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“Pittsburgh is a dynamic and vibrant community in which to live. The growth of UPMC, Pitt, and the remainder of the academic community (composed of at least 16 different institutions throughout the region) drives an extraordinary renaissance of medical and technological innovation, economic prosperity, and cultural renewal. As the department expands each year in size and significance, we continue 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.”

- John P. Williams MD

John P. Williams MD is the Peter and Eva Safar Professor and Chair of the Department of Anesthesiology at the University of Pittsburgh/UPMC. He is also the Associate Medical and Scientific Director of the UPMC International Division.

Dr. Williams graduated *summa cum laude* from Texas A & M University and received his medical degree from the Baylor College of Medicine. He completed an internship at St. Joseph Hospital in Houston, an anesthesiology residency at the University of Texas Medical School in Houston, and a fellowship at Guy’s Hospital in London, England. He is board certified in anesthesiology and critical care medicine.
MISSION STATEMENT
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.
RESEARCH

Jacques E. Chelly MD, PhD, MBA
Vice Chair for Clinical Research

Yan Xu PhD
Vice Chair for Basic Sciences

SIMULATION

Paul E. Phrampus MD
Director, Peter M. Winter Institute for Simulation, Education, and Research (WISER)

Joseph Samosky PhD
Director, Simulation and Medical Technology R&D Center
The Department of Anesthesiology of UPMC and the University of Pittsburgh currently serves 16 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. 2012 marked the third consecutive year that CHP was 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 five 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 (NICU) 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 South Side was absorbed by UPMC Mercy, converting into an ambulatory surgical center and reopening as **UPMC Mercy South Side Outpatient Center** in 2009. The center is 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.

- **UPMC South Surgery Center**, located in Pittsburgh’s South Hills, accommodates outpatient procedures such as dental surgery, gastroenterology, general surgery, gynecology, neurosurgery, ophthalmology, orthopaedics, otolaryngology, pediatrics, plastic surgery, podiatry, and urology.

- The department began providing services at **UPMC Northwest** in 2012. This Seneca, Cranberry Township (Venango County) hospital has 96 private rooms, including 30 that can be converted for semi-private occupancy, yielding as many as 126 beds.

- **UPMC East** opened its doors in Monroeville, PA in July of 2012. The brand new 300+ bed hospital has 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 Dublin (Beacon Hospital)**, located in Sandyford, Dublin, is a full service hospital that includes eight operating theatres with dedicated rooms for urology and neurological, cardiac, general, orthopedic, and ophthalmic surgery.
UPMC Presbyterian/Montefiore is the largest quaternary care hospital of the UPMC Health System and the largest in Western Pennsylvania. It remains the department’s core hospital in terms of clinical activity and resident education and is a nexus for clinical research.

The UPMC Presbyterian clinical site is larger than many entire academic departments found elsewhere in the country. It is comprised of 40 faculty members who cover 42 operating rooms (ORs) and up to 14 additional, non-OR anesthetizing locations. The site is staffed by more than 100 full time equivalent (FTE) Certified Registered Nurse Anesthetists (CRNAs). Up to 15 residents and 10 student nurse anesthetists (SRNAs) rotate at UPMC Presbyterian at any one time.

In fiscal year 2012 (FY12), UPMC Presbyterian faculty supervised 39,784 anesthetics, an increase of 3,088 cases (8.42%) over the previous fiscal year. Of these cases, 24,691 were performed in the ORs, an increase of 558 cases compared to the previous year. Procedures spanned the entire spectrum of surgical and special procedures, from combined thoracic and abdominal transplantation to anesthesia for electroconvulsive therapy. The anesthesiology faculty managed more cases outside the OR environment - 15,093 - an increase of 2,586 procedures over the previous year and representing about 38% of the total cases managed at UPMC Presbyterian. Locations where services were provided include the gastroenterology lab, bronchoscopy suite, electroconvulsive therapy suite (at Western Psychiatric Institute and Clinic [WPIC]), electrophysiology suite, cardiac catheterization lab, interventional radiology, and the magnetic resonance imaging (MRI) suite.

Many of the advanced anesthesiology subspecialty resident rotations (liver transplantation, cardiac, ENT, thoracic, trauma, and neuroanaesthesia) are based at UPMC Presbyterian; many novice residents and SRNAs perform their first cases there. Faculty are very active in medical student and resident education. Regular teaching conferences specifically for trainees rotating at UPMC Presbyterian are held on Wednesday mornings. Monthly Quality Improvement Morbidity and Mortality conferences and problem-based learning discussions (PBLDs) are also conducted at UPMC Presbyterian. Subspecialty services hold conferences on topics in their subspecialty areas (e.g., neuroanesthesiology, cardiac, hepatic transplant, and ambulatory anesthesiology).

Anesthesiologists at UPMC Presbyterian supervised 39,784 anesthesics in FY12, an 8.42% increase from last fiscal year.
The neurosurgical anesthesiology service at UPMC Presbyterian provided anesthetic care for over 5,000 neurosurgical procedures during FY12. Operations included expanded endonasal approaches, craniotomy for tumor as well as vascular pathologies, retromastoid craniectomy for microvascular decompression of various cranial nerves, and spinal surgery. Two separate neurosurgical intensive care units at UPMC Presbyterian facilitate innovative approaches to the acute care of cerebral vascular pathologies and promote optimal care for patients with neurotrauma and other acute neurological injury.

Our involvement in the anesthetic management of the expanding patient population of the Center for Neurointerventional and Neuroendovascular Therapy remained significant. 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 subclavian, and intracranial arterial stenting; vessel sacrifice; Wada testing; vertebroplasty (methylmethacrylate vertebral body injections); alcohol sclerotherapy; and routine angiography.

The Center for Minimally Invasive and Cranial Base Surgery continued to thrive both in terms of volume of cases and uniqueness of surgical approaches. Pioneering cutting-edge, endoscopic, minimally invasive craniotomy techniques, the team performed close to 500 procedures in FY12, attracting national and international recognition.

An additional critical development is the rapidly expanding complex spine service, tackling spine pathologies that exceed the expertise of other neurosurgical departments in the country. This endeavor provides the neuroanesthesia service with unique challenges, taken advantage of by our residents and other trainees.

The remainder of the clinical caseload continues to include various stereotactic procedures, such as MRI-guided and computed tomography (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 neuroanesthesiology 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 an online multimedia version of neuroanesthesiology instruction. Increasing attendance at the monthly neuroanesthesiology conference has fostered lively and informative discussion. Twenty-three lectures were given in the last academic year, seven by faculty members and 16 by residents rotating through neuroanesthesiology. Faculty lectures included guest lectures by neurosurgeons, neurophysiologists, and neuroradiologists, who all contributed refreshing new perspectives and productive dialogue.
Same Day Services at UPMC Presbyterian/Montefiore includes both Same Day Surgery (SDS) and the Preoperative Evaluation Center (PEC). FY12 saw a significant increase in both SDS and PEC patients. 15,744 patients were processed through SDS, either as same day-admitted patients (6,961) or outpatient surgery patients (8,784); 5,803 patients were seen in the PEC.

Most patients scheduled for outpatient surgical procedures at UPMC Presbyterian or 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, or patient concerns. All preoperative testing and consults are then combined with a detailed pre-anesthetic history and physical examination conducted by an anesthesiology resident or nurse practitioner. An attending anesthesiologist is available to review complicated patients or test results with the PEC staff. The entire evaluation is then available to the patient’s attending anesthesiologist on the day of surgery in an electronically retrievable PowerNote. 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 patients seen in the PEC are significantly less likely to have their scheduled surgeries delayed or cancelled.

The clinic continues to perform preoperative evaluations via telemedicine between the Oakland campus and UPMC Bedford. Patients scheduled for surgery in Pittsburgh are able to receive a comprehensive preoperative evaluation from a nurse practitioner or resident in Oakland utilizing the mobile remote camera, an electronic digital stethoscope, and a hand held camera for detailed examinations of the airway. Telemedicine evaluations from the Endocrine Surgery service at Falk Clinic will be the next site to go live, and other UPMC sites are being explored for the future.

