invasive suites were used to accommodate a growing variety of minimally invasive surgical procedures.

MWH is a primary educational site for medical students, SRNAs, residents, and fellows from programs within the University of Pittsburgh School of Medicine and UPMC. The division provides both obstetrical anesthesiology and general gynecology anesthesiology rotations. In addition, anesthesiology residents from other programs in the city rotate through the division for subspecialty obstetrical anesthesiology training.

MWH serves as the principal site for the department's clinical fellowship in obstetrical anesthesiology. The Accreditation Council for Graduate Medical Education (ACGME) accredited the program for a three year time period, the maximum cycle length granted for first time accreditation, effective July 1, 2012. Lectures and research opportunities for the fellows encompass areas which are not normally part of the residency program. For instance, fellows rotate through maternal fetal medicine as well as the neonatal ICU. This year, a new elective rotation that will expose fellows to women's neurology as well as blood banking was developed.

Research efforts by MWH faculty in both obstetric and general anesthesiology led to the publication of several manuscripts and case reports and the presentation of numerous abstracts. Additional MWH anesthesiology faculty accomplishments include a published book, several published book chapters, and invited lectures and presentations.

# UPMC Shadyside

ROBERT H. BORETSKY, MD, Chief Anesthesiologist



The UPMC Shadyside Anesthesiology division consists of 20 faculty members and 52 CRNAs. The division provides adult anesthesiology services for a 22-room main operating suite, a six-room ambulatory surgery center, and a two-room comprehensive urological center, as well as coverage for two gastrointestinal labs, two electrophysiology labs, and invasive radiology.

During FY14, clinical anesthesiology services were performed for 22,589 cases at UPMC Shadyside. Our caseload spans the full range of adult surgical procedures, including major thoracic, cardiovascular, neurosurgical, orthopedic, urologic, gynecologic, oncologic, and general surgery, as well as outpatient orthopedic, plastic, dental, gynecologic, and general surgery. The division provides subspecialty care in cardiac anesthesiology and neuroanesthesiology with subspecialty-trained and credentialed faculty. UPMC Shadyside was recently designated as an "Aortic Center" and is the regional referral center for complex cases involving the aortic valve and aorta. The cardiac anesthesiology team provides 24/7 coverage for cardiac surgical cases. All team members are board-certified in transesophageal echocardiography.

The division provides educational opportunities for its staff and faculty, as well as to a diverse set of students from other departments. Teaching activities include weekly case presentations where faculty members prepare and present lectures. UPMC Shadyside Anesthesiology faculty members actively participate in the medical student anesthesiology rotation. UPMC Shadyside is a designated primary instruction site for the University of Pittsburgh's Nurse Anesthesia program. Our CRNAs and faculty anesthesiologists actively participate in the education and training of these students. Airway management training is also provided for paramedic students from the Center for Emergency Medicine. Department faculty members also participate in the didactic educational program.

UPMC Shadyside has become a major center for clinical research, generating publications in acute pain management, surgical outcomes, OR management, and economics.

## Subdivisions of UPMC Shadyside

# Neuroanesthesiology

EDWARD TEEPLE, MD, Director

In FY14, 1,645 neuroanesthesiology cases were treated at UPMC Shadyside, a 13.5% increase from FY13. An excellent mix of neurosurgical and spinal orthopedic cases were carried out, such as craniectomy, cranioplasty, craniotomy, spinal surgeries, glycerol rhizotomy, and implantations of ventriculoperitoneal shunts, Ommaya reservoirs, spinal cord stimulators, pain pump and intrathecal catheters, and nerve stimulators.

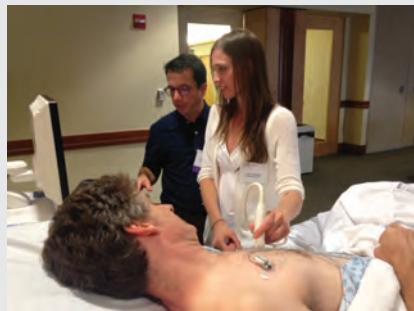
Residents are offered a neuroanesthesiology rotation at UPMC Shadyside Hospital. Although Shadyside handles less neuroanesthesiology cases than UPMC Presbyterian, the hospital provides a unique environment for residents to learn. UPMC Shadyside is a tertiary level teaching hospital and provides similar opportunities to practice the highest quality of neurosurgical and neuroanesthesiology practice. Our Neurosurgical ICU, Radiology Department, and Neurophysiology Department provide similar opportunities to practice the highest quality of neurosurgical and neuroanesthesia care. One resident per month rotates through the UPMC Shadyside Neuroanesthesiology Service, allowing us the unique opportunity to pick the best and most appropriate cases for the resident. The rotation is designed to provide both an excellent knowledge of the theory of neuroanesthesiology and actual practice.

## Department Conferences

### UPMC Regional Anesthesia & Ultrasound Guided Techniques Conference: Update in Acute and Chronic Pain and Liver Transplantation Anesthesiology

The department and the UPMC Center for Continuing Education sponsored the 10th Annual UPMC Regional Anesthesia & Ultrasound Guided Techniques Conference: Update in Acute and Chronic Pain and Liver Transplantation Anesthesiology at Nemacolin Woodlands in Farmington, PA, April 11-13, 2014. The program is intended to review and update the knowledge and skills of anesthesia providers as they relate to current professional practice. The Course Director was Jacques E. Chelly, MD, PhD, MBA and the department Course Co-directors were Cheryl Bernstein, MD; Brent Dunworth, MSN, CRNA; Mark E. Hudson, MD, MBA; Raymond M. Planinsic, MD; and Mihaela Visoiu, MD.

### Perioperative & Critical Care Monitoring Conference



The department, in conjunction with the Department of Critical Care Medicine and the University of Pittsburgh Center for Continuing Medical Education, held the First Annual Perioperative & Critical Care Monitoring Conference at the Herberman Conference Center, Shadyside Hospital, Pittsburgh, PA on August 24-25, 2013. National experts presented current standards and recent advances in the fields of perioperative and critical care monitoring. The Course Directors were department faculty members Kathirvel Subramaniam, MD and Stephen A. Esper, MD, MBA, both cardiothoracic anesthesiologists from UPMC Presbyterian. One hundred and seventy individuals attended this conference, including faculty members from the Departments of Anesthesiology, Critical Care Medicine, Surgery and the Divisions of Hematology and Pulmonary Medicine, as well as CRNAs, nurse practitioners, registered nurses, and trainees including fellows, residents, medical students, and student nurse anesthetists. The 2013 conference was a huge success and a second annual conference is planned for FY15.

# Veterans Affairs Pittsburgh Healthcare System



**MICHAEL P. MANGIONE, MD**  
Chief Anesthesiologist

The Veterans Affairs Pittsburgh Healthcare System (VAPHS) anesthesiology staff consists of eight full-time anesthesiologists, three part-time anesthesiologists, and 17 CRNAs who provide care for veterans in a 10-room operating suite, GI lab, cardiac EP suite, preoperative evaluation clinic, and pain clinic. The staff is also involved in a wide range of administrative, educational, research, and quality assurance activities at both the University of Pittsburgh School of Medicine (UP SOM) and the VAPHS.

A total of 5,487 OR cases, including 79 solid organ transplants, were performed at VAPHS in FY14. Off-site anesthesiology coverage accounted for 1,893 cases in the GI lab and 393 cases in the EP lab, as well as coverage for interventional pulmonary and radiology.

Pain management continued to run near 100% capacity, with 861 new consults and 798 follow-up encounters. Tele-health services continued with 140 E-consults, as well as a Scan Echo clinic that allows providers to communicate virtually to coordinate clinical care. The number of performed interventional procedures continued to increase, with a total of 527 interventional procedures performed, an increase of 12% compared to the previous year. Acute Pain Medicine/Regional Anesthesia activity continued to expand as well, with further evolution of the multi-modal block program.

During the course of the year, both third and fourth year medical students rotated through VAPHS. The rotation continues to be highly successful and highly rated. The VAPHS Anesthesiology division continues to provide clinical experiences for two to four anesthesiology residents per month. Evaluations of both the rotations and the individual faculty members remain consistently excellent. The VA remains a prime location for fourth year residents looking for experience in sub-staffing at a junior attending level. VAPHS anesthesiologists also provide clinical training for SRNAs, dental residents, and anesthesia technology students. Teaching activities include weekly teaching conferences and lectures for University of Pittsburgh medical students and residents, as well as various programs for hospital employees.

# UPMC St. Margaret & Harmar Ambulatory Center

JAY A. ROSKOPH, MD, Chief Anesthesiologist



UPMC St. Margaret bridges the gap between community anesthesiology practice and tertiary care center. Efforts are focused on patient care in the operating rooms and GI suites of both the main hospital and Harmar Ambulatory Center. The UPMC St. Margaret anesthesiology clinical site comprises 10 full-time physicians and 60 CRNAs. In September 2014, UPMC St. Margaret once again achieved ANCC Magnet Recognition® status, the highest international recognition for nursing excellence and leadership granted by the American Nurses Credentialing Center. The anesthesiology division was very active in the magnet designation process and recertification efforts.

The UPMC St. Margaret and Harmar Ambulatory Center Anesthesiology division have maintained a growing peri-operative environment for the past six years at a time when the local population continues to decline. In FY14, anesthetics were provided for 24,267 cases, a slight increase from FY13. A total of 14,003 cases were completed at the main hospital and 10,264 at the Harmar site. Anesthetics were provided at 25 sites at UPMC St. Margaret and the Harmar Ambulatory Center; these sites included 13 hospital and five ambulatory OR rooms, six GI rooms (two hospital and four ambulatory GI suites), and one remote location site, including a cardiology lab and invasive radiology suite. A large variety of surgical procedures were performed at St. Margaret, including orthopedic (spine, total joint, sports, and foot and ankle); general; thoracic; urologic; gynecological; vascular; ophthalmologic; plastic; and ENT surgery. In FY14, St. Margaret's designation as a Healthcare Bariatric Surgery Center of Excellence continued, and the hospital recently added a Robotic Bariatric Surgery program. Minimally invasive surgeries for knee and hip replacements were routinely performed here, and regional anesthesia with nerve blocks and post-operative pain control were used for orthopedic and general surgery cases. The combination of the two sites encompasses a large ultrasound-based regional anesthesiology and perioperative pain control program and manages the largest of UPMC's outpatient peripheral nerve block catheter programs. In addition, the UPMC St. Margaret Anesthesiology division is an integral member of the hospital's geriatric fracture program.

In FY14, UPMC St. Margaret was a rotation site for anesthesiology residents, medical students, SRNAs, dental anesthesiology residents, and acute and chronic pain and critical care fellows. The hospital was also a popular rotation site for senior residents in the advanced clinical track focusing on perioperative pain management and operating room management. The faculty also provided an educational experience for other UPMC facility faculty members in the practice of ultrasound-based regional anesthesiology. In addition, UPMC St. Margaret anesthesiologists participated in didactic sessions for the hospital medical staff and family practice residents. The group at UPMC St. Margaret has become increasingly involved in clinical research, participating in several industry-supported projects.

# UPMC McKeesport



EVELYN T. GONZALEZ - ABOLA, MD  
Chief Anesthesiologist



UPMC McKeesport is a 215-bed community hospital serving patients along the Monongahela Valley. The UPMC McKeesport Anesthesiology division is staffed by four anesthesiologists, eight full-time CRNAs, and one part-time and one casual CRNA. The department provides anesthesiology services for inpatients and ambulatory surgical patients, as well as at non-OR sites such as the GI unit, cardiac catheterization lab, bronchoscopy lab, and invasive radiology unit.

In FY14, UPMC McKeesport provided anesthesia for 5,505 surgical cases and off-OR site procedures. In addition, anesthesiologists performed 259 acute pain regional blocks for immediate post-operative pain control. Consultations for mostly chronic low back pain (126) and subsequent performance of epidural steroid injections (75) were provided.

Typical of a community hospital, the surgical procedures performed at UPMC McKeesport include major non-cardiac vascular surgery, thoracic surgery, lumbar laminectomies, spinal fusions, total joint replacements/orthopedic cases, abdominal surgery, gynecologic surgery, urologic, ENT, ophthalmologic, plastic surgery, and minimally invasive chronic pain procedures. Anesthesiology services are also provided at non-OR sites for GI, cardiac catheterization, bronchoscopy, and invasive radiologic procedures. The division provides back-up support for Emergency Department physicians, intensivists, and hospitalists in managing patients with difficult airways. The division has been instrumental in creating difficult airway carts in strategic locations within the hospital. The division also actively participated in the implementation of a hands-off protocol for transportation of post-surgical patients from the PACU to the ICU/cardiovascular unit.

Periodic evaluation and assessments are performed to ascertain compliance with Surgical Care Improvement Project (SCIP) initiatives, central line-associated bloodstream infection (CLABS) preventive measures, indicators for Physician Quality Reporting Initiatives (PQRI), and patient safety measures. The division has been actively involved with the On-Time Start Initiative.

Teaching activities at UPMC McKeesport include teaching airway management to non-anesthesiology trained chronic pain fellows, internal medicine and family practice residents, and EMT students. Residents in both disciplines also receive training and gain experience with insertion of invasive lines. UPMC McKeesport anesthesiologists and CRNAs are committed to the clinical teaching and training of student nurse anesthetists. The division is committed to maintaining and improving staff proficiency in the use of supraglottic devices and video laryngoscopy for patients with difficult airways. In addition to the use of the Ambu LMA, AirTraq, and glidescope, we are utilizing the I-Gel, King Airway, and the McGrath videolaryngoscope.

# UPMC Mercy

JERRY R. CLARK, MD, FASE, Chief Anesthesiologist



UPMC Mercy is a 488-bed tertiary care hospital in the uptown district of Pittsburgh. UPMC Mercy has a rich history, from its beginning as the first permanent hospital in Pittsburgh and the first Mercy hospital in the world, to its current role as a provider of faith-based care to its patient population, including the underserved in our region. The hospital remains the only Catholic hospital in the region, providing specialized services such as women's health, neurological, cardiac, and orthopedic care. In addition, it serves as a Neuroradiology Stroke Intervention Center, a Level 1 Adult Trauma Center, and an American Burn Association-verified Adult and Pediatric Burn Center. The hospital has been a focal point for student and resident teaching for the University of Pittsburgh Schools of Medicine, Dental Medicine, and Nursing for many years and continues to provide educational experiences for our residents in multiple specialties, including neuroanesthesiology, cardiothoracic anesthesiology, regional anesthesiology, and acute pain management.