Anesthesiology faculty members at Montefiore continue to be active in resident education, teaching principles of ambulatory, ENT, orthopedic, and regional anesthesiology. Residents participate in outpatient evaluations and learn a variety of regional anesthesiology techniques and principles of outpatient anesthesiology. The PEC is the site of the post-graduate year (PGY)-1 preoperative evaluation rotation, which is mandated by the Accreditation Council for Graduate Medical Education (ACGME) for anesthesiology residency programs. Residents see a variety of patients prior to the day of surgery, order appropriate testing, and obtain consultations if necessary. The residents then create a note available to the attending or resident assigned to the case on the day of surgery. A monthly Montefiore subspecialty meeting is also held, highlighting ambulatory anesthesia, preoperative evaluation, and regional anesthesiology. Faculty, residents, medical students, CRNAs, and SRNAs attend this meeting.
The Children’s Hospital of Pittsburgh of UPMC (CHP) anesthesiology clinical site comprises 30 faculty, 13 FTE CRNAs, and eight Certified Registered Nurse Practitioners (CRNPs) (4.5 FTE) who provide both anesthesiology and surgical perioperative care. CHP is one of the first fully-digital hospitals in the nation and sits on a 10-acre, environmentally sustainable campus. In June 2010, CHP became the first anesthesiology service in the UPMC system to implement the Cerner Electronic Anesthesia Record.

In FY12, the division provided anesthesiology service for 29,167 procedures at the main CHP campus in Lawrenceville and all CHP satellites, a 2.6% increase over the previous year (28,429). Of note, outpatient surgical centers in Sewickly (CHP North) oversaw 8,493 anesthesiology cases in FY12.

Under faculty supervision, CHP fellows prepared and presented teaching activities, including mini-lectures, core lectures, and case conferences. Faculty actively participated in medical student courses, including introduction to medicine (a first-year course), clinical problem-based learning (second-year), clinical skills (third-year), and various anesthesiology clerkships for third- and fourth-year students. The pediatric anesthesiology education programs continued to provide special training for critical care medicine fellows, pediatric dentists, emergency medical residents, and nurse anesthesiology students on rotation through the service. In addition, faculty members participated in an oral board preparation course for senior residents.

Research efforts at CHP focus on pediatric anesthetic pharmacology, respiratory physiology, and outcomes-based protocols. Clinical Trials are also conducted and form an active research component at CHP.
The Magee-Womens Hospital (MWH) anesthesiology clinical site comprises 20 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 airway management in conjunction with members of the Department of Critical Care Medicine for all cardio-respiratory arrests (Condition A). MWH anesthesiologists’ primary focus, however, is providing in-house, 24-hour anesthesiology coverage at two primary locations: the WomanCare Birth Center 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 WomanCare Birth Center. The Obstetric Anesthesiology section, directed by Dr. Manuel Vallejo, oversaw 10,191 deliveries in FY12, a 3.5% increase from FY11. Of these deliveries, 7,224 were vaginal births (a 4% increase from FY11) and 2,967 (29.1%) were cesarean deliveries (a 2.3% increase from FY11). Additional procedures performed on the unit include combined cesarean/abdominal hysterectomy, external cephalic version, percutaneous umbilical blood sampling, manual placental extraction, urogenital laceration repair, and postpartum tubal ligation. Fetal surgery continues to increase as the hospital focuses more resources on this activity. In FY13, MWH is expected to perform their first in utero myelomeningocele repair.

Beyond the birthing suite, MWH provided anesthetic management for 17,681 cases in the surgical services center, a 0.4% increase from FY11. The site total (including deliveries) was 27,872 cases, a 1.5% increase from FY11. The Surgical Services Center consists of 14 general ORs, 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 and general gynecologic anesthesiology rotations. In addition, anesthesiology residents from other programs in the city rotate through the division for subspecialty obstetrical anesthesiology training. All residents attend daily didactic lectures covering topics in obstetric and gynecologic anesthesiology. Mock ABA oral examinations given by the faculty to each resident are an important aspect of the educational experience. Continuous quality improvement and formal case-discussion conferences are also held each week. All residents rotating through obstetrical anesthesiology become certified in neonatal resuscitation.
The UPMC Shadyside anesthesiology clinical site consists of 23 faculty and 52 CRNAs. Adult anesthesiology services are provided in a 21-room main operating suite, a six-room ambulatory surgery center, and a two-room comprehensive urological center. This year saw the opening of a new robotic OR, which will have the capability for robotic open heart surgery. Coverage is also provided for two GI labs, two electrophysiology labs, and an invasive radiology suite.

During FY12, clinical anesthesiology services were performed for 15,626 cases in the main ORs and 5,465 cases in the ambulatory surgery center, for a total of 21,091 cases. The Shadyside anesthesiology caseload spans the full range of adult inpatient surgical procedure patients, including major thoracic, cardiovascular, neurosurgical, orthopedic, urologic, gynecologic, oncologic, robotic, and general surgical patients, as well as those undergoing outpatient orthopedic, plastic, dental, gynecologic, and general surgical procedures. The site provides subspecialty care in cardiac anesthesiology and neuroanesthesiology, with subspecialty trained and credentialed faculty.

Shadyside anesthesiology provides educational opportunities to its staff and faculty, as well as to a diverse set of students from other departments. Faculty members prepare and present teaching activities, including weekly case presentations and lectures. UPMC Shadyside is designated as a primary instruction site for the University of Pittsburgh School of Nursing nurse anesthesia master’s program. Airway management training is also provided for paramedic students from the Center for Emergency Medicine. Faculty also participate in the didactic educational program.

UPMC Shadyside has become a major center for clinical research, generating numerous publications on the topics of acute pain management, surgical outcomes, OR management, and economics. Shadyside anesthesiology recently received a grant to study a video teleconferencing system that would allow patients in the Post-Anesthesia Care Unit (PACU) to communicate with their families in the waiting room.
The Veterans Affairs Pittsburgh Healthcare System (VAPHS) anesthesiology staff consists of eight full time anesthesiologists, three half 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 and the VAPHS.

Clinical service for FY12 consisted of a total of 5,732 OR cases, a slight increase over the previous year. Transplant activity increased 20% compared to the prior year, with a total of 83 solid organ transplants. Off-site anesthesiology coverage continued to expand significantly, with 1,140 cases in the GI lab and 432 cases in the EP lab, a total increase of 50% compared to FY11.

Pain management cases continued to increase as well; the total number of outpatient encounters was identical to FY11 (842 consults and 864 follow ups), primarily because the clinics continue to run at 100% capacity. The number of interventional procedures, however, was 397, an increase of 93% compared to the previous year.

The most notable clinical advancement for FY12 was the ongoing development of the acute pain service. Under the direction of Dr. Brian Williams, the five member team began administering multi-modal peripheral nerve blocks and neuraxial anesthesia for major joint surgery and other extremity procedures. Preliminary quality improvement data indicates that the addition of this service has been of great benefit to the patients and the service has been very well received by the surgeons.

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. VAPHS anesthesiology continues to provide clinical experience for two to four anesthesiology residents per month. Evaluations of both the rotations and the individual faculty members are consistently excellent. In particular, the VAPHS has become a prime location for PGY IV 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 bridges the gap between a community anesthesiology practice and tertiary care center, where efforts center on patient care in the ORs and GI suite 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 February 2009, UPMC St. Margaret achieved American Nurses Credentialing Center (ANCC) Magnet Recognition® status, the highest international recognition for nursing excellence and leadership. The anesthesiology division was very active in the magnet designation process.

The anesthesiology division at UPMC St. Margaret and Harmar Ambulatory Center has consistently grown 1-2% every year for the past four years at a time when the local population continues to decline. 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; gynecologic; vascular; ophthalmologic; plastic; and ear, nose, and throat surgery.

In FY12, St. Margaret's designation as a Healthcare Bariatric Surgery Center of Excellence continued, and the hospital added a Robotic Bariatric Surgery program. Minimally invasive surgeries for knee and hip replacements were routinely performed, and regional anesthesiology with nerve blocks for anesthesia and post-operative pain control were used for orthopedic and general surgery cases. The two sites together encompass a large ultrasound based regional anesthesiology and perioperative pain control program, and manage the largest UPMC outpatient peripheral nerve block catheter program. In addition, the UPMC St. Margaret Anesthesiology Department is an integral member of the hospital's Geriatric Fracture Program.

In FY12, St. Margaret was a rotation site for anesthesiology residents, medical students, SRNAs, dental anesthesiology residents, and pain (acute and chronic) 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 OR management. The faculty also provided an educational experience for other UPMC faculty members in the practice of ultrasound-based regional anesthesiology. In addition, 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 is a 215-bed community hospital serving patients along the Monongahela River area. Five anesthesiologists and six full-time, two part-time, and one casual CRNA provide anesthesiology services for inpatients and ambulatory surgical patients, as well as at non-OR sites such as the GI unit, Cardiac Cath Lab, Bronchoscopy Lab, and Invasive Radiology.

In FY12, UPMC McKeesport provided anesthesia for 5,681 surgical cases and off-OR site procedures. In addition, clinicians provided acute pain services for immediate post-operative pain control, totaling 294 regional blocks. The department also provided consultation requests for chronic pain and the subsequent performance of 111 epidural steroid injections.

Typical of a community hospital, the surgical procedures performed at UPMC McKeesport include major vascular surgery, thoracic surgery, laminectomies/spinal fusions, total joint replacements/orthopedic cases; abdominal, gynecologic, urologic, ENT, ophthalmologic, and plastic surgery; and invasive chronic pain procedures.

The division provided back-up support for Emergency Department physicians, intensivists, and hospitalists for the management of patients with difficult airways. The department has been instrumental in creating difficult airway carts in strategic locations within the hospital. The department also actively participated in the implementation of the hands-off protocol of post-surgical patients from the PACU to the Intensive Care Unit/Cardiovascular Unit.

Morbidity and mortality conferences, journal club meetings, and appropriate clinical updates are conducted on a regular basis. Periodic evaluations and assessments are conducted to ascertain compliance with Surgical Care Improvement Project (SCIP) initiatives, central line associated bloodstream infection preventive measures, Physician Quality Reporting Initiatives, and patient safety measures.

Teaching activities at UPMC McKeesport include teaching airway management to non-anesthesiology trained chronic pain fellows and internal medicine and family practice residents, as well as EMT students. The residents in both disciplines also receive training and gain experience in insertion of invasive lines. The staff anesthesiologists and CRNAs are committed to the clinical training of SRNAs. The division is committed to maintaining and improving staff proficiency in the use of supraglottic devices for patients with difficult airways.

For the second year in a row, UPMC McKeesport was named as one of 620 hospitals in the US to earn the distinction of Top Performer on Key Quality Measures which among others, include SCIP initiatives.
UPMC Mercy is a large tertiary-care hospital located in the uptown district of Pittsburgh. It has a rich history, from its beginning as the first permanent hospital in Pittsburgh and the first Mercy hospital in the world, and continuing 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 to provide specialized services, including women’s health, neurological, cardiac, and orthopedic care, as well as serving as a Neuroradiology Stroke Intervention, Level 1 Trauma and Adult and Pediatric Burn Center. The hospital has been a focal point for teaching students and residents from 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 neuro- and cardiothoracic anesthesiology.

The UPMC Mercy anesthesiology faculty consists of approximately 17 clinical FTE anesthesiologists who cover 16 in-patient ORs, six out-patient 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 (PEC) center is staffed by one CRNP and two physician assistants (PAs), with faculty oversight. The case selection includes all but solid organ transplants. Highlights include voice surgery, airway modifying 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 the parturient who suffers either blunt or penetrating trauma.

In FY12, Mercy clinicians supervised more than 25,000 anesthetics. The vast majority of anesthetics were administered in the ORs. The breakdown of cases included 10,685 cases in the inpatient OR suite and 5,044 in the outpatient OR suite. There were 1,657 deliveries during FY12; of the 1,657 deliveries, 583 were cesarean sections. More than 98% of cesarean section patients received spinal or epidural anesthesia and 95% of vaginal delivery patients underwent lumbar epidural analgesia. The endoscopy, electrophysiology, and radiology suites realized a greater role in total anesthetic activities, which parallels a local and national trend, with nearly 20% of our primetime (7am – 5pm) coverage provided to these areas. Anesthesia for burn hydrotherapy for patients of all ages contributed to this off-site (outside the OR) trend with pediatric burn hydrotherapy activity increasing significantly in FY12.

The UPMC Mercy anesthesiology division has an active teaching component, with an average of 10 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 the podiatric medicine and EMT programs and medical students from numerous medical schools spend time on the service. Hospital lectures include site Grand Rounds, Journal Club, Quarterly Morbidity and Mortality conferences, and monthly staff meetings. Most weekly departmental conferences have been certified for CME credits, as well as CEU credits for CRNAs.
FY12 was UPMC Mercy/Southside Outpatient Center’s third full year of service after its conversion from an inpatient facility to an ambulatory surgical center. The orthopedic sports medicine service and the ophthalmology service remain the primary source of surgical cases, along with a lesser number of plastic surgery (hand surgery) and podiatry cases. Off-site provision of anesthesia for GI cases has continued to increase over the past year. All of the physicians in our division now spend part of their clinical time at UPMC-Southside Ambulatory Surgery Center and part at UPMC East, the newly opened inpatient hospital in Monroeville. This institution continues to be the primary core site for resident peripheral nerve block training, with two residents rotating there each month, each of whom typically provides 70 to 110 blocks.

Although there was a significant decrease in surgical/procedural cases in the years following the metamorphosis of Southside into an ambulatory facility, the increasing volume of the sports/orthopedic service, as well as the integration of the ophthalmology department into this site, has resulted in restoration of the case numbers. The anesthesia 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 6,275 during FY12, while over 2,700 peripheral nerve blocks were administered.
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 Township (Butler County). Our staff and physicians, dedicated to quality and innovation, provide exceptional service by utilizing cutting-edge technology in a patient- and family-centered atmosphere. The UPMC Passavant anesthesiology division consists of 60 physicians and 103 CRNAs. The division supports the surgical volume and numerous outside-the-OR cases, including the EP lab, GI lab, and minimally invasive image-guided procedures suite.

UPMC Passavant McCandless is a 399-bed campus that attracts patients from around the region and the country for advanced cardiovascular, cancer, neurosurgical, and gastrointestinal and colorectal care. The 132-acre McCandless campus boasts 21 operating rooms, an EP lab, a GI lab, and a large cancer center. The recently completed seven-story tower provided an additional 220,000 square feet of space, more than doubling the size of the operating room suite, the emergency department, and the cancer center. The new tower, 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 patient and family experience.

UPMC Passavant’s 35-bed campus in Cranberry Township includes a recently 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 smaller Cranberry campus has six operating rooms/procedure rooms.

UPMC Passavant’s combined surgical volume exceeds 17,000 procedures annually, ranging from complex quaternary/tertiary cases to more community-based procedures.

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. In 2010, UPMC Passavant expanded its busy neurosurgical program to include intracranial procedures and initiated a multispeciality robotic surgery service line.