The UPMC Mercy anesthesiology faculty consists of approximately 15 clinical FTE anesthesiologists who cover 16 inpatient operating rooms (ORs), six outpatient ORs, an obstetrical suite with two cesarean-section rooms, a busy endoscopy suite, interventional neuroradiology suite, MRI, hydrotherapy unit for burn care, and electrophysiology suite. A pre-anesthesia evaluation center is staffed by two CRNPs with a full-time physician director. The case selection includes all but solid organ transplants. Highlights include voice surgery, airway-modifying surgery, robotic surgery, and thoracic surgery. Burn care is a focal point at UPMC Mercy for both children and adults. UPMC Mercy's Level I trauma service has a team dedicated to care for parturients who suffer either blunt or penetrating trauma.

In FY14, UPMC Mercy clinicians supervised 21,882 cases. The vast majority of anesthetics were performed in the ORs. There were 1,445 deliveries during the fiscal period, 463 of which were cesarean sections. The endoscopy, electrophysiology, and radiology suites played a greater role in total anesthetic activities, which parallels a local and national trend, with nearly 20% of our prime time (7am – 5pm) coverage provided to these areas. Anesthesia for burn hydrotherapy patients of all ages contributed to the off-site trend, with pediatric burn hydrotherapy activity increasing significantly in FY14.

Teaching at the UPMC Mercy anesthesiology site consists of an average of eight rotating residents, one cardiothoracic fellow, and four to six SRNAs, as well as off-service residents and students from the emergency medicine, surgery, and transitional year programs. Trainees from podiatric medicine and EMT programs and medical students from the University of Pittsburgh spend time on the service.

# UPMC East



**MICHAEL L. KENTOR, MD**  
Chief Anesthesiologist



FY14 was UPMC East's second full year of service after opening on July 2<sup>nd</sup>, 2012. Located in the heart of Monroeville, UPMC East is a full-service community hospital providing patient-centered care. It is a 156-bed facility, with 120 medical-surgical beds, 16 ICU beds, and 19 rehab beds, and houses seven operating rooms with 31 pre-op/PACU bays, two endoscopy rooms, and two integrated interventional procedural and catheterization labs. The same faculty who staff UPMC Mercy South Side Outpatient Center also staff UPMC East.

Our surgical volumes cover a wide spectrum of surgical specialties, including general surgery, orthopedics, podiatry, plastics, ENT, urology, neurosurgery – consisting mainly of procedures of the spine, thoracic, gynecology, and vascular. In addition, we have a very active inpatient/outpatient GI lab that uses anesthesia services on almost of all their cases. Requests for anesthesia services in the interventional procedure suites also continue to grow.

The volume at UPMC East has steadily increased over the year, consistently surpassing budgeted key volume indicators, and continues to grow. Anesthesiologists performed 6,538 cases at UPMC East in FY14, which was a slightly more than a 34% increase from FY13.

## UPMC Mercy South Side Outpatient Center

**MICHAEL L. KENTOR, MD, Chief Anesthesiologist**

FY14 was UPMC Mercy/South Side Outpatient Center's fifth full year of service after converting from an inpatient facility to an ambulatory surgical center. The orthopedic sports medicine and ophthalmology services remain the primary source of surgical cases, along with a lesser number of podiatry cases. Off-site provision of anesthesia for GI cases continued as well. Eighty percent (80%) of the nurse anesthetists in our division share time between UPMC Mercy South Side and other institutions, mainly UPMC Mercy, UPMC South Surgery Center in Bethel Park, and UPMC East. South Side continues to serve as the primary core site for resident peripheral nerve block training, with two residents rotating here each month, each of whom typically provides 50-80 nerve blocks. One major administrative change for the division was the transition to using the e-record in June, which occurred seamlessly, thanks to effective technical support and appropriate planning.

The South Side anesthesiology division continues to provide high-quality ambulatory services to these patients using multi-modal analgesia, aggressive prophylaxis against postoperative nausea and vomiting, and regional anesthesia (when practical) to mitigate against postoperative pain. The total number of cases performed at this center, including off-site GI cases, was 5,629 during FY14, while almost 2,000 peripheral nerve blocks were provided.

# UPMC South Surgery Center



**GREGORY J. GODLA, MD**  
Chief Anesthesiologist



UPMC South Surgery Center is a freestanding ambulatory surgery center located in the South Hills of Pittsburgh. The center is administratively a part of UPMC Presbyterian-Shadyside. A full range of outpatient surgical services is provided in a convenient patient-centered environment. Four operating rooms are available, as well as full GI screening capabilities.

The anesthesiology division at UPMC South Surgery Center consists of a group of credentialed physicians and CRNAs who work primarily at UPMC Shadyside and the UPMC Mercy South Side Outpatient Center. Expertise in peripheral nerve blocks and anesthesia for healthy pediatric patients is available as indicated. Members of the Acute Interventional Perioperative Pain Service (AIPPS) are present on a regular basis to perform regional nerve blocks. Ambulatory pain catheters are now also available for select patients. The FY14 caseload for UPMC South Surgery Center was 2,880.

South Surgery Center was the first UPMC site to become enrolled in the Society for Ambulatory Anesthesia Clinical Outcomes Registry. This project was designed to assist anesthesiologists to track their own outcomes, compare with national benchmarks, and meet regulatory requirements. We also hope this data collection will help better define best practices, as well as identify rare but serious events to further improve anesthesia safety. This data will also be important as the Centers for Medicare and Medicaid Services move ahead to implement mandates of the Affordable Care Act. With over 5,500 cases entered into the registry to date, our outcome data compares very favorably to national benchmarks:

- Antiemetic rescue in PACU: South Surgery Center 2%, national 3%
- Analgesic rescue in PACU: South Surgery Center 14%, national 24%
- Vomiting at home callback: South Surgery Center 4%, national 5%
- Nausea at home callback: South Surgery Center 2%, national 2%
- “Pain always well controlled” at callback: South Surgery Center 92%, national 86%
- Satisfaction rating 9 or 10: South Surgery Center 97%, national 96%



# UPMC Passavant

DANIEL R. SULLIVAN, MD, JD, MBA, Chief Anesthesiologist

As UPMC's tertiary care center north of Pittsburgh, UPMC Passavant is a 434-bed, state-of-the-art hospital offering world-class medical care at campuses in McCandless and Cranberry. Our staff and physicians, dedicated to quality and innovation, provide exceptional service, including all the capabilities of an academic medical center, by utilizing cutting-edge technology in a patient-and family-centered atmosphere.

The 132-acre UPMC Passavant–McCandless site is a 399-bed campus with 21 operating rooms that attracts patients from around the region and the country for advanced cardiovascular, cancer, neurosurgical, gastrointestinal, and colorectal care. The hospital's new seven-story pavilion, the first Leadership in Energy and Environmental Design (LEED)-certified hospital addition in the North Hills, has enhanced the ability of UPMC–McCandless to provide specialized medical and surgical treatment while improving the patient and family experience. Located in the new pavilion, UPMC Cancer Center at UPMC Passavant provides high-quality, comprehensive cancer care to residents in Pittsburgh's northern communities.

UPMC Passavant's smaller 35-bed campus in Cranberry Township has six operating/procedure rooms and includes an expanded Emergency Department; a Comprehensive Breast Center; a complete diagnostic services department, including CT scan, MRI, ultrasound, general and cardiac nuclear medicine, and echocardiography; and outpatient surgical services.

The UPMC Passavant Anesthesiology division consists of 45 credentialed physicians and 105 credentialed CRNAs, translating to an approximate 16 FTE physician/55 FTE CRNA complement. The division supports the surgical volume and numerous outside-the-OR cases, including in the EP lab, GI lab, and minimally invasive image-guided procedures suite. In FY14, UPMC Passavant anesthesiologists treated over 28,000 cases at both the McCandless and Cranberry locations.

Anesthetizing locations may run as high as 30 daily between both campuses. All surgical subspecialties are represented, with the exception of transplant and complex pediatric surgery. The hospitals' neurosurgical program performs both spinal and intracranial procedures. UPMC Passavant has a multispecialty robotic surgery service line. A UPMC Passavant division of the Acute Interventional Perioperative Pain Service (AIPPS) provides comprehensive postoperative pain management for appropriately selected patients.

Three anesthesiology fellowship programs (acute pain/regional anesthesiology, pain medicine, and cardiac anesthesiology) are active at UPMC Passavant. The hospital is a rotation site for senior anesthesiology residents and University of Pittsburgh and La Roche College anesthesia MSN students.



MCCANDLESS CAMPUS



CRANBERRY CAMPUS

# UPMC Bedford Memorial



CHRISTOPHER J. SAMUEL, MD  
Chief Anesthesiologist



UPMC Bedford Memorial is a 49-bed, acute care general hospital located in Bedford County, Pennsylvania. The hospital has units for medical, surgical, obstetric, intensive care, coronary care and telemetry services, and offers a variety of diagnostic capabilities, including CT, MRI, and the region's only digital mammography with 3D tomosynthesis. The hospital also operates a cardiac-pulmonary rehabilitation program, an outpatient procedure unit, and an ambulatory surgical unit. The emergency facilities include 24-hour, in-house coverage by Emergency Medicine physicians, a licensed heliport for emergency transport, and trauma center affiliation. The UPMC Bedford anesthesiology division consists of two physicians and four CRNAs who provide both anesthesia and surgical perioperative care.

In FY14, 3,800 cases were performed: 618 inpatient OR procedures, 1,955 outpatient procedures, 83 inpatient GI procedures, and 1,144 outpatient GI procedures. The obstetric case count was 307 total births, with 208 vaginal and 99 C-section deliveries.

The UPMC Bedford anesthesiology division was instrumental in the design and installation of a new GI lab/endoscopy suite on the hospital's second floor. The number of endoscopies involving anesthesia have nearly doubled since its inception. The pre-operative clinic's first full year has shown a decrease in case delays and cancellations.

UPMC Bedford Memorial Hospital and its medical staff have committed to teaching residents from UPMC St. Margaret; medical students from Philadelphia College of Osteopathic Medicine, Lake Erie College of Osteopathic Medicine, West Virginia College of Osteopathic Medicine, and physician assistant students from St. Francis University and the UPMC Physician Assistant Program. Students can rotate through the anesthesiology, surgery, obstetrics and gynecology, emergency medicine, radiology, pathology, and family medicine services.

# UPMC Northwest

DARREN T. LOUGHAN, DO, Chief Anesthesiologist



Located in Seneca, PA, UPMC Northwest is a 180-bed community-based hospital that opened in October 2004, merging the campuses of Franklin and Oil City hospitals. Since that time, the hospital has been providing state-of-the-art medical care to the citizens of Venango County and the surrounding areas in a spacious new facility that includes a 28-bed Inpatient Behavioral Health Unit, a nine-bed Inpatient Rehabilitation Unit, and a 16-bed Inpatient Transitional Care Unit. UPMC Northwest provides a wide range of technical and medical services, including a nationally-recognized stroke program, cancer center, and diabetes center, as well as comprehensive cardiology and radiology services. In order to meet the needs of advancing technology and hospital growth,

recent investments have resulted in new equipment, including: a new CT machine; an EEG system; new blood pressure machines; an emergency room monitoring system; an operating room laser; new anesthesia monitors; as well as an infant security system.

The UPMC Northwest Anesthesiology division consists of four full-time anesthesiologists and eight full-time nurse anesthetists who cover five general ORs, one cesarean section OR, three labor and delivery suites, two endoscopy suites, and one cystoscopy suite. Therefore, a wide range of anesthesia cases are performed, covering general, urologic, radiologic, thoracic, vascular, neurologic, obstetric, orthopedic, ENT, plastic, and ophthalmologic surgery. As most of the cases performed are ambulatory in nature (75.8%), an emphasis is placed on multimodal analgesia and PONV prophylaxis. Furthermore, ultrasound-guided regional anesthesia is being utilized with increasing frequency in order to ameliorate post-operative pain and improve patient satisfaction, averaging about 31 regional anesthetic blocks per month.

During FY14, 6,663 total cases were performed at UPMC Northwest. Of those cases, 2,261 required general anesthesia and 1,269 (19.0%) were inpatients. Moreover, the Department of Obstetrics and Gynecology had a near record 593 deliveries in FY14. Of those deliveries, 198 patients (33.4%) were delivered via cesarean section and 339 epidurals (57.2% of patients) were placed for labor and delivery analgesia purposes.

As Venango County's only hospital, UPMC Northwest represents more than a place of healing. As one of the three top employers in Venango County, the hospital generates a total economic impact of \$152.9 million dollars annually and employs a total of 730 at the hospital and an additional 246 at UPMC facilities such as the Visiting Nurses Association of Venango County and Sugarcreek Station Skilled Nursing and Rehabilitation Complex.

As an educational resource, UPMC Northwest affords on-site training for those wishing to pursue careers in nursing, phlebotomy, radiation technology, and respiratory therapy. Moreover, 13 annual internships for physical therapy students, three residency rotation positions for orthopedics, as well as pharmacy internships, family practice residency rotations, physician assistant clinical rotations, and SRNA clinical rotations are available.