Three anesthesiology fellowship programs (acute pain/regional anesthesiology, pain medicine, and cardiac anesthesiology) are active at UPMC Passavant. In July 2011, the hospital became a rotation site for senior anesthesiology residents and continues to serve as a rotation site for the University of Pittsburgh and La Roche College anesthesiology MSN programs.
UPMC Bedford Memorial is a 49-bed, acute care general hospital located in Bedford County, Pennsylvania. The hospital has units for medical, surgical, obstetrical, 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 Bedford anesthesiology division consists of two physicians and four CRNA’s providing both anesthesiology and surgical preoperative care. UPMC Bedford Memorial was one of the first hospitals in the UPMC system to implement an electronic medical record system, and the Bedford anesthesiology division uses the Cerner Electronic Anesthesia Record.

In FY12, the total number of cases performed was 3,519, which included 592 inpatient OR procedures (17 percent of total cases); 2,237 outpatient procedures (64 percent); 39 inpatient GI procedures (1 percent), and 651 outpatient GI procedures (18 percent). The obstetrical case count was 268 total births, with 160 vaginal and 108 C-section deliveries. Ninety-eight percent of C-section procedures were performed under regional anesthesia. Eighty-five epidurals were performed.

The Bedford anesthesiology division was instrumental in the design and installation of a new gastrointestinal lab/endoscopy suite (two rooms) on the hospital’s second floor. The new lab offers a larger operations area to accommodate monitored anesthesia. The project is anticipated to increase the number of gastrointestinal/endoscopy procedures by as much as 30 percent.

UPMC Bedford Memorial Hospital and its medical staff have committed to teaching residents from UPMC St. Margaret Hospital; medical students from Philadelphia College of Osteopathic Medicine (PCOM), Lake Erie College of Osteopathic Medicine (LECOM), and physician assistant students from St. Francis University and the UPMC Physician Assistant Program. Students will rotate through Surgery, Obstetrics and Gynecology, Emergency Medicine, Radiology, Pathology and Family Medicine.

UPMC Bedford received the 2012 Bedford County Chamber of Commerce Hall of Fame award for its six decades of providing high-quality health care while serving as a major employer, an anchor in the business community, and a significant driver of economic vitality in the region. UPMC Bedford contributes $59.5 million to the local economy, including $2.6 million in free or reduced care, charity care, and subsidized shortfalls in government programs for the poor.

UPMC Bedford Memorial was named among Pennsylvania Business Central’s Top 100 Businesses in 2012.
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. Dr. Gregory Godla assumed the role of Chief Anesthesiologist and Medical Director as of January 1, 2012.

The anesthesiology division at UPMC South Surgery Center consists of a group of physicians and CRNAs who work primarily at UPMC Shadyside, UPMC McKeesport, and UPMC Mercy South Side Hospitals. Expertise in peripheral nerve blocks and anesthesia for healthy pediatric patients is available as needed. Due to an active physician recruitment effort, the caseload for fiscal year 2012 increased to 3,416. South Surgery Center is the first UPMC site to become enrolled in the Society for Ambulatory Anesthesia Clinical Outcomes Registry. This project was designed to allow anesthesiologists to track their own outcomes, compare them 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.

UPMC Northwest

The department began providing services at UPMC Northwest in spring of 2012, staffing the site with four physicians and six CRNAs. UPMC Northwest activities will be included in next year’s annual report.

UPMC East

The department began providing anesthesia services at UPMC East when it opened on July 1, 2012 and Dr. Michael Kentor was appointed chief there. UPMC East activities will be included in next year’s annual report.
The Certified Registered Nurse Anesthetist (CRNA) staff increased to full capacity in FY12 to meet the needs of patient care service delivery. CRNAs provide services at all UPMC sites; the number of full time equivalent CRNAs has grown to 370 in the past year; our total staff exceeds 470 - the largest cohort of nurse anesthetists in the United States and in the world.

The nurse anesthesia professionals have been actively involved in quality improvement projects to benefit both efficiency as well as quality of care delivery. The compilation of case notes continued to serve as an integral tool to disseminate information about new surgical techniques that continue to be pioneered at UPMC. Simulation-based continuing education was enhanced tremendously this year to include topics such as difficult airway management, advanced airway techniques and fiberoptic bronchoscopy, central venous catheterization, regional anesthesiology, and advanced adult and pediatric life support recertification.

Mentoring continues to be a key component in the socialization and success of new members of our profession. 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. All CRNAs also serve as clinical instructors for the University of Pittsburgh School of Nursing Nurse Anesthesia program, which prepares Registered Nurses to become CRNAs. In FY12, 47 CRNAs graduated from the program, which has consistently been ranked as a top ten nurse anesthesia program in *U.S. News and World Report's* "Best Graduate Schools" for the past decade.

**CRNA Awards**

**Shannon Askren** and **Karen Florian**: 2012 UPMC Physician Services Division “Service to the Community” Award; 2012 UPMC Physician Services Division ACES Award

**Hayley Chemski**: Westmoreland County YWCA Winners Circle 2012 Rising Star Award for business/professional leadership

**Robert Dukic**: UPMC Physician Services Division “You are a Star” Award

**Brent Dunworth**: first recipient of the University of Pittsburgh School of Nursing Alumni Association’s Outstanding Young Alumnus Award

**Dale Fleck**: Outstanding Didactic Instructor of the Year Award

**Carolyn Garver, CRNP**: lead a patient safety project that won the UPMC St. Margaret Anesthesiology Department the hospital’s 2012 Patient Safety Award

**Evelyn Lawler, Vito Ranieri, Aaron Ostrowski**: University of Pittsburgh School of Nursing Cameos of Caring Award

**Jamie Vorhes**: 2011 UPMC Richard L. Simmons, MD Speak Up for Patient Safety Award

**UPMC Mercy CRNAs generously donated a room full of clothing and toys to the pediatric patients treated in the Trauma Burn Unit**
In FY12, the Mediterranean Institute for Transplantation & Advanced Specialized Therapies/Istituto Mediterraneo per i Trapianti e Terapie ad alta Specializzazione (ISMETT) continued to build on the success of past years.

In summer 2011, the ISMETT and Civico Hospital’s Cardiac surgery programs merged. Since October 2010, an Extracorporeal Membrane Oxygenation (ECMO) team has been dedicated to managing non-responsive severe acute respiratory distress syndrome (ARDS) emergencies. ISMETT coordinated its rescue actions, mainly relying upon airborne helicopter transportation provided by the regional medical emergency service. Within a short time frame, a 24/7 on-call ECMO team, including one anesthesiologist, one cardiac surgeon, and one perfusionist, all experienced in ECMO technology and management, were able to participate in rescue procedures at other hospitals.

ISMETT continued to increase the number of courses offered to external customers by their Renato Fiandaca Simulation Center, sponsored by the Fiandaca Foundation. In FY12 the hospital conducted an elective anesthesiology rotation and continued to host residents and students from different universities and countries. Residents from other Italian medical schools have also participated in ISMETT ICU and OR rotations.

ISMETT’s clinical responsibilities are quite diverse and include OR anesthesia, 24-hour ICU staffing, and coverage of all the invasive procedures in Radiology, the Cardiac Cath Lab, GI Clinical Laboratory, and the PACU.

During FY12, 23 kidney transplants were performed. Eighteen living donor kidney transplants, including one pediatric; 65 liver transplants, including six pediatric; five living donor liver transplants, including three pediatric; 863 cardiac and thoracic surgeries; 12 lung transplants; 13 heart transplants; two combined kidney-pancreas transplants, and 425 other surgical procedures were performed. Additionally, ISMETT treated 954 ICU admissions. ISMETT continued to receive patient referrals for both adult and pediatric complex surgery or ICU treatments. Currently, four ORs, 12 PACU beds, and 16 ICU beds accommodate the increase in cardiac surgery patients.

Active planning is still underway to bring ISMETT faculty to the United States for varying terms, and at the same time encourage University of Pittsburgh faculty to visit the institute. The growth of the clinical and academic aspects of the department was achieved thanks to the close relationship and teamwork between the Palermo and American UPMC teams, led by Dr. John Williams.
UPMC Beacon Hospital, located in Sandyford, Dublin, Ireland, is a full service hospital with a 214-bed capacity, including two critical care units comprising 14 isolated beds. The hospital contains eight operating theatres - specific rooms dedicated to neurosurgery, urology, and cardiac, general, orthopedic, and ophthalmic surgery. There are ER facilities and the hospital acts as a hub for a number of satellite units around Ireland. The hospital serves as a showcase site for General Electric in Europe and therefore features state of the art radiology systems and digital radiology suites.

In FY12, 10,993 procedures were performed at Beacon, a 6% increase in activity from FY11. Five full time anesthesiologists and two half-time anesthesiologists staffed UPMC Beacon; in addition, three other key anesthesiologists covered specific days, and approximately 18 others worked regularly in the anesthesiology division, although the exact personnel varied from time to time. Three anesthesiology registrars were employed; one registrar was in-house at all times to cover the ICU and emergencies and assist in the operating theatre when needed. Consultant anesthetic and ICU coverage was available at all times by dual roster.

UPMC Beacon also provides an acute pain/regional service, chronic and palliative care, and has a pain nurse. Chronic pain treatment is provided on a multidisciplinary level.
The Cardiothoracic Anesthesiology Division, composed of 30 faculty members who are experts in their subspecialty, covers five hospital locations: UPMC Presbyterian, UPMC Shadyside, UPMC Passavant, UPMC Mercy, and the VAPHS. This report includes FY12 data for UPMC Presbyterian and UPMC Shadyside. 1,451 cardiac cases were performed at these two sites, compared to 1,363 during FY11. Procedures included heart, lung, or heart-lung transplants. Surgeries span the full spectrum of adult cardiac surgical practice, from 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 valve and Maze surgery, thoracic aorta repair/reconstruction, pulmonary thromboendarterectomy, repair of ventricular and atrial septal defects, and removal of cardiac tumors/myxomas. During FY12, a new minimally invasive procedure for replacement of stenotic aortic valves, transcatheter aortic valve implantation, was introduced at UPMC Presbyterian, where 33 of these procedures were performed.

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 FY12, 139 cardiothoracic transplants were performed, consisting of 27 heart transplants, 110 lung transplants, and two heart/double-lung transplants. UPMC Presbyterian was the leading center in the nation for the number of lung transplants performed at a single center during FY12, with a total of 112. This campus is also the primary site for surgical treatment of patients with end-stage heart failure.

The cardiothoracic anesthesiology faculty perform intraoperative transesophageal echocardiography (TEE) on all patients undergoing cardiac and transplant surgery. During FY12, UPMC Presbyterian acquired three new 3D capable transesophageal echo machines, which enable the faculty to assist our cardiac surgery colleagues in assessing the degree of mitral valve disease and adequacy of mitral valve repair.

Cardiothoracic anesthesiology fellows have the opportunity to obtain extensive exposure to this technology to develop their skills in diagnostic 2D and 3D TEE. In addition to their intraoperative experience performing and interpreting TEEs, all fellows spend a minimum of one month in the echocardiography laboratory at UPMC Presbyterian, learning introductory principles of echocardiography. Several cardiology and critical care medicine fellows have spent time with the cardiothoracic anesthesiology faculty in the ORs for the specific purpose of improving their intraoperative TEE skills. Intraoperative TEE remains a fruitful area of research for the faculty and trainees. Achievement of Testamur and Board Certification status via the PTEeXAM is strongly encouraged for existing faculty and required for all new faculty who have recently completed an ACGME-accredited Adult Cardiothoracic Anesthesiology Fellowship Program.

The division offers world-class opportunities for both basic and advanced training in adult cardiothoracic anesthesiology. Most PGY-2 residents receive their initial exposure to cardiac anesthesiology at UPMC Presbyterian. PGY-3 residents are offered a three-month elective in advanced adult cardiac anesthesiology. Adult cardiothoracic anesthesiology fellows have the opportunity to receive advanced training in the subspecialty beyond the PGY-3 year in an ACGME-accredited program. Didactic programs are separate for residents and fellows and consist of intraoperative clinical teaching, lectures, and PBLDs based on topics related to cardiothoracic anesthesiology. In addition, fellows attend a weekly TEE review and lecture series that is moderated by the cardiac anesthesiology faculty. UPMC Presbyterian hosts a monthly subspecialty conference that follows an interactive evidence-based medicine format. Residents and fellows present topics of interest that are moderated by a cardiothoracic anesthesiology faculty member. A combined cardiothoracic anesthesiology faculty and fellow conference is held quarterly and includes case presentations, morbidity and mortality discussions, journal club, and quality improvement topics.
The Division of Transplantation Anesthesiology (TA) is responsible for the care of patients undergoing liver, intestinal, multivisceral, kidney, pancreas, and composite tissue allograft transplantation. In FY12, TA performed a total of 189 solid organ transplants at UPMC, including at Children’s Hospital of Pittsburgh of UPMC. These included 60 cadaveric kidney, 43 live donor kidney, 52 cadaveric liver, six live donor liver, 20 pancreas-kidney/pancreas, and eight small bowel transplants. TA also provides anesthesiology care and work-up for patients undergoing major hepatic resections.

The primary responsibilities of TA 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, anesthesiologists provide hepatologists and surgeons with valuable information on extrahepatic organ function. All candidates are evaluated at the Thomas E. Starzl Transplantation Outpatient Clinic or as inpatients at UPMC. Preoperative information is discussed at weekly multi-departmental transplant morbidity and mortality conferences. Clinical information is exchanged on individual patients to improve patient care and recommendations are made to optimize patients eligible for transplantation.

Anesthetic management of hepatic, intestinal, multivisceral, kidney, pancreatic and composite tissue allograft transplantation requires both highly sophisticated monitoring and tight control of physiologic variables. An anesthesiologist carries out this management with the assistance of trainees, CRNAs, and clinical technicians. For hemodynamic monitoring, TA staff 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 continues to be 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 is one of the only centers that performs liver transplantation on patients with known HIV disease.

FY12 was notable for continued expansion of the adult living related liver and kidney transplantation program at UPMC. Over 40% of kidney transplants performed in the United States are from live donors, and this trend is reflected at UPMC. A live liver donor continues to be an option for patients with end stage liver disease requiring transplantation and is available at UPMC due to the expertise of our transplant surgeons and anesthesiologists.

TA education is comprised of a mandatory rotation (four weeks) for PGY-2 trainees and an elective rotation (three to nine months) for PGY-3 and PGY-4 trainees. The teaching objectives vary with the level of training. PGY-2 residents are expected to carry out anesthesiology for liver transplantation with supervision and to apply clinical skills learned during this rotation to other high-risk patients undergoing major surgery. PGY-3 trainees should comprehend the complex pathophysiology of patients with hepatic dysfunction and perform anesthetic care with minimal supervision. PGY-4 trainees should be able to perform anesthetic care independently and prepare themselves to become consultants and/or directors of a liver transplantation anesthesiology program.

In addition to one-on-one bedside teaching, each resident attends seven didactic sessions during the rotation. Topics include cerebral hemodynamic changes in acute and chronic hepatic encephalopathy, hemodynamic alterations during liver transplantation (pulmonary hypertension), hepatopulmonary syndrome, coagulation and thromboelastography during liver transplantation, electrolyte and acid base changes during liver transplantation, hepatic physiology, and pathophysiology. Residents are required to present a topic related to liver transplantation anesthesiology at a weekly hepatic TA subspecialty research meeting. PGY-3 and PGY-4 trainees are encouraged to participate in research activities.
The mission of the Acute Interventional Perioperative Pain Service (AIPPS) is the coordination and standardization of perioperative pain management of patients undergoing surgery at UPMC.