# Division of Cardiothoracic Anesthesiology

ERIN A. SULLIVAN, MD, Director



The Cardiothoracic Anesthesiology (CA) division, comprising 32 faculty members who are experts in their subspecialty, encompasses five hospital locations: UPMC Presbyterian, UPMC Shadyside, UPMC Passavant, UPMC Mercy, and the Veterans Affairs Pittsburgh Healthcare System (VAPHS). This report includes data obtained from the SurgiNet Anesthesia electronic database for UPMC Presbyterian, UPMC Shadyside, UPMC Passavant, and UPMC Mercy for FY14. The total number of cardiac and thoracic surgical procedures performed at these four sites was 2,146 cardiac cases and 4,737 thoracic cases in FY14. Surgical procedures spanned the full spectrum of adult cardiothoracic practice: coronary artery bypass graft surgery (including minimally invasive coronary artery bypass and off-pump coronary artery bypass),

conventional cardiac valve replacement and repair, minimally invasive/robotic valve and MAZE surgery, thoracic aorta repair/reconstruction (conventional and endovascular approach), pulmonary thromboendarterectomy, repair of ventricular and atrial septal defects, and removal of cardiac tumors/myxomas, transcatheter aortic valve implantation, pulmonary resection (conventional and minimally invasive approach), pneumonectomy, minimally invasive esophagectomy, complex endoscopy procedures (flexible/rigid bronchoscopy, esophagoscopy), tracheal resection, and minimally invasive procedures for digestive disorders.

UPMC Presbyterian is recognized as a world leader in heart, lung, and heart-double lung transplants and is the designated site in the UPMC health care system for these procedures. During FY14, 131 cardiothoracic transplants were performed: 36 heart transplants, 94 lung transplants, and one heart/double-lung transplant. UPMC Presbyterian was one of the leading centers in the nation in the number of lung transplants performed at a single center during FY14. This campus is also the primary site for the surgical treatment of patients with end-stage heart failure. A variety of mechanical ventricular assist devices are used as a bridge to transplantation or for “destination” therapy (Heartmate II, Ventrassist, Levitronix, Heartware, Novocor, and Thoratec); 48 devices were implanted at UPMC Presbyterian in FY14.

The CA faculty performs diagnostic intraoperative transesophageal echocardiography (TEE) on all patients undergoing cardiac and transplant surgery. CA fellows also obtain extensive experience with this technology to develop their skills in advanced diagnostic 2D and 3D intraoperative TEE. In addition to their intraoperative experience performing and interpreting TEEs under the supervision of the cardiothoracic anesthesiology faculty, all fellows may choose to spend one month in the UPMC Presbyterian echocardiography laboratory learning transthoracic echocardiography (TTE) skills.

The Division of Cardiothoracic Anesthesiology offers world-class opportunities for both basic and advanced training in adult CA. Fourth-year residents are offered a three-month elective in advanced adult cardiac anesthesiology. Adult CA fellows have the opportunity to receive advanced training in the subspecialty beyond residency in an Accreditation Council for Graduate Medical Education (ACGME)-accredited program.

In October 2013, our Adult Cardiothoracic Anesthesiology Fellowship Program had an ACGME site visit that resulted in continued accreditation and transition to the Next Accreditation System (NAS). Our program received two commendations for its demonstrated substantial compliance with the ACGME's Program and/or Institutional Requirements for Graduate Medical Education without citations. We also received commendation for our quality of leadership, organization, and record of scholarship, as well as for the dedication of one morning every week for teaching. An ACGME NAS Self-Study Visit is scheduled for April 2022.

# UPMC Palermo



**ANTONIO F. ARCADIPANE, MD**  
Chief, Anesthesiology and Critical Care  
Medicine & Medical Director,  
Critical Care Unit

24/7 OR anesthesia and ICU staffing and coverage of all invasive procedures in radiology, the cardiac catheterization lab, the gastrointestinal clinical laboratory, and the PACU.

During FY14, ISMETT's Department of Anesthesiology and Critical Care Medicine treated 2,309 cases. One hundred and three (103) transplants were carried out, including 22 cadaveric kidney, 15 living donor kidney, 47 cadaveric liver, four living donor liver, nine lung, and four heart transplants, as well as one combined kidney-liver transplant and one pancreas transplant. Additionally, UPMC Palermo treated 943 ICU admissions, 668 cardiothoracic surgeries, 164 thoracic surgeries, and 429 abdominal surgeries. ISMETT continued to receive patient referrals for both adult and pediatric complex surgery or ICU treatments.

In FY14, ISMETT continued to host students and anesthesiology residents who wish to spend part of their elective time in Palermo. Residents from other Italian medical schools have also participated in ISMETT ICU and OR rotations. We also conducted an elective anesthesiology rotation and hosted residents and students from different universities and countries. ISMETT hosted visiting residents from Pittsburgh, the University of Palermo, and the University of Messina.

We continued to increase the number of courses offered to external customers by our Renato Fiandaca Simulation Center, sponsored by the Fiandaca Foundation. Our simulation center became an American Heart Association-licensed International Training Center, conducted about 114 courses, and trained more than 1,000 participants.

Active planning is still underway to bring ISMETT faculty to the United States for varying terms, and at the same time to encourage University of Pittsburgh faculty to visit ISMETT. The ISMETT Anesthesiology and Critical Care Medicine Department grew clinically and academically thanks to the close relationship and teamwork between the UPMC anesthesiology faculty in Palermo and western Pennsylvania.

*Mediterranean Institute for Transplantation &  
Advanced Specialized Therapies  
Istituto Mediterraneo Per I Trapianti E Terapie  
Ad Alta Specializzazione (ISMETT)*



During FY14, ISMETT continued to build on the success of past years, which would not have been possible without the input, hard work, and dedication of all the members of the ISMETT Department of Anesthesiology and Critical Care Medicine as well as the ICU, OR, and PACU nursing staff.

ISMETT's clinical responsibilities are quite diverse and include

the gastroenterological clinical laboratory, and the PACU.

## Pain Services



**JACQUES E. CHELLY, MD,  
PHD, MBA  
Director**

### Acute Interventional Perioperative Pain and Regional Anesthesiology Service

The mission of the Acute Interventional Perioperative Pain and Regional Anesthesiology Service (AIPPS) is the coordination and standardization of perioperative pain management of patients undergoing surgery at UPMC. In FY14, the total acute pain case count was 42,007 and the total number of regional procedures, consults, and follow-up visit revenue increased by 5.3%. The division performed 26,648 visits, including 5,269 pre-procedure consults and 21,379 postoperative visits.

In August 2013, the division organized an ultrasound workshop for Pediatric and Regional Anesthesiology Fellows. In April 2014, AIPPS held the Tenth Update in Regional Anesthesia and Ultrasound Techniques: Update in Acute & Chronic Pain and Liver Transplantation Anesthesiology at Nemacolin resort, which included an ultrasound workshop. In addition, several members of the division participated in various national and international ultrasound workshops.

In FY14, 15 regional anesthesiology fellows rotated through AIPPS at UPMC Presbyterian, UPMC Montefiore, UPMC Shadyside, UPMC Mercy, UPMC Passavant, Children's Hospital of Pittsburgh of UPMC, UPMC St. Margaret Harmar Outpatient Center, and UPMC South Surgery Center. Fellows also completed research rotations. Three pediatric pain fellows rotated for a month at UPMC Shadyside. Also, 10 first year residents rotated with AIPPS at UPMC Presbyterian; 14 second year residents (PGY-2) rotated at UPMC Presbyterian; six PGY-2 residents rotated at UPMC Mercy; 10 third year residents (PGY-3) rotated at UPMC Shadyside; 11 PGY-3 residents rotated at UPMC Mercy; 14 fourth year (PGY-4) residents rotated at UPMC Shadyside; and two PGY-4 residents rotated at UPMC Mercy.



## Pain Services



**AJAY D. WASAN, MD, MSc**  
Vice Chair for Pain Medicine

## Chronic Pain Medicine

The UPMC Chronic Pain Medicine Division, consisting of 10 faculty members, is a multidisciplinary clinical, teaching, and research endeavor spread over seven locations: UPMC St. Margaret, Centre Commons in East Liberty, Oakland campus, Monroeville, UPMC Passavant, UPMC Mercy, and Children's Hospital of Pittsburgh of UPMC. The program is committed to the evaluation and treatment of the entire range of pain, disability, and rehabilitation problems, from infancy to old age, including end of life care. It offers an interdisciplinary team approach that includes dedicated professionals from various specialties including anesthesiology, neurology, psychiatry, nursing, occupational therapy, physical therapy, and psychology.

The treatment teams develop and coordinate individual treatment plans to reduce pain and suffering whenever possible and assist patients in coping with any remaining discomfort; reduce disability to restore a more normal, meaningful, and satisfying life; reduce emotional distress caused by chronic pain; reduce dependency on drugs and on the healthcare system; and facilitate, as appropriate, the patient's return to gainful employment and usual household and leisure activities.

During FY14, Department of Anesthesiology Chronic Pain Medicine physicians completed 48,409 visits. Interventional modalities were carried out at all seven locations, including somatic and sympathetic nerve blockade, neurolytic blocks, placement of intrathecal pumps and neurostimulators, joint injections, and pharmacotherapy.

Unique and valuable assets of UPMC Pain Medicine are the Intensive Pain Rehabilitation and Fibromyalgia Rehabilitation Programs at Centre Commons, which provide effective therapies for conditions not requiring invasive procedures. Rehabilitative programs and services offered at Centre Commons include physical conditioning exercises, cardiovascular conditioning, coping skills training, work hardening, job-site evaluation, family counseling, relaxation therapy, stress management, biofeedback, self-hypnosis, gait and postural training, physical-capacity evaluation, work simulation, psychological counseling, and nutritional and sleep counseling.

In keeping with its mission, the UPMC Pain Medicine Program treats the entire spectrum of pain conditions, including persistent post-surgical pain, chronic back pain, complex regional pain syndrome (reflex sympathetic dystrophy), fibromyalgia, cancer pain, musculoskeletal injuries, headaches, post-herpetic neuralgia (shingles), and cumulative trauma syndromes.

The division offers a one-year pain medicine fellowship that is fully accredited by the Accreditation Council of Graduate Medical Education. The program was recently re-accredited for the maximum five year timeframe with no citations and with commendation. This is the third time the program has received this honor. UPMC has one of the largest clinical pain medicine fellowships in the country, graduating eight fellows per year. In addition, our department is the only one in the country with two NIH T32 programs in pain medicine, which train basic scientists and physicians over a two-year period in conducting basic, clinical, or translational research. The Pain Medicine Division works directly with the directors of the T32 programs to offer additional research training opportunities to the clinical pain medicine fellows. We are one of the very few pain medicine divisions in the country with this physician-scientist training track.

Fellows rotate through the outpatient services at UPMC St. Margaret, Centre Commons, Oakland campus, Monroeville, and UPMC Passavant and provide inpatient consultation at UPMC St. Margaret, UPMC Shadyside, UPMC Mercy, WPIC, UPMC Passavant, UPMC Cranberry, UPMC Montefiore, and UPMC Presbyterian.



**YAN XU, PHD**  
Vice Chair for Basic Sciences

The department was awarded over \$4.5 million in extramural grants in FY14

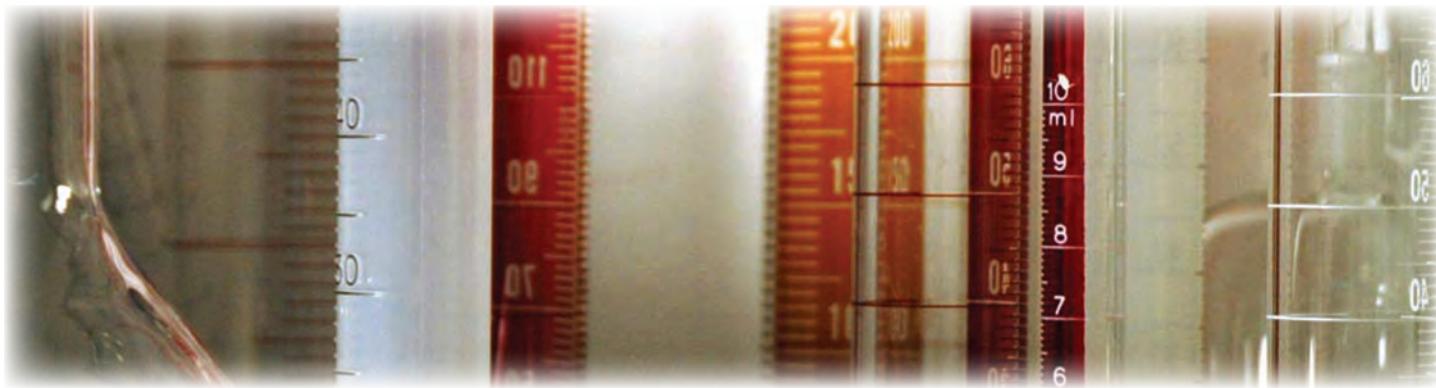
## Basic Research

FY14 was a productive year for basic research in the Department of Anesthesiology. We received a total of \$4,562,181 in extramural grants, \$4,222,963 of which was from the National Institutes of Health (NIH) (totals include direct and indirect funds). Five of our investigators are among the top 100 NIH-funded investigators in anesthesiology, each bringing in from \$724,088 to \$1,535,791 total in NIH grant dollars in 2014.

Department of Anesthesiology basic researchers authored 57 peer-reviewed publications in FY14, 47 of which were published in journals with impact factors above three. Please see the publications section of this report for a detailed list of publications.

The Department of Anesthesiology held a Multi-departmental Trainee Research Day on May 21, 2014 in conjunction with the Departments of Critical Care Medicine, Emergency Medicine, and Physical Medicine & Rehabilitation as part of the 12th annual Safar Symposium. A range of trainees (postdoctoral scholars and associates, graduate students, undergraduates, other research fellows) presented research posters and lectured on cutting edge research being conducted in the respective departments. The theme of the 2014 event was "Novel Approaches to Understanding and Managing Pain across the Continuum of Care." The event featured 64 posters and four oral presentations from trainees in each of the four collaborating departments. Trainees in the Department of Anesthesiology presented 43% of the abstracts. Please see our "Scholarly Activity" section on page 46 for more info about the 2014 Safar Symposium/Research Day.

The department continues to place a major focus on research training, fostering research activity among the next generation of anesthesiology investigators and physician scientists. The Director of Resident Research and the Junior Chief Resident for Research facilitate resident research and scholarly activities, and the department offers research opportunities to University of Pittsburgh medical students throughout the year, matching students with anesthesiology faculty for their scholarly projects. Our department was one of 37 in the nation selected to serve as a host site for the 2014 Foundation for Anesthesia Education and Research (FAER) Medical Student Anesthesia Research Fellowship program. Finally, our department is one of only 14 anesthesiology departments in the nation which have NIH T32 training grants, and the only department to hold two T32 training grants (see the "Research Fellowships" section on page 41 for more information).



# Basic Research Investigators

**Inna Belfer, MD, PhD** Genetic and Non-genetic Factors Contributing to Chronic Post-mastectomy and Post-lumpectomy Pain; Genetic Determinants of Labor-related Pain and Analgesia; Approaching the Risk of Severe Acute and Chronic Pain after Total Knee Replacement with Genomics and Proteomics (collaboration with Jacques E. Chelly MD, PhD, MBA); Exploratory Studies of Psychophysical Pain Phenotyping and Genetic Variability in Sickle Cell Disease; Expression of Pain Candidate Genes in Human Dorsal Root Ganglion

**Gerald F. Gebhart, PhD** Afferent Mechanisms of Pelvic Hypersensitivity; Peripheral Contributions to Bladder Sensitivity

**Michael S. Gold, PhD** The Role of Dural Immune Cells, Sympathetic Post-ganglionic Neurons, and Dural Afferents in the Link between Stress and Migraine; The Impact of Persistent Inflammation on the Regulation of Intracellular Ca<sup>2+</sup> and its Impact on Pain, Gene Expression, and Transmitter Release; The Impact of Persistent Inflammation on Voltage-gated Sodium Channels in Pulpal Afferents; The Impact of Persistent Inflammation on GABA-A Receptor Signaling; The Study of Human Dorsal Root Ganglion Neurons; Enhancing Post-traumatic Pain Relief with Alternative Perineural Drugs (collaboration with Brian Williams, MD, MBA); Mechanisms of Chemotherapeutic-induced Peripheral Neuropathy; Effects of Artemin on Nociceptors (collaboration with Kathryn Albers, PhD); Herpes Simplex Virus Vectors for the Selective Silencing of Subpopulations of Afferents (collaboration with Joseph Glorioso, PhD); Mechanisms of Trigeminal Neuralgia (collaboration with Raymond Sekula, MD); Mechanisms of Temporomandibular Joint Disorder (collaboration with Alex Almarza, PhD and Scott Tashman, PhD); Novel Therapeutic Targets for the Treatment of Pain (collaboration with Yan Xu, PhD)

**Gregg E. Homanics, PhD** G Protein Modulation of Glycine Receptor Function and Ethanol Action; Ethanol Mechanisms in GABAA-R Gene-targeted Mice; Genetically-engineered Rodents Core; Single Molecule Detection of Ion Channels in Neurons (collaboration with Allison Barth, PhD); Transgenerational Epigenetic Effects Induced by Paternal Preconception Ethanol (collaboration with David Martin, MD); Alcohol Actions - Molecular Targets on Brain Proteins (collaboration with R. Adron Harris, PhD)

**Eric E. Kelley, PhD** Nitric Oxide Production from Xanthine Oxidase in Obesity; Xanthine Oxidase-derived Reactive Species Critically Impact Obesity-mediated Pulmonary Arterial Hypertension

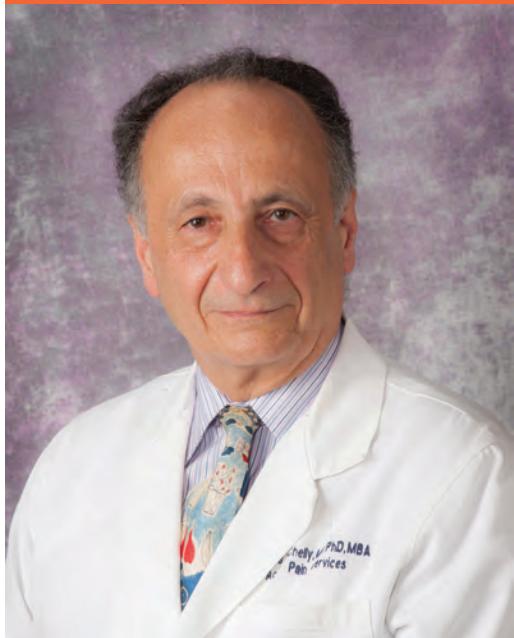
**Jun-Ho La, DVM, PhD** Role of Peripheral Mediators in Persistent Visceral Hypersensitivity; Distribution of Extrinsic Nerves Innervating the Mouse Colorectum; Essential Role of Nav1.6 in Spike Initiation at Stretch-sensitive Colorectal Afferent Endings; New Mouse Model of Chronic Prostatitis

**Pei Tang, PhD** Insights into Distinct Modulation of  $\alpha 7$  and  $\alpha 7\beta 2$  nAChRs by the Volatile Anesthetic Isoflurane; Nuclear Magnetic Resonance Structures of the Human  $\alpha 7$  nAChR Transmembrane Domain and Associated Anesthetic Binding Sites; ELIC- $\alpha 7$  nAChR Chimeras Reveal a Prominent Role of the Extracellular-Transmembrane Domain Interface in Allosteric Modulation

**Yan Xu, PhD** Nuclear Magnetic Resonance Studies of Mechanisms of General Anesthesia; Registration of Olfactory Events during General Anesthesia; Anesthetic Effects on Ion Channel Structures and Dynamics (collaboration with Pei Tang, PhD); Open-channel Structures of the Human Glycine Receptor  $\alpha 1$  Full-length Transmembrane Domain; Cellular Registration without Behavioral Recall of Olfactory Sensory Input Under General Anesthesia



## Research



**JACQUES E. CHELLY, MD,  
PHD, MBA**  
Vice Chair for Clinical Research

**The department's Clinical Trials Program  
contracted 21 studies in FY14,  
totaling \$461,536**

## Clinical Research

The Department of Anesthesiology continues to maintain its own industry-sponsored Clinical Trials Program (CTP). The self-contained program has been designed to provide, within the department, all the services necessary for faculty members as both principal investigators and sub-investigators to fully execute a clinical trial. Services include contract and budget negotiations, clinical research coordinator (CRC) support, and Institutional Review Board (IRB) submissions. The CTP is also committed to developing new study opportunities by promoting departmental resources to the pharmaceutical industry as a whole. The strong relationships with pharmaceutical companies continue to bring

potential clinical trials. Next year brings opportunities with two new sponsors. In addition, the CTP supports the regional anesthesiology fellowship program's introduction to and involvement with clinical research.

To ensure satisfaction of all legal and ethical requirements, the program staff prepares research protocols and patient consent forms, verifies compliance with federal regulations and Good Clinical Practices, and submits IRB materials for approval. The program also manages all the financial aspects of clinical trials by developing and negotiating budgets. The CTP staff then oversees the trials themselves by training and supervising five full-time clinical research associates and one part-time research assistant to coordinate trial initiation, facilitate and monitor patient enrollment and study progress, and sustain quality control of data collection and record keeping.

During FY14, the CTP managed 21 active clinical trials. Several of the studies have been recruiting subjects for over three years. The opportunity to conduct a study at four sites greatly increased the staffing needs and investigators involved; all sites successfully executed the protocol with each site/hospital staff. CTP contracted three new clinical trials and completed eight of the 21 ongoing clinical trials. Over 70 faculty members at six UPMC sites conducted trials with the following sponsor companies: AbbVie Pharmaceuticals, Inc., AcelRx Pharmaceuticals, Inc., Avancen MOD Corporation, Cadence Pharmaceuticals, Inc., Coramed Technologies, LLC, Cumberland Pharmaceuticals, Inc., Haemonetics Corporation, J&J Pharmaceutical Research, Endo Pharmaceuticals Inc., Hospira Inc., Purdue Pharma L.P., and 3M. FY14 contracted grants totaled \$461,536 (Direct Contracted Revenue, \$385,395; Indirect Contracted Revenue, \$76,141).

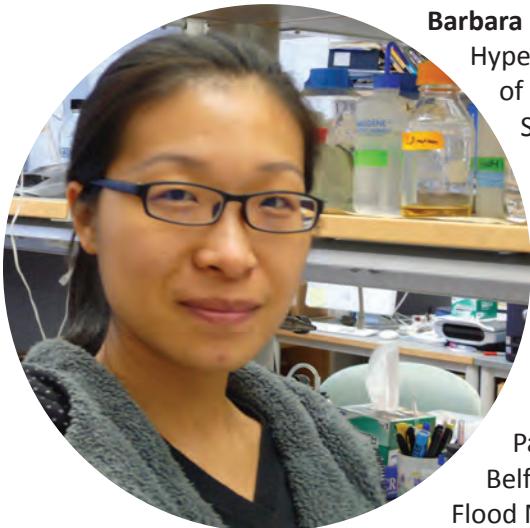


# Clinical Trials

PRINCIPAL INVESTIGATOR(S)	SPONSOR	TITLE
Emerson S. Conrad III, MD (UPMC Mercy); Kevin King, DO (UPMC Passavant); Bruce Ben-David, MD (UPMC Shadyside); Darrin Taormina, MD (UPMC St. Margaret)	AcelRx Pharmaceuticals, Inc.	A Multicenter, Randomized, Double-blind, Placebo-controlled Trial to Evaluate the Efficacy and Safety of the Sufentanil NanoTab PCA System/15 mcg for the Treatment of Post-Operative Pain in Patients after Knee or Hip Replacement Surgery
Peter J. Davis, MD (Children's Hospital of Pittsburgh of UPMC - CHP)	Hospira, Inc.	Dexmedetomidine as a Rapid Bolus for Treatment and Prophylactic Prevention of Emergence Agitation in Anesthetized Children
Peter J. Davis, MD (CHP)	Arizant Healthcare, Inc./3M	3M SpotOn Temperature Monitoring System
Peter J. Davis, MD (CHP)	Cumberland Pharmaceuticals, Inc.	A Multi-center, Randomized, Double-blind, Placebo-controlled, Single-dose Trial of the Safety and Efficacy of Intravenous Ibuprofen for Treatment of Pain in Pediatric Patients Undergoing Tonsillectomy
Peter J. Davis, MD (CHP)	J&J Pharmaceutical Research	Open-label Evaluation of the Pharmacokinetics Profile and Safety of Tapentadol Oral Solution of the Treatment of Postsurgical Pain in Children and Adolescents Aged From 6 to Less than 18 Years
Rama Joshi, MBBS, MPM (UPMC Shadyside)	AbbVie Inc.	A Phase 2b, Randomized, Double-blind, Placebo-controlled Safety and Efficacy Trial of Multiple Dosing Regimens of ABT-719 for the Prevention of Acute Kidney Injury in Subjects Undergoing High Risk Cardiac Surgery
Rama Joshi, MBBS, MPM (UPMC Shadyside)	AbbVie Inc.	A Phase 2b, Randomized, Double-blind, Placebo-controlled Safety and Efficacy Trial of Multiple Dosing Regimens of ABT-719 for the Prevention of Acute Kidney Injury in Subjects Undergoing High Risk Major Surgery
Lois Pizzi, RN (UPMC Shadyside)	Avancen MOD Corporation	A Prospective, Randomized Trial of an Oral PCA Device versus SOC Delivery of as-needed Oral Pain Medications Following Total Hip Arthroplasty
Erica L. Sivak, MD (CHP)	Hospira, Inc.	Phase IV, Open-label Safety Study Evaluating the Use of Dexmedetomidine in Pediatric Subjects Undergoing Procedure-type Sedation
Darrin Taormina, MD (UPMC St. Margaret)	Pacira Pharmaceuticals, Inc.	Assessing the Impact of EXPAREL on Patient-reported Outcomes when Administered by Filtration into the Tranversus Abdominal Plane Under Ultrasound Guidance for Prolonged Postsurgical Analgesia in Lower Abdominal Surgeries
Anna Uskova, MD (UPMC Shadyside)	Pacira Pharmaceuticals, Inc.	A Multicenter, Randomized, Double-blind, Parallel-group, Placebo-controlled, Dose-ranging Study to Evaluate the Safety, Efficacy, and Pharmacokinetics of Single Injection Femoral Nerve Block with Liposome Bupivacaine for Postsurgical Analgesia in Subjects Undergoing Total Knee Arthroplasty
Mihaela Visoiu, MD (CHP)	Cadence Pharmaceuticals, Inc.	A Randomized, Placebo-controlled, Multi-Center Study of the Efficacy, Pharmacokinetics and Pharmacodynamics of Intravenous Acetaminophen for the Treatment of Acute Pain in Pediatric Patients
Mihaela Visoiu, MD (CHP)	Endo Pharmaceuticals, Inc.	An Open-label, Non-randomized, Multicenter, Ascending Dose by Age, Single- and Multi-dose Evaluation of the Effectiveness, Safety, and Tolerability of Oral Liquid Oxymorphone Immediate Release for Acute Postoperative Pain in Pediatric Subjects
Jonathan H. Waters, MD (Magee-Womens Hospital of UPMC - MWH)	Haemonetics Corporation	Clinical Evaluation of the OrthoPAT Advance System in Orthopedic Procedures
Jonathan H. Waters, MD (MWH)	Coramed Technologies, LLC	Equivalency Study of the CORA and TEG 5000 Systems
Charles I. Yang, MD (CHP)	Endo Pharmaceuticals, Inc.	A Multicenter Study of the Safety, Tolerability, Effectiveness, and Pharmacokinetics of Oxymorphone HCL Extended-release Tablets in Pediatric Subjects Requiring an Around-the-Clock Opioid for an Extended Period of Time
Charles I. Yang, MD (CHP)	Purdue Pharma L.P.	An Open-Label, Multicenter Study of the Safety of Twice Daily Oxycodone Hydrochloride Controlled-Release Tablets in Opioid Experienced Children from Ages 6 to 16 Years Old, Inclusive, with Moderate to Severe Malignant and/or Nonmalignant Pain Requiring Opioid Analgesics
Charles I. Yang, MD (CHP)	Purdue Pharma L.P.	An Open-label, Multicenter Study of the Safety, Pharmacokinetics, and Efficacy of Buprenorphine Transdermal System in Children From 7 to 16 Years of Age, Inclusive, Who Require Continuous Opioid Analgesia for Moderate to Severe Pain