AIPPS support was provided at UPMC South Side, UPMC St. Margaret, UPMC Presbyterian, UPMC Shadyside, Children’s Hospital of Pittsburgh of UPMC (CHP), UPMC Mercy, and UPMC Passavant.

In FY12, AIPPS performed 28,455 blocks. 11,521 blocks were performed using an ultrasound guided technique. The division performed a total of 8,367 paravertebral blocks, including 6,392 continuous paravertebral blocks and 1,975 single paravertebral blocks.

In August 2012, the division organized an ultrasound workshop for Pediatric and Regional Anesthesiology fellows. In April 2012, the division held the Eighth Update in Regional Anesthesiology and Ultrasound Techniques: Update in Acute & Chronic Pain and Liver Transplantation Anesthesiology at the Nemacolin resort, which included an ultrasound workshop. In addition, several members of the division participated in various national and international ultrasound workshops.

Twelve regional anesthesiology fellows and two mini-fellows rotated through AIPPS in FY12. Fellows rotated at UPMC Presbyterian, UPMC Montefiore (including an OR rotation), UPMC Shadyside, UPMC Mercy, UPMC Passavant, CHP, and UPMC Harmarville, and conducted research. Furthermore, three pediatric pain fellows rotated for a month at UPMC Shadyside.

In FY12, 10 clinical base year residents rotated with AIPPS at UPMC Presbyterian; 14 PGY-2 residents rotated at UPMC Presbyterian; six PGY-2 residents rotated at UPMC Mercy; 14 PGY-3 residents rotated at UPMC Shadyside; seven PGY-3 residents rotated at UPMC Mercy; nine PGY-4 residents rotated at UPMC Shadyside; and three PGY-4 residents rotated at UPMC Mercy.

2012 also marked the 10 year anniversary of AIPPS.

In the coming year, AIPPS plans to continue the development of the AIPPS at CHP and train at least two anesthesiologists in regional anesthesiology/acute interventional perioperative pain to help support the Regional Service at UPMC East.
The UPMC Chronic Pain Medicine Program is a multidisciplinary clinical, teaching, and research endeavor spread over seven clinical locations: UPMC St. Margaret, Centre Commons in East Liberty, Oakland campus, Monroeville, UPMC Passavant, UPMC Mercy, and UPMC South Hills Surgery Center. The program is committed to the evaluation and treatment of the entire range of pain, disability, and rehabilitation problems. It offers an interdisciplinary team approach that includes dedicated professionals from various specialties including medicine, nursing, occupational therapy, physical therapy, and psychology.

The treatment team develops and coordinates programs designed 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. 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.

During FY12, the number of pain medicine physician visits was 50,133: 6,856 patient visits at UPMC St. Margaret, 12,874 patient visits at Centre Commons, 2,067 patient visits at the Oakland campus, 4,486 patient visits at Monroeville, 4,315 patient visits at UPMC Passavant, 6,794 patient visits at UPMC Mercy, 142 at the South Hills Surgery Center, and 4,262 patient visits at UPMC Shadyside. Interventional modalities are carried out at all seven locations, including somatic and sympathetic nerve blockade, neurolytic blocks, placement of intrathecal pumps and neurostimulators, joint injections, and pharmacotherapy.

UPMC Pain Medicine at Centre Commons provides 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.

The division offers an ACGME-accredited one-year pain medicine fellowship, which was recently reaccredited for the maximum five year timeframe with commendation and no citations. This is the third time our program has received this honor. UPMC has one of the largest pain medicine fellowships in the country, graduating nine fellows per year. Fellows rotate through 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.
FY12 was a productive year for basic research in the Department of Anesthesiology. We received a total of $6,232,118 in extramural grants, $5,027,889 of which was from the National Institutes of Health (NIH) (totals include both direct and indirect funds).

In FY12, Department of Anesthesiology researchers authored many peer-reviewed publications which were published in journals with an impact factor above four (please see the publications section of this report on pages 48-49 for a detailed list).

The department continues to place a major focus on research training. Our NIH T32 postdoctoral research training program, "Research Training in Anesthesiology and Pain Medicine," hosted three postdoctoral fellows in FY12, including two MDs and one PhD. Research topics ranged from anesthesia mechanisms to improving cell salvage efficiency. Trainees from the Department of Anesthesiology presented current research at the third annual Safar Symposium Multi-Departmental Trainees’ Research Day, sponsored jointly with the departments of Critical Care Medicine, Emergency Medicine, and Physical Medicine and Rehabilitation (PM&R) in June 2012. This collaborative event dovetails with the annual Safar Symposium and highlights research in areas spanning the interests of the late Dr. Peter Safar. Scientific abstracts encompassing a range of basic and clinical research were submitted by trainees ranging from postdoctoral fellows, residents, graduate and medical students, and undergraduate students. The Department of Anesthesiology was well represented, with forty percent of the abstracts submitted by our trainees (see page 35).

The department also encourages and fosters research activity among the next generation of anesthesiology investigators. 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 served as a host site for the Foundation for Anesthesia Education and Research (FAER) Medical Student Anesthesia Research Fellowship (MSARF) program. This program offers talented medical students an eight week anesthesiology-related research experience and the opportunity to present research findings at the American Society of Anesthesiologists Annual Meeting. In the summer of 2011, the department hosted two MSARF fellows, Keith Wirth (SUNY Downstate College of Medicine) and Shiv Dua (George Washington University School of Medicine); Shiv returned in 2012 to continue working with his mentor. In the summer of 2012, we hosted two MSARF fellows, both from the University of Pittsburgh School of Medicine – Benjamin Cobb (mentor: Manuel C. Vallejo MD, DMD, Professor and Director of Obstetric Anesthesiology at Magee-Women’s Hospital of UPMC) and Shu Yang Lu (mentor: Jonathan H. Waters, MD, Professor and Chief of Anesthesiology, Magee-Women’s Hospital of UPMC.)
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 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 Children with 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  Mechanisms Underlying the Sensitization of Dural Afferents; The Role of the Sympathetic Post-Ganglionic Neuron in the Link between Stress and Migraine; The Impact of Persistent Inflammation on the Regulation of Intracellular Ca2+ 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 in Cutaneous Afferents; The Study of Human Dorsal Root Ganglion Neurons; Enhancing Post-Traumatic Pain Relief with Alternative Perineural Drugs (collaboration with Brian Williams MD, MBA); 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)

Jun-Ho La DVM, PhD  Contributions of Luminal Factors to Chronic Functional Visceral Pain; Therapeutic Potential of Botulinum Toxin for Pancreatitis and Pain; Contribution of Isolectin B4-Binding Sensory Neurons to Colorectal Mechanosensitivity; Neuro-Immune Interactions In Functional Bowel Disorders

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

Eric E. Kelley PhD  Nitric Oxide Production from Xanthine Oxidase in Obesity; Xanthine Oxidase-Derived Reactive Species Critically Impact Obesity-Mediated Pulmonary Arterial Hypertension

William Lariviere PhD  Genetics of Variation in Mechanosensation; Genetics of Inflammatory Pain; Genetics of Visceral Inflammatory Pain


Erica S. Schwartz PhD  Role of Egr1 in Visceral Inflammation and Pain; Neurogenic Inflammation and Pancreatic Hypersensitivity

Pei Tang PhD  Structure of the Pentameric Ligand-Gated Ion Channel GLIC Bound with the Anesthetic Ketamine; Structure of the Pentameric Ligand-Gated Ion Channel ELIC Co-crystallized with its Competitive Antagonist Acetylcholine; NMR Resolved Multiple Anesthetic Binding Sites in the TM Domains of the α4β2 nAChR; NMR Structures of the Transmembrane Domains of the α4β2 nAChR

Margaret M. Tarpey MD  Interplay of Oxidants with Nitric Oxide in Vascular Dysfunction, Including Hypertension and Atherosclerosis; Development of Site-Directed Antioxidants to Ameliorate Local Production of Oxidants; Redox Transduction of Nitric Oxide Signaling (collaboration with Bruce A. Freeman PhD)