# Other Research by Academic/Clinical Faculty

**Nicholas G. Bircher, MD, FCCM** Improving Overall and Neurological Outcomes after Resuscitation and Critical Care; Improving Educational Methodology; Special Task Force to Reshape the System for Survival for Sudden Cardiac Arrest; Society of Critical Care Medicine Glycemic Control Task Force; Analysis of the Get With The Guidelines®-Resuscitation Database (collaboration with Yan Xu, PhD); Delphi Method Validation of the Cerebral Performance Categories-Revised (collaboration with Margo B. Holm, PhD); Effects of a Structured Facebook Study Assistance Program (collaboration with Rose Ferrara-Love, RN, DNP)



**Barbara W. Brandom, MD** Maintenance of the North American Malignant Hyperthermia (MH) Registry at the University of Pittsburgh; Molecular Genetics of MH Susceptibility; Clinical Correlates of the Confirmed Diagnosis of MH Susceptibility

**Thomas M. Chalifoux, MD** Effect of Automated Interpretation of International Normalized Ratio in the Electronic Medical Record on Plasma Transfusion; Development of an Objective Assessment Scale to Measure Anesthesiology Residents' Performance in Elective Cesarean Section

**Patricia L. Dalby, MD** Patient and Family Satisfaction with the "Condition O" Emergency Care Questionnaire; Genetic Determinants of Ante Partum, Parturition, and Postpartum Pain and Labor Analgesia (collaboration with Inna Belfer, MD, PhD); Protein Shake and Progress of Labor (collaboration with Pamela Flood MD; Inna Belfer, MD, PhD; and Jonathan Waters, MD)



**Tomas Drabek, MD, PhD** Novel Concept of Emergency Preservation with Delayed Resuscitation for Victims of Exsanguination Cardiac Arrest (CA); Normovolemic Ventricular Fibrillation CA Model

**Stephen A. Esper, MD** Anticoagulation and Blood Transfusion Strategies to Develop a Standardized Treatment Method for Operating Room and Intensive Care Unit Patients

**Ferenc E. Gyulai, MD** Impact of Anesthesia on Spinal Pain Gating in the Presence of Inflammation; Imaging of Memory Circuits Potentially Responsible for the Amnestic Effects of Midazolam (collaboration with Carnegie Mellon University); Robust Electrocorticography-based Brain Control of an Anthropomorphic Prosthetic Arm and Hand in Individuals with Spinal Cord Injury (collaboration between the Departments of Physical Medicine and Rehabilitation, Neurosurgery, Neurobiology, and Bioengineering); Assessment of Peri- and Intra-operative Ketamine for Improved Pain Relief in Patients with Histories of Chronic Opioid Use Undergoing Spinal Fusion (collaboration with the Department of Neurosurgery); Validation of Diffuse Correlation Spectroscopy and Diffuse Optical Spectroscopy (collaboration with University of Pennsylvania)

**Ibtesam A Hilmi, MB CHB, FRCA** Outcome Study of Jehovah Witness Orthotopic Liver Transplant (OLT) Recipients; Primary Graft Non-function in Adult OLT Recipients: a Single Center Experience; Stop-Bang Questionnaire to Preoperatively Identify Patients at Risk for Obstructive Sleep Apnea at a Tertiary Care Medical Center; Incidence, Risk Factors, and Outcomes of Acute Kidney Injury in Live Donor Liver Transplant Patients; Evaluation of Postoperative Coagulation Profiles in Living Liver Donors; Evaluation of New CVInsight Medical Device as a Non-invasive Intraoperative Hemodynamic Monitor in Live Kidney Donors and Kidney Recipients

# Other Research by Academic/Clinical Faculty

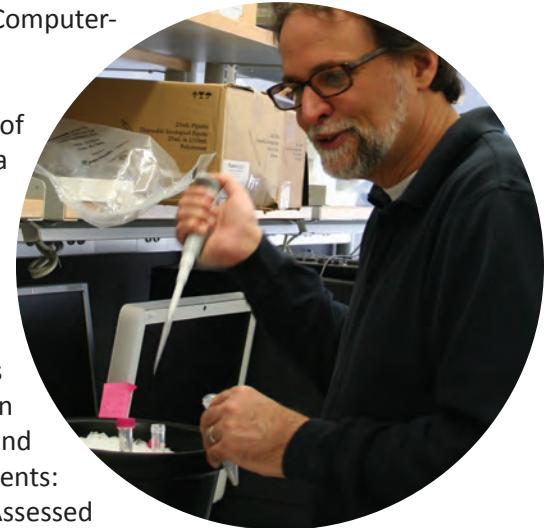
**James W. Ibinson, MD, PhD** Functional MRI of Short and Long Duration Painful Electric Nerve Stimulation; Exploration of the Functional Connectivity Differences between Pain and Resting States; Imaging Pain Phenotype and Genotype: Identifying Brain Areas Underlying Individual Differences in Pain

**Qing Liu, MD, PhD** Mechanisms Underlying Loss of Local Anesthetic Potency

**William McIvor, MD** Assessment of Board-certified Anesthesiologists' Performance during Simulations of Perioperative Crises; Development of Mannequin- and Computer-based Simulations

**Steven L. Orebaugh, MD** Femoral Nerve Anatomy Study; Comparison of Cervical Nerve Root, Intraneural, and Perineural Injection Pressures in a Cadaver Model; Integration of a Computerized Gross Anatomy Tutorial with Ultrasound Scanning to Learn Sono-anatomy for Peripheral Nerve Blockade

**Tetsuro Sakai, MD, PhD** Epidural and Bilateral Paravertebral Blocks for Perioperative Pain Management in Open Liver Resection Patients; Incidence, Outcome, and Risk Factors for Postoperative Pulmonary Complications in Laryngectomy Patients; ROTEM vs. TEG for Coagulation Parameters in Patients Undergoing Liver Transplantation; Teaching Peri-operative Ultrasound to Anesthesiology Residents; System-based Project for Anesthesiology Residents: a 10-year Single Center Experience; Post-operative Use of Focus Assessed Transthoracic Echo by Post-Anesthesia Care Unit Anesthesiology Residents; Efficacy of an Epidural Anesthesia Workshop Curriculum for Milestone Achievement in Junior Anesthesiology Residents



**Kenichi Tanaka, MD, MSc** Thrombelastography vs. Thromboelastometry in Liver Transplantation; Fibrinogen Measurements in Adult Cardiac Surgery

**Haibin Wang, MD, PhD** Modulating Visceral Hypersensitivity with Spinal Cord Stimulation; Effect of Gralise on Persistent Post-mastectomy Pain

**Ajay D. Wasan, MD, MSc** Brain Mechanisms Underlying Cognitive-behavioral Therapy-related Reductions in Fibromyalgia; Assessing Activation of Brain Microglia in Chronic Pain with Simultaneous Magnetic Resonance/Positron Emission Tomography; Neuroimaging Acupuncture Effects Brain Activity in Chronic Low Back Pain; A Functional MRI Study of Expectancy on Acupuncture Treatment Outcomes in Knee Osteoarthritis



**Jonathan H. Waters, MD** Shear-induced Hemolysis in Pregnant and Non-pregnant Patients; Implementation of a Patient Blood Management Program for UPMC; Comparative Effectiveness of Allogeneic Transfusion to Blood Recovery During Gynecologic Cancer Debulking Surgery

**Brian A. Williams, MD, MBA** Peripheral Nerve Blocks with Multimodal Analgesics; Benefits of Routine Antiemetic Prophylaxis; Clinical Outcomes in Reference to National Benchmarks (collaboration with Gregory J. Godla, MD); Outcomes after ACL Reconstruction: Femoral Nerve Block; Process Re-engineering and Health Care Economic Considerations with Regional Anesthesia in Ambulatory Surgery; Resident Training in Ambulatory/Regional Anesthesia

**Li-Ming Zhang, MD** WISP1 and TLR4 Signaling in Ventilator-induced Lung Injury

## Research Programs

# Pittsburgh Center for Pain Research



**GERALD F. GEBHART, PhD**  
Director

The Pittsburgh Center for Pain Research (PCPR) was established in 2006 and rapidly established a national presence in the pain research community. Research in the PCPR ranges from mechanisms of hyperalgesia and neural circuits that underlie pain and itch to genetic bases of pain and functional neuroimaging of pain processing. The Department of Anesthesiology is the administrative home of the PCPR and principal research laboratories are located in contiguous space in the Thomas E. Starzl Biomedical Science Tower, Department of Neurobiology. As a center, the PCPR extends beyond departmental boundaries and is comprised of basic and clinical scientists appointed in the departments of Anesthesiology, Medicine, Neurobiology, Pharmacology, and Psychiatry. Seventeen Department of Anesthesiology faculty members were PCPR researchers in FY14.

The PCPR strives to become a leading center for training both basic and clinical scientists in the arenas of pain research and pain management. Because PCPR faculty are diverse in background, well-funded, experienced as mentors, and both interactive and collegial, the research training environment is outstanding and supported by a T32 NIH training program for both pre- and post-doctoral fellows.

## Molecular Epidemiology and Pain Program



**INNA BELFER, MD, PhD**  
Director

The principal research focus of the Molecular Epidemiology and Pain Program is the relationship between human genetic polymorphism and complex phenotypes related to pain. For the past ten years, we have simultaneously addressed the development and extension of analytic approaches for identifying and characterizing genotype-phenotype relationships and the application of those approaches to a variety of complex phenotypes, including acute and chronic post-surgical pain, pain-related mood and motor disorders, and psychosocial traits. Lately, a set of collaborative studies has centered on the interaction between genetic and environmental factors influencing pain perception and analgesia. A complementary research focus is the analysis of human dorsal root ganglia sensory neurons using genomic and proteomic tools as well as histology and immunocytochemistry, as well as the study of pain candidate gene expression patterns as functional genomics and follow-up for significant hits from association studies.

## Research Programs

# North American Malignant Hyperthermia Registry

of the Malignant Hyperthermia Association of the United States (MHAUS)



**BARBARA W. BRANDOM, MD**  
Director

with positive versus negative muscle contracture test results, a review of the safety and efficacy of dantrolene as documented in AMRA reports, and analysis of recrudescence after MH reactions.

The North American Malignant Hyperthermia Registry (NAMHR) consists of over 3,520 reports of *in vitro* testing for malignant hyperthermia (MH) susceptibility and over 820 reports of adverse metabolic reactions in anesthetized patients (AMRAs). It also includes over 260 reports of the anesthetic experience of individuals who believe they are MH-susceptible and others who have experienced MH episodes but have not had contracture tests. Results of genetic screening of the ryanodine receptor gene type one (RYR1) in CLIA diagnostic molecular genetics labs such as that at UPMC and two other genetic testing centers in the USA are being added to the NAMHR database.

The NAMHR was selected, through a competitive process, by the Global Rare Disease Registry (GRDR) to be one of 12 existing groups to participate in this open, de-identified, web-based registry of common data elements describing subjects with different rare diseases. In 2014, MHAUS signed a Memorandum of Understanding and NAMHR prepared to send de-identified data to the GRDR for posting.

The NAMHR acquires data under the rules of the University of Pittsburgh Institutional Review Board and makes it available for research purposes. The NAMHR has supported several studies by UPMC investigators and elsewhere including: investigation of RYR1 variants in patients and families with MH susceptibility, a survey of complaints of muscular pain or weakness in patients

## Ambulatory Anesthesiology



**BRIAN A. WILLIAMS MD, MBA**  
Director

The Ambulatory Anesthesiology division was created in 2009 to integrate research-based patient care principles for same-day surgery into a formal clinical entity. The foundation for the division is the development of new recovery criteria, the "WAKE Score," which outlines recovery parameters after ambulatory surgery and/or moderate sedation. The WAKE score not only predicts safe bypass of the "Phase 1 Recovery Unit" (Post-Anesthesia Care Unit), but also predicts successful same-day discharge (i.e., no unplanned hospital admission). In August 2010, the WAKE score was "rolled out" for daily clinical use *en route* to becoming the official recovery criteria for UPMC. This important initiative for standardizing recovery criteria system-wide is a Joint Commission-driven patient care directive, and this rollout involved top-level teamwork with many departments and committees.

Several ambulatory anesthesiology studies continued in FY14: investigating femoral nerve blocks either with or without a sciatic block; comparing clinical outcomes at UPMC South Surgery Center to national benchmarks; testing peripheral nerve blocks with multimodal analgesics in animals; examining the benefits of applying recommendations for low-risk antiemetic prophylaxis; and comparing health care costs associated with regional vs. general anesthesia in the ambulatory orthopedic surgery population.

# Education



**RITA M. PATEL, MD**  
Vice Chair for Education

In addition to the educational endeavors in which departmental faculty members participate for the benefit of residents, fellows, medical students, and colleagues, many are involved in educational projects and presentations that contribute to the field of anesthesiology education and give our department national and international prominence.

## Overview

The Department of Anesthesiology excels in the education of medical students, residents, fellows, and faculty. In addition to teaching in the traditional OR and clinical clerkships, anesthesiology faculty serve on important committees, such as admissions, curriculum, and the medical school executive committee, and serve as research mentors for medical student scholarly projects. Our medical student program is recognized nationally as among the best in the nation and is unique among departments of anesthesiology because of our involvement in the preclinical medical student curriculum. Our fully Accreditation Council for

Graduate Medical Education (ACGME)-accredited Anesthesiology Residency Program is nationally renowned for education quality, diversity and volume of clinical cases, and resident performance. We also host ten fellowship training programs, five of which are ACGME-accredited.

## Academy of Master Educators

The University of Pittsburgh School of Medicine Academy of Master Educators recognizes and rewards excellence in education, advances education through innovation and professional development of faculty, and supports and promotes educational scholarship. Six Department of Anesthesiology faculty members are members of the Academy of Master Educators: Shawn T. Beaman, MD; Michael P. Mangione, MD; William R. McIvor, MD; Steven L. Orebaugh, MD; Rita M. Patel, MD; and Paul E. Phrampus, MD were selected from the University of Pittsburgh School of Medicine faculty based upon their exceptional contributions to medical education. Members must be involved in the education of medical students, graduate students, and/or residents for the duration of their appointment to the academy.

Dr. Rita M. Patel is also a member and former Chair of the Task Force for the Academy on Teaching Residents to Teach. The committee developed the Applying Principles and Practice of Learning and Education (APPLE) curriculum. The Introduction to Teaching Program is provided for all residents and fellows who join UPMC Medical Education (approximately 600) in June and July of every academic year.

## National Education Activities

Rita M. Patel, MD began her appointment to the ACGME Institutional Review Committee in FY14. She continues to serve as a member of the ACGME Appeal Panel for Institutional Review and has been instrumental in developing the Anesthesiology Milestones and the Obstetric Anesthesiology Milestones.

Dr. Shawn T. Beaman was also newly appointed as an American Board of Anesthesiology (ABA) Board Examiner in FY14. Erin A. Sullivan, MD, Program Director of the Adult Cardiothoracic Anesthesiology Fellowship, was named a Senior Editor and exam content developer for the ABA Part 2 Examination in FY14.

# Anesthesiology Grand Rounds Series



The Anesthesiology Grand Rounds Online course program continued in FY14. The series included monthly journal clubs and lectures from visiting professors on various topics. Both the journal clubs and visiting professor lectures are integral to the success of the Grand Rounds series.

The program allows faculty, fellows, residents, and medical students in the department to view digitally-recorded grand rounds presentations on-line from any computer with internet access. The presentations include multiple-choice questions for review and an evaluation form. In addition, continuing medical education (CME) credit may be earned. The modules are kept on-line indefinitely as an educational resource.

In 2013-2014, approximately 210 faculty members viewed 34 presentations, obtaining over 2,800 hours of CME credit.

A Grand Rounds Advisory Committee was developed in FY14 to assist with organizational and educational aspects of Anesthesiology Grand Rounds.

## VISITING PROFESSOR LECTURES, 2013-2014

**Patrick Odonkor, MD;** Assistant Professor, Department of Anesthesiology, University of Maryland: Aortic Valve Bypass Surgery in High Risk Patients with Symptomatic Aortic Stenosis

**Renyu Liu, MD, PhD;** Assistant Professor, Department of Anesthesiology and Critical Care, Perelman School of Medicine, University of Pennsylvania: Salvinorin A: A Potent Cerebral Vascular Dilator and Potential Neuroprotectant

**Naum Shaparin, MD;** Assistant Professor and Director, Montefiore Pain Center, Bronx, NY: Non-opioid Analgesia in Perioperative Pain Management

**Ian Welsby, MSc, MBBS, FRCA;** Associate Professor of Anesthesiology and Critical Care; Duke University Medical Center, Durham, NC: Transfusion Related Acute Lung Injury – Emerging Concepts and Fresh Targets

**Sheldon Goldstein, MD;** Staff Anesthesiologist, Department of Anesthesiology; Montefiore Medical Center, Bronx, NY: Metacognition for Residents and Faculty: Implications for Learning and Teaching

**Gavin Fine, MD;** Staff Anesthesiologist, Department of Anesthesiology; Cook Children's Hospital, Fort Worth, TX: Pediatric Airway: Anatomy and Management

# Residency Program



**DAVID G. METRO, MD**  
Director

The University of Pittsburgh Anesthesiology Residency Program is nationally renowned for education quality, diversity and volume of clinical cases, and resident performance. The program is fully-accredited by the ACGME to provide training and education in anesthesiology leading to certification by the American Board of Anesthesiology. Residents complete subspecialty rotations in critical care and pain medicine, as well as in pediatric, obstetric, and geriatric anesthesiology. The program provides additional training in subspecialty areas including cardiac, neuro-, thoracic, liver-transplantation, and regional/ambulatory anesthesiology, as well as the post anesthesia care unit. As in previous years, academic year 2013-2014 was a period of excellence and innovation in education, as well as adaptation to the emergent and evolving changes that characterize contemporary graduate medical education.

The resident curricula includes special lectures, presentations, and educational sessions on topics such as anesthesiology billing, practice management, ethics, patient care, and systems-based practice. Lectures are cataloged online, allowing residents unlimited access and review. Post-graduate year- (PGY) 4 residents participated in a curriculum consisting of evidence-based medicine, case management, and oral board preparatory sessions. Case-management sessions are presented in the American Society of Anesthesiology Problem-based Learning

Discussion format to facilitate active learning in small groups. The educational program is augmented by weekly grand rounds in which local speakers and visiting professors provide up-to-date reviews of relevant topics. A monthly journal club is included in the Grand Rounds curriculum. During these sessions, residents research and present important articles with the goals of increasing their understanding of scientific literature and sharpening their presentation skills. The PGY-2 and PGY-4 curriculum continues to include mock oral examination sessions in the fall and spring of each year. Subspecialty rotations during the PGY-3 year also continue to include mock oral board examinations as part of the rotation. In addition to regular attendance at lectures and grand rounds, a standard requirement in the residents' curriculum is to teach at least one session of the Clinical Procedures Course to University of Pittsburgh medical students.

Many resident simulation courses conducted at WISER provide both didactic and hands-on experience in the management of problems that are uncommon, or common but clinically challenging. Residents were able to sharpen skills and build confidence in crisis leadership, fiberoptic endotracheal intubation, central venous cannulation, Advanced Cardiac Life Support, and difficult-airway management. Residents were given the opportunity to orient or receive additional training for their subspecialty rotations in regional, obstetric, and liver transplantation anesthesiology.

Several faculty committees continually evaluate and improve the residency program. The Resident Education Committee began to incorporate the new ACGME-defined "milestones" into the curriculum and develop assessment tools. The Curriculum Subcommittee, consisting of rotation directors at each site, annually reviews and develops the didactic and clinical curricula. The Recruitment and Selection Subcommittee is responsible for establishing criteria for resident selection, overseeing the progress of the interview season, attending recruitment fairs, updating the department's educational web site, and formulating guidelines for the selection of the chief resident as well as detailing the responsibilities of that position. The Evaluation and Competence Subcommittee closely monitors resident educational progress and works to develop policies regarding resident responsibilities, resident incentives, and academic progress. The Program Review Subcommittee ensures that educational policies and procedures are in place, reviews program design and function, and collects and compiles an extensive amount of data regarding the program and the activities of faculty members and residents. This committee oversees the planning of the Annual Program Review, which was held in May 2014; fifty members of the Resident Education Committee and residents attended the event. The information gained and discussions that ensue at this event are used to make improvements to the residency program on an annual basis.

## PARRC 2014

The Anesthesiology Residency Program hosted the ninth annual Pennsylvania Anesthesiology Resident Research Conference (PARRC) at UPMC Shadyside on May 10, 2014 under the direction of Course Director Tetsuro Sakai, MD, PhD. PARRC is an opportunity for residents and faculty to learn about current, cutting edge research by anesthesiology residents from seven residency programs across the state of Pennsylvania. Both original research and case reports were submitted in oral presentation and poster categories, representing scholarly activities performed in each institution. Twenty-four oral presentations in original research and case report categories were presented and sixty-eight posters in both original research and case report categories were presented by residents representing seven Anesthesiology residency programs from across the State of Pennsylvania. UPMC was represented by sixteen residents who presented posters and six who presented oral presentations. The University of Pittsburgh School of Medicine designated the activity for a maximum of 5.25 AMA PRA Category 1 Credit(s)<sup>TM</sup>. An educational grant from the Foundation for Anesthesia Education & Research helped support this activity.



Keith Vogt, MD, PhD won the second place award for the oral presentation “Functional Connectivity of the Posterior Insula Reveals Pain vs Rest Differences not Present with the Anterior Insula” (Mentor: James Ibinson, MD, PhD). Daniela Damian, MD (PGY-4) won the third place award for “The Effect of Protamine and Hemodilution on the Thrombus Formation Under Flow Condition” (Mentor: Kenichi A. Tanaka, MD, MSc). Lindsay Stollings, MD won the sixth place award for the oral presentation “Immunomodulation of Inhaled Anesthetics” (Mentors: Binfeng Lu, PhD and Yan Xu, PhD).

## TEACHING AWARDS

**Dr. Leroy Harris Excellence in Teaching Award:** Richard H. McAffee, MD

**Excellence in Clinical Teaching of Residents:** Patrick M. Callahan, MD; Derek Davis, MD; Shawn T. Beaman, MD; Thomas A. Gasior, MD; Steven L. Orebaugh, MD; Sudhakar Yennam, MD; Anthony T. Silipo, DO

**Mark H. Gilliland, MD Award for Best Clinical Resident:** Phillip Adams, DO

## GRADUATING RESIDENTS

### Graduate

Phillip Adams, DO  
Scott Berry, MD  
Daniela Damian, MD  
Sean DeChancie, DO  
Trent Emerick, MD  
Wendy Haft, MD  
Ricky Harika, MD  
James Jernigan, MD  
James Krakowski, MD  
Tiffany Lonchena, MD  
Sharanya Nama, MD  
Jessica O'Connor, DO  
Lauren Partyka, MD  
  
Faith Ross (Jordan), MD

### Post-Residency Position

Pediatric Anesthesiology Fellowship, UPMC  
Chronic Pain Medicine Fellowship, UPMC  
Children's Hospital of Pittsburgh of UPMC Anesthesiology Faculty  
Critical Care Medicine Fellowship, UPMC  
Chronic Pain Medicine Fellowship, UPMC  
Cardiothoracic Anesthesiology Fellowship, UPMC  
Cardiovascular Anesthesiology Fellowship at Texas Heart Institute in Houston, TX  
United States Air Force at Joint Base Andrews, Maryland  
Regional Anesthesiology Fellowship at the University of North Carolina  
Chronic Pain Medicine Fellowship, UPMC  
Chronic Pain Medicine Fellowship, UPMC  
Regional Anesthesiology Fellowship, UPMC  
Pediatric Anesthesiology Fellowship at Riley Children's Hospital associated with Indiana University in Indianapolis, IN  
Pediatric Anesthesiology Fellowship at Seattle Children's Hospital (University of Washington)  
Private practice, United Hospital Center in Bridgeport, WV  
Critical Care Medicine Fellowship, UPMC  
Regional Anesthesiology Fellowship, UPMC  
Pediatric Anesthesiology Fellowship, UPMC

# Medical Student Programs



**MICHAEL P. MANGIONE, MD**  
Director

The Department of Anesthesiology's medical student programs are recognized as being among the best in the nation. We are unique among anesthesiology departments because of our faculty's extensive involvement in medical student education. Clinical department faculty direct pre-clinical courses in very few U.S. medical schools.

Faculty members continued their enthusiastic participation in clinical teaching during the anesthesiology clerkship and in the electives offered by the department in FY14. The Clinical Procedures Course is designed for second-year medical students just prior to the start of clinical rotations. This four-week course consists of brief introductory lectures followed by "hands-on" sessions. Medical students studied the details of airway assessment and endotracheal intubation, received a brief introduction to hemodynamic monitoring and interpretation of blood-gas reports, and learned how to assess back pain and perform lumbar punctures, nasogastric tube insertion, and Foley catheter insertion. They utilized universal precautions and performed intravenous cannulation and venipuncture. Based on written evaluations from the medical students, the Clinical Procedures Course received an overall approval rating of 88%. Students said they valued the opportunity to learn these basic procedures prior to performing them on patients.

The mandatory Surgery and Perioperative Care Clerkship consists of an eight-week course with fully integrated surgery and anesthesiology portions. Thanks to the faculty's teaching efforts, the course enjoyed another very successful year, as evidenced by excellent evaluations and feedback. Students continue to rate the overall quality of the clerkship as good or outstanding.

One month-long electives provide in-depth exposure to anesthesiology. Four electives are offered in General Anesthesiology, Anesthesiology Research, Subspecialties in Anesthesiology, and Pain Medicine. Thirty-nine students participated in our electives; 37 took the general anesthesiology course, one took the research course, and one took the pain medicine course. Due primarily to the enthusiastic involvement of the faculty, as evidenced by evaluations, these electives continue to be well-received.

The Anesthesiology Interest Group (AIG) that was formed in 2005 continues to thrive. This group welcomes students from all four years of medical school who are interested in our specialty. An increasing number of students have been accepted into the ASA Student Membership component. Departmental support was also provided in connection with the AIG's lunch and social meetings, which were well-attended by both faculty and residents. Our faculty and residents continue to enthusiastically support the students' efforts.

Each spring, our department hosts a "Specialty Night" for University of Pittsburgh students who are in their final two years of medical school. This proves to be an excellent forum for students who are interested in our specialty to learn about the residency application process and the specialty. Students from the Classes of 2015 and 2016 participated in this year's event at the University Club on June 4, 2014.

## SCHOLARLY PROJECTS

Anesthesiology faculty members mentored the following medical student scholarly projects in FY14:

Mentor	Student	Project
Franklyn Cladis, MD	Jessica Asencio	Tranexamic Acid for the Reduction of Allogeneic Transfusion Requirements in Infants and Children having Craniofacial Surgery
William McIvor, MD	Sean Flynn	Assessing the Educational Value of Screen-based Simulations for USMLE Step 1 Pharmacology Review
William McIvor, MD	Peter Larossa	Using a Screen-based Simulation Tool to Create an Expert-validated Solution to a Mannequin-based Simulation of an Uncal Herniation
Patricia Dalby, MD	Hanzi Zhan	Patient and Family Satisfaction Following Emergency Obstetric Crisis: Development of a Valid and Reliable Questionnaire

## FAER Summer Research Fellowship

The Department of Anesthesiology was one of 35 sites nationwide selected to host the Foundation for Anesthesia Education and Research (FAER) Medical Student Anesthesia Summer Research Fellowship (MSARF) in 2014 and will again serve as a host site in the summer of 2015. The department has hosted at least one student every summer since 2008 and a total of 13 students and eight faculty mentors have participated in the fellowship during that time period. Six of these students were University of Pittsburgh medical students and seven of them came from other medical schools. During FY14, Drs. Yan Xu and Inna Belfer served as mentors for the projects.