Yan Xu PhD  NMR Studies of Mechanisms of General Anesthesia; Post-Treatment of Delayed Cerebral Injuries after Cardiac Arrest by Exogenous Stem Cell Signaling; Registration of Olfactory Events During General Anesthesia; Anesthetic Effects on Ion Channel Structures and Dynamics (collaboration with Pei Tang PhD); Reversal of Ion Charge Selectivity Renders the Pentameric Ligand-Gated Ion Channel GLIC Insensitive to Anesthetics; Cannabinoids Suppress Inflammatory and Neuropathic Pain by Targeting α3 Glycine Receptors

Erin E. Young PhD  Novel Candidate Genes for Inflammatory Nociception; Candidate Genes for Mechanosensation; Role of Neuroinflammation in Persistent Visceral Hypersensitivity
The Department of Anesthesiology Clinical Trials Division provides all the services necessary for faculty members, as both principal investigators and sub-investigators, to conduct industry-sponsored clinical trials. The division is expected to operate with a pre-established budget. The services provided include contract and budget negotiations, clinical research coordinator support, clinical trial monitoring and compliance review, and Institutional Review Board (IRB) submissions. In FY12, the staff oversaw all trials with four full-time clinical research coordinators, coordinating trial initiation, facilitating and monitoring patient enrollment and study progress, and sustaining quality control of data collection and record keeping.

The division is also committed to developing new study opportunities by promoting departmental resources to the pharmaceutical industry as a whole. FY12 consolidated budgets totaled 75% more than sponsor initial proposed budgets. Several studies met the contracted enrollment, allowing the division to negotiate additional enrollment.

To ensure satisfaction of all legal and ethical requirements, program staff prepare research protocols and patient consent forms, verify compliance with federal regulations and Good Clinical Practice Guidelines, and submit IRB materials. After contracts are finalized, the division also manages all financial aspects of clinical trials.

FY12 was characterized by a predominant number of sponsored studies being conducted in the pediatric population. The division contracted seven new clinical trials and completed five of the fourteen ongoing clinical trials. Over 40 faculty members at three UPMC sites were involved with the following sponsor companies: Avancen MOD Corporation, Cumberland Pharmaceuticals, Inc., GlaxoSmithKline LLC., J&J Pharmaceutical Research, Endo Pharmaceuticals Inc., Helsinn Therapeutics, Inc., Hospira Inc., Purdue Pharma L.P., Welch Allyn, and the U.S. Department of Interior. FY12 contracted grants totaled $686,815 (direct contracted revenue, $546,843; indirect contracted revenue, $139,972).

The beginning of FY13 has shown an increase in opportunities to perform sponsored clinical trials in the adult population and, even more interesting, the opportunity to involve several of the sites in these trials.
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<td>Jacques E. Chelly MD, PhD, MBA, <em>et al.</em></td>
<td>A Multicenter, Randomized, Single-blind, Active-controlled, Parallel Group, Phase II Study to Evaluate the Efficacy, Safety, and Tolerability of a Single Intravenous (6 mg, 12 mg, 18 mg, 24 mg or 36 mg) Dose of the Neurokinin-1 Receptor Antagonist, Vestipitant (GW597599), Compared with a Single 4 mg Intravenous Ondansetron Hydrochloride Dose for the Treatment of Breakthrough Post-Operative Nausea and Vomiting after Failed Prophylaxis with an Ondansetron-Containing Regimen in Patients Undergoing Non-Emergency Surgical Procedures</td>
<td>GlaxoSmithKline, LLC</td>
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<td>Jacques E. Chelly MD, PhD, MBA, <em>et al.</em></td>
<td>A Prospective Randomized Trial of an Oral PCA Devise versus SOC Delivery of as Needed Oral Pain Medications Following Total Hip Arthroplasty</td>
<td>Avancen, LLC</td>
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<td>Patricia Dalby MD, <em>et al.</em></td>
<td>A Multicenter, Randomized, Single-blind, Active-controlled, Parallel Group, Phase II Study to Evaluate the Efficacy, Safety, and Tolerability of a Single Intravenous (6 mg, 12 mg, 18 mg, 24 mg or 36 mg) Dose of the Neurokinin-1 Receptor Antagonist, Vestipitant (GW597599), Compared with a Single 4 mg Intravenous Ondansetron Hydrochloride Dose for the Treatment of Breakthrough Post-Operative Nausea and Vomiting after Failed Prophylaxis with an Ondansetron-Containing Regimen in Patients Undergoing Non-Emergency Surgical Procedures</td>
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<td>Peter J. Davis MD, <em>et al.</em></td>
<td>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</td>
<td>J&amp;J Pharmaceutical Research</td>
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<tr>
<td>Peter J. Davis MD, <em>et al.</em></td>
<td>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</td>
<td>Cumberland Pharmaceuticals, Inc.</td>
</tr>
<tr>
<td>Peter J. Davis MD, <em>et al.</em></td>
<td>Dexmedetomidine as a Rapid Bolus for Treatment and Prophylactic Prevention of Emergence Agitation in Anesthetized Children</td>
<td>Hospira, Inc.</td>
</tr>
<tr>
<td>Ayse Genc MD, <em>et al.</em></td>
<td>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</td>
<td>Purdue Pharma L.P.</td>
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<tr>
<td>Ibtesam A. Hilmi MB, CHB, FRCA, <em>et al.</em></td>
<td>Next Generation ITR Thermometer Technique Compensation Clinical Study</td>
<td>Welch Allyn</td>
</tr>
<tr>
<td>Daniel Sabo MD <em>et al.</em></td>
<td>Phase II-Double -Blind, Placebo-Controlled,Dose Finding Study to Evaluate the Safety and Efficacy of Ipamorelin Compared to Placebo fo the Recovery of Gastrointestinal Function in Patients Following Small or Large Bowel Resection with Primary Anastomosis</td>
<td>Helsinn Therapeutics, Inc.</td>
</tr>
<tr>
<td>Kelly T. Shannon MD, <em>et al.</em></td>
<td>A Phase III Randomized, Double-Blind, Placebo and Active-Comparator-Controlled, Multiple-Dose Clinical Trial to Study the Safety and Efficacy of MK-0663/Etoricoxib and Ibuprofen in the Treatment of Postorthopedic Knee Replacement Surgery Pain</td>
<td>Merck &amp; Co., Inc.</td>
</tr>
<tr>
<td>Doreen Soliman MD, <em>et al.</em></td>
<td>A Phase III, Randomized, Double-Blind, Dose-Controlled, Multicenter, Study Evaluating the Safety and Efficacy of Dexmedetomidine in Intubated and Mechanically Ventilated Pediatric Intensive Care Unit Subjects</td>
<td>Hospira Inc.</td>
</tr>
<tr>
<td>Charles Yang MD, <em>et al.</em></td>
<td>An Open-Label Study to Characterize the Pharmacokinetics and Safety of Oxycodone Hydrochloride q12h Controlled-Release (ORF) Tablets in Pediatric Patients Aged Six to 16 Years Inclusive, Who Require Opioid Analgesia</td>
<td>Purdue Pharma L.P.</td>
</tr>
</tbody>
</table>
Other Research by Full Time Academic/Clinical Faculty

Nicholas G. Bircher MD, FCCM  Improving Overall and Neurological Outcomes after Resuscitation and Critical Care; Optimizing Use of Simulation for Education; Analysis of the Get With The Guidelines® Resuscitation Database

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

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

Patricia L. Dalby MD  Patient and Family Satisfaction with “Condition O” Emergency Care Questionnaire Development

Tomas Drabek MD  Novel Concept of Emergency Preservation with Delayed Resuscitation for Victims of Exsanguination Cardiac Arrest