2012 MSARF Fellow Shu Yang Lu received a Young Investigator Award at the 2014 Joint International Congress of the International Liver Transplantation Society (ILTS), European Liver and Intestine Transplant Association (ELITA), and Liver Intensive Care Group of Europe (LICAGE) on June 4–7 in London, United Kingdom. His abstract, “Applicability of Rapid Thrombelastography and Functional Fibrinogen Assay in Adult Liver Transplantation” (Lu SY, Tanaka KA, Abuelkasem E, Planinsic RM, Sakai T) was also chosen as a prestigious oral presentation at the meeting. Mr. Lu’s mentor on the project was Tetsuro Sakai, MD, PhD.

## AWARDS

**Best Student in Anesthesiology Award:** Gabrielle Paoletti

**Department of Anesthesiology Peter M. Winter Award for Excellence in Medical Student Teaching:**

William McIvor, MD

## MATCHING

Eight UPSOM students (Class of 2014) matched into anesthesiology residencies:

Student	Match
Isaac Jenabi	UCLA Medical Center, Los Angeles, CA
Chih King	Brigham and Women's Hospital, Boston, MA
Michael Kiyatkin	New York Presbyterian Hospital-Columbia University Medical Center, New York, NY
Duane Koh	University of California Irvine Medical Center, Orange, CA
Kaarlin Michaelsen	UPMC Medical Education, Pittsburgh, PA
Gabrielle Paoletti	Massachusetts General Hospital, Boston, MA
Hanzi Russino	UCLA Medical Center, Los Angeles, CA
Brett Tomlin	Medical College of Wisconsin Affiliated Hospitals, Milwaukee, WI

# Fellowship Programs

The Department of Anesthesiology offers ten fellowship training programs:

## ACGME-ACCREDITED FELLOWSHIP PROGRAMS

### ADULT CARDIOTHORACIC ANESTHESIOLOGY

**Director: Erin A. Sullivan, MD**

Fellows gain substantial expertise managing anesthesia for the entire range of cardiac surgical procedures, including heart and lung transplants, removal of ventricular assist devices as a bridge to transplantation, the use of extracorporeal membrane oxygenation for short-term support after lung transplantation, coronary bypass, valve replacement and repair, thoracic aortic reconstruction, arrhythmia ablation, and pulmonary thromboendarterectomy. Trainees are encouraged to take advantage of the opportunity to gain expertise in pediatric cardiothoracic anesthesia during a three-month rotation at Children's Hospital of Pittsburgh of UPMC. Fellows gain extensive experience in the clinical use of intraoperative transesophageal echo, and all fellows rotate for one month in the echocardiography lab. Fellows may also participate in research.

### ANESTHESIOLOGY CRITICAL CARE MEDICINE

**Director: A. Murat Kaynar, MD**

Fellows in this one-year program may rotate through radiology and general medical-surgical, coronary care, and surgical specialty ICUs such as cardiothoracic, burn, trauma/general surgery, neurosurgical, obstetric, liver and abdominal visceral transplantation, and general pre- and postoperative surgical critical care. Elective rotations may include echocardiography, radiology, nephrology, infectious diseases and general medical, coronary care, and surgical specialty ICUs. Fellows have the opportunity to complete an optional second year of research.

### OBSTETRIC ANESTHESIOLOGY

**Director: Patricia Dalby, MD**

Trainees gain advanced experience in all aspects of obstetric anesthesiology. The program offers participation in state-of-the-art anesthetic care of low- and high-risk obstetrical patients, as well as opportunities in clinical and basic science research in the discipline. A strong Maternal Fetal Medicine Division, together with Magee-Womens Research Institute, further enhance training. The fellowship year may be tailored to individual needs by combining obstetric anesthesiology with clinical and research experience in other subspecialties (e.g. neuroanesthesiology, cardiac, pain, pediatrics, and transplantation).

### PEDIATRIC ANESTHESIOLOGY

**Director: Franklyn P. Cladis, MD**

The Pediatric Anesthesiology Fellowship Program based at Children's Hospital of Pittsburgh of UPMC is designed to further develop clinical expertise in caring for neonates, infants, children, and adolescents undergoing a wide variety of surgical, diagnostic, and therapeutic procedures. It is among the oldest and most successful fellowships of its kind in America and it is one of the first pediatric anesthesiology fellowships to receive ACGME accreditation. In addition to routine pediatric surgical patients, fellows will master the anesthetic care of complicated pediatric patients undergoing repair of orthopedic, neurologic, urologic, plastic, and general surgical pathologies. Fellows will also be exposed to pediatric patients with organ failure undergoing transplantation and non-transplantation procedures. Fellows will develop expertise in critical perioperative pediatric care, pediatric advanced life support, invasive monitoring and pediatric pain management during subspecialty rotations on the Acute Pain Medicine Service, Congenital Cardiac Service, and the Cardiac Intensive Care Unit. Fellows will be involved in emergency room and intraoperative management of the pediatric trauma patient. Participation in clinical or laboratory research is optional but highly encouraged.

### PAIN MEDICINE

**Interim Director: Nashaat Rizk, MD**

The Pain Medicine Fellowship program is a truly multidisciplinary program with services ranging from pain rehabilitation to interventional therapies, affording fellows opportunities to learn from work with psychologists, physical therapists, occupational therapists, and pain medicine physicians from other disciplines including neurology, psychiatry, and rehabilitation medicine. Productive research is encouraged and supported. We strongly encourage applications from individuals interested in conducting pain-related research during and/or after the completion of the fellowship. An important objective of the program is to attract individuals with an interest in developing an academic career.

# Fellowship Programs

## HEPATIC TRANSPLANTATION ANESTHESIOLOGY (HTA)

**Director:** Raymond M. Planinsic, MD

The program provides a comprehensive curriculum emphasizing perioperative care with the collaboration of colleagues in surgery, hematology, and critical care medicine. By the end of the training year, fellows achieve sufficient qualification to become a Director of HTA in other major medical centers, thus joining the vast alumni of this highly successful fellowship program. The objectives of the one- or two-year fellowships include clinical, education, and research components. The program also can be tailored to meet special goals and needs, such as pediatric HTA and critical care. During a one-year experience, the fellow will participate in more than 50 cases of liver transplantation.

## ORTHOPEDIC ANESTHESIOLOGY

**Director:** Jacques E. Chelly, MD, PhD, MBA

The program provides advanced clinical training in orthopedic anesthesia and acute pain and rehab with research activities and educational curricula. Training is dedicated to anesthesiology and acute postoperative pain in orthopedic trauma and oncology; pediatric orthopedics; chronic pain related to orthopedic surgery; joint replacement; and sport medicine-related and spine surgery. Two months are given for additional training in other orthopedic surgery sub-specialties or research.

## NEUROANESTHESIOLOGY

**Director:** Steven L. Whitehurst, MD

Fellows gain experience with a wide variety of cases, including: spine and spinal cord work, surgery for carotid artery disease and intracranial vascular disease, microvascular decompression on cranial nerves, and a broad variety of tumor surgery and skull base work, much of which involves stereotactic or image guidance, and trauma neurosurgery. Pediatric neurosurgery is performed at Children's Hospital of Pittsburgh of UPMC. Rotations include neurophysiologic monitoring, neuroradiology, neurosurgical intensive care, and pediatric neuroanesthesia. Research opportunities are available, including collaborative work with Neurosurgery and the Safar Center for Resuscitation Research.

## REGIONAL ANESTHESIOLOGY

**Director:** Jacques E. Chelly, MD, PhD, MBA

Fellows develop expertise in not only the practice and theory of regional anesthesiology and acute pain management techniques, but also the understanding of the related physiology and pharmacology in the provision of patient care, patient outcomes, and financial related issues.

## RESEARCH FELLOWSHIPS

**Director:** Yan Xu, PhD

Fellows have the opportunity to work with renowned clinical and basic science investigators in a variety of disciplines. Students can explore investigative careers, while others will develop into clinician-scientists who will be leaders in the field of anesthesiology research. Training programs include the NIH T32 Postdoctoral Research Fellowship, the Charles W. Schertz Research Fellowship, and the FAER Medical Student Anesthesia Research Fellowship.

## 2014 GRADUATING FELLOWS

**ADULT CARDIOTHORACIC ANESTHESIOLOGY** Michael Boisen, MD; Thomas Borsari, MD; Jessica Heath, MD; Stephen McHugh, MD

**CRITICAL CARE MEDICINE** Ali Abdullah, MB, ChB; Mary Przybysz, MD; Justin Tawil, MD; Vishal Yajnik, MD

**PAIN MEDICINE** Kevin Costello, MD; Harshini Dani, DO; Cheryl Daves, MD; Edward Garay, MD, PhD; Stanley Ikezi, MD; Gaurav Jain, MBBS; Ashwin Madupu, MBBS; Nader Sawiris, MBChB; Paramvir Singh, MBBS

**PEDIATRIC ANESTHESIOLOGY** Evan Burke, MD; Heather Byrd, MD; Scott Jones, MD; Anjana Sahani Panjwani, MD; Max Rohrbaugh, MD; E. Gail Shaffer, MD; Jonathan Tan, MD; Thomas Weismueller, MD

**OBSTETRIC ANESTHESIOLOGY** Crystal Jean-Louise, MD

**REGIONAL ANESTHESIOLOGY** Sheri Azmy, MD; D'Andra Davis, MD; Rena Farquhar, MD; Zachary Fisk, MD; Emily Goodwin, MD; Susan Ironstone, MD; Jun Luo, MD; Marissa Lytle, MD; Javier Pena, MD; April Peterson, MD; Joseph Pierson, MD; Hanna Schittekk, MD; Sarah Smolik, MD; Julie Smolinski, MD; Eileen Watson, MD

**POST-GRADUATE RESEARCH FELLOWSHIPS:** Kyle Baumbauer, PhD; Jean-Marc Gerard Guedon, PhD; Richard Miller, MD; Jami Lynn Saloman, PhD; Lindsay Stollings, MD

## Simulation

# Peter M. Winter Institute for Simulation, Education & Research (WISER)



**PAUL E. PHRAMPUS, MD**  
Director

**In 2014, WISER reached the exciting milestone of 20 years of training and patient safety excellence**

WISER is dedicated to healthcare education and educational research. Utilizing the University of Pittsburgh's standards of excellence and professionalism, WISER applies advanced instructional technology and various forms of simulation to study the efficacy of educational training programs and their impact on learning and clinical care. The objectives of WISER are as follows: 1) create a safer environment for patients and improve healthcare operational efficiency by using simulation and other state of the art educational technologies in the training and assessment of healthcare system professionals, 2) serve as a laboratory to research the use of simulation and other

advanced instructional technology in healthcare education and publish the results, 3) create simulation-based education programs for primary education in various domains of the healthcare delivery system, 4) develop and validate simulation-based technology as a competency assessment evaluation tool for healthcare professionals, and 5) contribute to the education and mentorship of future generations of healthcare system educators and education researchers interested in creating or evaluating simulation-based teaching methodologies.

WISER offers many anesthesiology and non-anesthesiology based courses that continue to improve patient safety throughout UPMC. The anesthesiology difficult airway management course for residents, SRNAs, CRNAs, and attending physicians was created to allow participants the opportunity to obtain working knowledge and proficiency of the American Society of Anesthesiologists (ASA) Difficult Airway Management Guidelines and associated airway management techniques and equipment. Didactic training focuses on evaluation of the airway and the ASA guidelines. WISER also offers a fiberoptic bronchoscopy course, which provides the trainee with a firm foundation in all aspects of principles and psychomotor skill sets necessary to rapidly become clinically proficient in the basic and advanced uses of the fiberoptic bronchoscope in the domain of anesthesiology. A central venous cannulation course focuses on proper central line placement, including the use of ultrasound guidance and manometry for locating and verifying venous access sites. The course includes web-based content emphasizing patterns of injury, site anatomy, central venous catheterization indications and alternatives, as well as complication recognition and corrective maneuvers.

WISER offers a liver transplantation anesthesiology course, which provides hands-on experience in a simulation setting for delivering anesthesia for orthotopic liver transplantation. Participants include anesthesiologists, residents, CRNAs, SRNAs, and fellow-visitors. This course emphasizes a multidisciplinary team approach that includes preoperative assessment, operating room setup, placement of central venous access, and insertion of wide bore venous lines for infusion of large volumes of fluids, invasive monitoring, management of massive blood transfusion, coagulopathy, and hemodynamic instability. Special emphasis is placed on veno-venous bypass issues.

During FY14, WISER conducted 1,783 classes, with 13,721 educational encounters. Over 3,600 individual students, ranging from undergraduate nurses to anesthesiologists with decades of experience, logged almost 50,000 hours of class time. WISER was fortunate to have over 358 instructors teach 144 separate courses during the year. Classes occupied 14,628 room hours throughout the year. With recent expansions in nursing school classes and new courses for professional health care providers, WISER will be even busier in 2015.

WISER offers a simulation course for the Maintenance of Certification in Anesthesiology Program® (MOCA®). This simulation course fulfills one requirement of the American Board of Anesthesiology (ABA) MOCA® Part IV. WISER's MOCA® program incorporates simulation-based training in a fast-paced and challenging experience. During the simulation sessions, participants manage patients with hypoxia and hemodynamic instability in the general surgical, neurosurgical, obstetric care, and pediatric surgery settings. The curriculum focuses on relevant and challenging perioperative crises that a clinician might face. Instructors for this course are well-versed in practical training for our anesthesiology colleagues.

The Society for Simulation in Healthcare (SSH) announced record attendance at the 14th Annual International Meeting on Simulation in Healthcare (IMSH) held January 25-29, 2014 at the Moscone West Convention Center, San Francisco, California. Nearly 3,000 attendees benefitted from an abundance of learning and networking opportunities. As the world's most influential healthcare simulation conference, SSH Members reviewed over 1,000 abstract submissions before building an agenda of over three hundred courses. The theme for the 2014 conference was "Making Connections" and these ideas were woven into the daily offerings at the conference. Dr. Paul Phrampus began his role as past President for the SSH. In this role he will still serve on the Board of Directors of the Society as well as be a resource for the current President for the Society.

WISER and the Gateway Medical Society continued their seven-month program, "Journey to Medicine," a pre-college academic mentorship program to increase the number of minorities on the path toward careers in medicine. The Gateway Medical Society is a component of the National Medical Association, whose objectives are to promote the science and art of medicine and the betterment of public health. Each month, selected students learn about various specialties in medicine and have the opportunity to participate in simulation-based exercises to treat simulated patients. Topics include anesthesiology, emergency medicine, surgery, and code teams. The first session was an interactive workshop on simulation and how WISER uses simulation-based manikins to train individuals from all different healthcare professions.

In addition to the main site, WISER also now manages and operates satellite centers at Children's Hospital of Pittsburgh of UPMC (CHP), UPMC McKeesport, UPMC Passavant, UPMC Shadyside, and UPMC East. WISER has been collaborating with CHP to bring pediatric simulation training to other UPMC hospitals, including Horizon and Hamet.



# Publications

**Department of Anesthesiology faculty members generated over 200 published peer-reviewed journal papers and numerous book chapters, abstracts, and editorials during 2013 and 2014. The following are peer-reviewed journal papers that were published in high-impact journals (20,000 or more citations).**

Aguayo LG, Castro P, Mariqueo T, Munoz B, Xiong W, Zhang L, Lovinger DM, Homanics GE. Altered Sedative Effects of Ethanol in Mice with  $\alpha$ 1 Glycine Receptor Subunits that are Insensitive to Gbetagamma Modulation. *Neuropharmacology*. 2014; 39(11):2538-48.

Badhwar V, Esper SA, Brooks M, Mulukutla S, Hardison R, Mallios D, Chu D, Wei L, Subramaniam K. Extubating in the Operating Room after Adult Cardiac Surgery Safely Improves Outcomes and Lowers Costs. *The Journal of Thoracic and Cardiovascular Surgery*. 2014; 148(6):3101-9.

Cladis F, Kumar A, Grunwaldt L, Otteson T, Ford M, Losee JE. Pierre Robin Sequence: A Perioperative Review. *Anesthesia & Analgesia*. 2014; 119(2):400-12.

Dede O, Motoyama EK, Yang CI, Mutich RL, Walczak SA, Bowles AJ, Deeney VF. Pulmonary and Radiographic Outcomes of Vertical Expandable Prosthetic Titanium Rib Treatment in Early-onset Scoliosis. *Journal of Bone and Joint Surgery-American Volume*. 2014; 96(15):1295-302.

den Hartog CR, Beckley JT, Smothers TC, Lench DH, Holseberg ZL, Fedarovich H, Gilstrap MJ, Homanics GE, Woodward JJ. Alterations in Ethanol-induced Behaviors and Consumption in Knock-in Mice Expressing Ethanol-resistant NMDA Receptors. *PLoS One*. 2013; 8:e80541.

Esper SA, Levy JH, Waters JH, Welsby IJ. Extracorporeal Membrane Oxygenation in the Adult: A Review of Anticoagulation Monitoring and Transfusion. *Anesthesia & Analgesia*. 2014; 118(4):731-43.

Finegersh A, Homanics GE. Paternal Alcohol Exposure Reduces Alcohol Drinking and Increases Behavioral Sensitivity to Alcohol Selectively in Male Offspring. *PLoS One*. 2014; 9:e99078.

Gan TJ, Diemunsch P, Habib AS, Kovac A, Kranke P, Meyer TA, Watcha M, Chung F, Angus S, Apfel CC, Bergese SD, Candiotti KA, Chan MT, Davis PJ, Hooper VD, Lagoo-Deenadayalan S, Myles P, Nezat G, Philip BK, Tramer MR. Consensus Guidelines for the Management of Postoperative Nausea and Vomiting. *Anesthesia & Analgesia*. 2014; 118(1):85-113.

Holmes AA, Konig G, Ting V, Philip B, Puzio T, Satish S, Waters JH. Clinical Evaluation of a Novel System for Monitoring Surgical Hemoglobin Loss. *Anesthesia & Analgesia*. 2014; 119(3):588-94.

Horn CC, Wallisch WJ, Homanics GE, Williams JP. Pathophysiological and Neurochemical Mechanisms of Postoperative Nausea and Vomiting. *European Journal of Pharmacology*. 2014; 722:55-66.

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Kelley EE, Baust J, Bonacci G, Golin-Bisello F, Devlin JE, St Croix CM, Watkins SC, Gor S, Cantu-Medellin N, Weidert ER, Frisbee JC, Gladwin MT, Champion HC, Freeman BA, Khoo NK. Fatty Acid Nitroalkenes Ameliorate Glucose Intolerance and Pulmonary Hypertension in High-fat Diet-induced Obesity. *Cardiovascular Research*. 2014; 101(3):352-63.

Kertai MD, Esper SA (Co-First Author), Akushevich I, Voora D, Ginsburg GS, Stafford-Smith M, Grichnik K, Newman MF, Fontes M, Smith P, Podgoreanu MV, Mathew JP, Cardiothoracic Anesthesia Research Endeavors Group. Preoperative CYP2D6 Metabolism-dependent B-blocker use and Mortality after Coronary Artery Bypass Grafting. *Journal of Thoracic and Cardiovascular Surgery*. 2014; 147(4):1368-1375.

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Larach MG, Brandom BW, Allen GC, Gronert GA, Lehman EB. Malignant Hyperthermia Deaths Related to Inadequate Temperature Monitoring, 2007-2012: A Report from The North American Malignant Hyperthermia Registry of the Malignant Hyperthermia Association of the United States. *Anesthesia & Analgesia*. 2014; 119(6):1359-66.

Li H-H, Li J, Wasserloos KJ, Wallace C, Sullivan MG, Bauer PM, Stoltz DB, Lee JS, Watkins SC, St Croix CM, Pitt BR, Zhang L-M. Caveolae-dependent and -independent Uptake of Albumin in Cultured Rodent Pulmonary Endothelial Cells. *PLoS One*. 2013; 8(11):e81903.

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Mantha VRR, Nair HK, Venkataraman R, Gao YY, Matyjaszewski K, Dong H, Li W, Landsittel D, Cohen E, Lariviere WR. Nanoanesthesia: A Novel, Intravenous Approach to Ankle Block in the Rat by Magnet-Directed Concentration of Ropivacaine-associated Nanoparticles. *Anesthesia & Analgesia*. 2014; 118(6):1355-62.

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Mowrey DD, Liu Q, Bondarenko V, Xu Y, Wu Y, Tang P. Insights into Distinct Modulation of  $\alpha 7$  and  $\alpha 7\beta 2$  nAChRs by the Volatile Anesthetic Isoflurane. *Journal of Biological Chemistry*. 2013; 288(50):35793-800.

Sakai T, Emerick TD, Metro DG, Patel RM, Hirsch SC, Winger DG, Xu Y. Facilitation of Resident Scholarly Activity: Strategy and Outcome Analyses Using Historical Resident Cohorts and a Rank-to-Match Population. *Anesthesiology*. 2014; 120(1):111-9.

Samuelsson AR, Brandon NR, Tang P, Xu Y. Cellular Registration without Behavioral Recall of Olfactory Sensory Input under General Anesthesia. *Anesthesiology*. 2014; 120(4):890-905.

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Visoiu M, Young MC, Wieland K, Brandom BW. Anesthetic Drugs and Onset of Malignant Hyperthermia. *Anesthesia & Analgesia*. 2014; 118(2):388-96

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# Scholarly Activity



## American Society for Anesthesiology (ASA)

The ASA annual meeting is a major departmental event, with an impressive number of medical students, residents, fellows, and faculty presenting every year. The 2013 meeting was held from October 12-16, 2013 in San Francisco, CA. Department residents, fellows, and faculty members delivered 67 presentations. Additionally, 13 faculty members and one resident served on ASA and ASA-related committees. Faculty and residents presented problem-based learning discussions, panels, clinical forums, workshops, medically challenging cases, scientific papers, and scientific & educational exhibits. The department also participated in the ASA Practice Management Conference in Dallas, TX, January 23-26, 2014. Trent Emerick, MD (PGY-4 resident) won 3rd place in overall poster presentations for "Operating Room Performance Improvement Across A Large Multi-Hospital Health Care System" (authors: Drs. Trent D. Emerick and Mark E. Hudson).

## International Anesthesia Research Society (IARS) Annual Meeting and International Science Symposium

The IARS Annual Meeting and International Science Symposium was held in Montreal, Canada, May 17-20, 2014. Department members presented several projects. Keith Vogt, MD (PGY-3) won Best of Category Award in Pain Mechanisms for the abstract "The Posterior Insula Reveals Pain vs. Rest Functional Connectivity Differences Not Present with the Anterior Insula" (authors: Drs. Keith Vogt and James Ibinson). This was Dr. Ibinson's lab's second consecutive year winning this distinction at the IARS meeting. The abstract "Minocycline Fails to Improve Neurologic and Histologic Outcome after Ventricular Fibrillation Cardiac Arrest in Rats," by department faculty member Tomas Drabek, MD, PhD won a Best in Category award for Critical Care, Trauma, and Resuscitation and was selected as a Best of Meeting finalist.

## Safar Symposium and Annual Multi-Departmental Trainees' Research Day

The 12th annual Safar Symposium and fourth annual Multi-Departmental Trainees' Research Day was held on May 21-22, 2014. This yearly event honors the late Dr. Peter Safar and his wife Eva for their contributions to the scientific community and highlights current research in areas spanning Dr. Safar's interests. The research day event is a collaboration between the Departments of Anesthesiology, Critical Care Medicine, Emergency Medicine, and Physical Medicine & Rehabilitation, as well as the Peter M. Winter Institute for Simulation Education and Research (WISER). The theme of the 2014 event was "Novel Approaches to Understanding and Managing Pain across the Continuum of Care." Sixty-four posters were presented, as well as four oral presentations from trainees in each of the four collaborating departments. Trainees in the Department of Anesthesiology presented 43% of the abstracts.

Daniela Damian, MD, PGY-4 resident, was the oral presenter from the Department of Anesthesiology, presenting "Incidence of Acute Kidney Injury after Orthotopic Liver Transplantation Using Living-Donor Versus Cadaveric Donor Graft: a Propensity Score Matched Analysis." Graduate student Nicole N. Scheff, BS, (mentor: Michael Gold, PhD) won the Best Poster Award among all the posters at the symposium for "The Functional Implications of the Differential Distribution of Na+/Ca<sup>2+</sup> Exchanger Isoforms in Rat Sensory Neurons." Jonathan Beckel, PhD, a T32 postdoctoral scholar (mentor: William de Groat, PhD) won the 1st place Department of Anesthesiology poster award for "Involvement of Pannexin Hemichannels in Purinergic Signaling of the Urinary Bladder Epithelium." Nicholas Schott, MD, PGY-2 resident (mentor: Tetsuro Sakai, MD, PhD) won the 2nd place Department of Anesthesiology poster award for "Evaluation of a New Curriculum of Focus-assessed Transthoracic Echocardiography for Anesthesiology Residents."

# University of Pittsburgh



The University of Pittsburgh is an internationally-respected center of learning and research, offering exceptional educational opportunities in the humanities, sciences, and professions. A state-related, coeducational institution, the University's Pittsburgh campus offers a multitude of degree-granting and other programs housed in 16 undergraduate, graduate, and professional schools.

The University's mission is to advance teaching, research, and public service. This three-part commitment enables the University to serve others by educating diverse students from the region, the nation, and the world; expanding boundaries of knowledge, discovery, and technology; and enhancing quality of life in the western Pennsylvania region and beyond.

To learn more about the University of Pittsburgh, visit [www.pitt.edu](http://www.pitt.edu).

- Ranked among the top two U.S. universities and no. 4 among universities worldwide in the 2013 edition of *The Scientist's* "Best Places to Work in Academia" survey.
- Ranked among the top 10 recipients of National Institutes of Health (NIH) research funding since 1998
- Ranked 12th in the nation and eighth among public institutions in the U.S. National Science Foundation's ranking of federally funded research.
- Consistently ranked in the top 20 U.S. public universities in *U.S. News & World Report's* annual "America's Best Colleges" listing, and Pitt graduate schools and programs perennially earn high grades in *U.S. News'* "Best Graduate School" rankings.

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Pittsburgh is a vibrant, mid-sized city with the feel of a small town. Located in the southwest corner of Pennsylvania, it offers the best of everything — an urban melting pot, historical landmarks, ethnic neighborhoods, a vibrant nightlife, picturesque countryside, and the famous three rivers.

- Since 2000, Pittsburgh has topped “most liveable city” lists six times, including those of *The Economist*, *Forbes*, and Yahoo!
- 2nd best city in the nation to pursue the American dream, Equality of Opportunity Project (2014)
- 3rd safest city in the U.S., Farmers Insurance (2012)
- Best Places to Raise Your Kids, *BusinessWeek* (2009)
- Ranked #1 in affordability among U.S. cities, Demographia (2015)
- One of the best worldwide travel destinations, *National Geographic* (2012)

## Sports

Steelers football  
Penguins hockey  
Pirates baseball

## Arts/Culture

Pittsburgh Symphony Orchestra  
Pittsburgh Ballet  
Carnegie Science Center  
Carnegie Museums of Pittsburgh  
(Andy Warhol Museum; Carnegie Museum of Art; Carnegie Museum of Natural History)  
Phipps Conservatory and Botanical Gardens  
National Aviary

## Fun & Nightlife

Pittsburgh Zoo  
PPG Aquarium  
Kennywood Park  
Sandcastle Waterpark  
Rivers Casino

To learn more about life in the “Most Livable City,” visit [www.coolpgh.pitt.edu](http://www.coolpgh.pitt.edu) or [www.visitpittsburgh.com](http://www.visitpittsburgh.com).

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# Department of Anesthesiology at a Glance

Fiscal Year (FY) 2014  
July 1, 2013-June 30, 2014

Total Anesthesiology Cases	302,666
Non-Pain Cases	212,250
Chronic and Acute Pain Visits	90,416
Obstetric Deliveries	14,812
Faculty Full-time Equivalents (FTEs)	198
Total ORs Covered	210
Total Anesthetizing Locations	303
CRNA FTEs	386
Graduating SRNAs	42
Residents and Fellows	121
Active Clinical Trials	21
Total NIH Awards	\$4,222,963
Total Awards	\$4,562,181

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