Stephen A. Esper MD  The Role of Administration of Beta-Blockers Intraoperatively During Cardiac Surgery and their Association with Mortality and Morbidity at 30 Days and One Year: a Retrospective Analysis Covering Ten Years of Cardiac Surgery

Ferenc E. Gyulai MD  Potential Deleterious Effects of Anesthetics on Inflammatory Pain

Ibtesam A. Hilmi MB, CHB, FRCA  Perioperative Myocardial Infarction and the Use of Beta-Blockers in High-Risk Surgical Patients; Awareness and Recall During General Anesthesia; Post-Anesthesia Confusion and Delirium; The Evaluation of Different Oxygen Saturation Monitoring Equipment to be Used in High-Risk Surgical Population

James W. Ibinson MD, PhD  Functional MRI (fMRI) of Short and Long Duration Painful Electric Nerve Stimulation; Exploration of the Functional Connectivity Differences between Pain and Resting States; Understanding Chronic Pain Mechanisms and Optimizing Treatments Using fMRI

Qing Liu MD, PhD  Variables Impacting Local Anesthetic Efficacies in Regional Anesthesia

Venkat R.R. Mantha FFARCSI  Nanoanesthesia: Ankle Block in the Rat with Nanoparticle/Ropivacaine Complex

Dawn A. Marcus MD  Therapy Dogs Relieve Pain; Therapy Dogs in Cancer Care; Companion Dogs Alert Owners to Impending Migraines; Fibromyalgia Diagnosis; Fibromyalgia Family and Relationship Impact; Fibromyalgia Treatment

William McIvor MD  Automation of the Debriefing Process After Mannequin Simulation; Effectiveness of Screen Versus Mannequin Simulation; Utilizing Simulation in Medical Education

Etsuro Motoyama MD  Effect of Serial VEPTR Expansion Thoracoplasty on Lung Growth and Function in Children: a Longitudinal Study; The Effect of Rocuronium and Cisatracurium on Lung Function in Anesthetized Children


Jerome Parness MD, PhD  Dantrolene and Ryanodine Receptor Coupled Calcium Entry

Tetsuro Sakai MD, PhD  Role of Tissue Inhibitor of Metalloproteinase in Stem Cell-Mediated Neuronal Protection in Vitro; Prospective Randomized Comparative Study Between Epidural and Bilateral Paravertebral Blocks for Perioperative Pain Management in Patients Undergoing Open Liver Resection; Research Training for Residents as Lead Investigators in a Simulated Prospective Randomized Clinical Trial: Use of PBLD Format; Assessment of Research Initiatives for Anesthesiology Residents; A Retrospective Chart Review to Assess Incidence, Outcome, And Risk Factors for Postoperative Pulmonary Complications in Laryngectomy Patients; Assessment of Research Initiatives for Anesthesiology Residents - Comparison Using the Rank to Match Population as Control Group

Kenichi Tanaka MD, MSc  Comparative Evaluations of Prothrombin Complex Concentrate and Recombinant Activated Factor VII in Neonatal Plasma after Post-Cardiopulmonary Bypass; Evaluation of the Difference between Thrombelastography and Thrombelastometry during Liver Transplantation

Manuel C. Vallejo Jr. MD, DMD  A Randomized, Prospective, Placebo-Controlled, Double Blind Trial To Evaluate The Efficacy Of Preoperative Aprepitant In Patients At Moderate-To-High Risk For Postoperative Nausea Undergoing Ambulatory Plastic Surgery; Prevention of Dental Injury Under Anesthesia: The Dental Risk Reduction And Injury Prevention Program; Inhaled Nitrous Oxide and Labor Analgesia; Ultrasound Assessment of Gastric Emptying Following the Addition of a High Protein Drink vs. Ice Chips during Labor; The Addition of a High Protein Drink During Labor to Decrease the Incidence of Emesis and Promote Patient Satisfaction; A Novel Way to Estimate Epidural Depth in Morbidly Obese Parturients; Ultrasound-Guided Transversus Abdominis Plane Block For Post-Cesarean Section Analgesia

Jonathan Waters MD  Modification of Shear Induced Hemolysis by Anesthetic Agents; Postpartum Hemorrhage among Women with Undiagnosed Bleeding Disorders

Brian A. Williams MD, MBA  Outcomes After ACL Reconstruction: Femoral Nerve Block; Process Re-Engineering, and Health Care Economic Considerations with Regional Anesthesia in Ambulatory Surgery; Benefits of Routine Antiemetic Prophylaxis; Peripheral Nerve Blocks with Multimodal Analgesics; Resident Training In Regional Anesthesia

Li-Ming Zhang MD  WNT1 Inducible Signaling Pathway Protein 1 and TLR4 Signaling in Ventilator-Induced Lung Injury
The Pittsburgh Center for Pain Research (PCPR) was established in 2006. 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 are PCPR Researchers.

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.

The PCPR has 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.

North American Malignant Hyperthermia Registry of the Malignant Hyperthermia Association of the United States (MHAUS)

The NAMHR currently consists of over 3,000 reports of in vitro testing for malignant hyperthermia (MH) susceptibility and over 750 reports of adverse metabolic reactions in anesthetized patients (AMRAs), as well as over 250 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.

In 2012 the NAMHR responded to a request for information from the Global Rare Disease Registry (GRDR). The individual registries will maintain the confidentiality of their subjects and work with researchers who develop a hypothesis based on the GRDR data. The document prepared by the NAMHR was reviewed in a competitive process. The NAMHR was accepted as one of the 12 existing registries that will contribute to the GRDR.

The NAMHR acquires data and makes it available for research purposes under the rules of the Institutional Review Board of the University of Pittsburgh. The NAMHR has supported several studies by investigators from UPMC 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 with positive versus negative muscle contracture test results (for which the University of Pittsburgh Medical student James Wilde received the Massik Award from the MHAUS), a review of anesthetics administered and the course of symptoms of MH, review of the safety and efficacy of dantrolene as documented in AMRA reports, and analysis of the recrudescence after MH reactions.
The Division of Ambulatory Anesthesiology 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). The WAKE score was authored by Drs. Brian A. Williams and Michael L. Kentor, Chief Anesthesiologist at UPMC East and UPMC Mercy South Side Outpatient Center. 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 research studies continued in FY12, including investigating femoral nerve block effectiveness in the presence-absence of a sciatic block, and examining the benefits of applying recommendations for low-risk antiemetic prophylaxis. Dr. Williams’ group developed animal models to test a multimodal analgesic single-injection nerve block they developed. They will apply for NIH grant funding in FY13 to establish a clinical research program at the VA Pittsburgh Healthcare System in the future to test comparative efficacy of multimodal analgesic nerve blocks in veterans.

MEPP research in FY12 included studies on the genetic bases of pain after mastectomy or lumpectomy; before, during, and after childbirth; after knee replacement; and in children with sickle cell disease.

The principal focus of the Molecular Epidemiology and Pain Program (MEPP) is the relationship between human genetic polymorphism and complex phenotypes related to pain. For the past ten years, the MEPP has 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.

MEPP research in FY12 included studies on the genetic bases of pain after mastectomy or lumpectomy; before, during, and after childbirth; after knee replacement; and in children with sickle cell disease.
The tenth annual Safar Symposium was held on June 27-28, 2012. 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 symposium began with the third annual Multi-Departmental Trainees’ Research Day on June 27th, a collaboration between the Departments of Anesthesiology, Critical Care Medicine, Emergency Medicine, and Physical Medicine & Rehabilitation, and the Peter M. Winter Institute for Simulation Education and Research (WISER). This multi-departmental event is an outgrowth of the first Anesthesiology Research Day held in 2009 and featured 33 posters and five oral presentations from trainees in the four collaborating departments. Forty percent of the abstracts were submitted by trainees in the Department of Anesthesiology.

Helen Shnol BS, a research scholar working with Inna Belfer MD, PhD, won best poster from the Department of Anesthesiology for “Pain Phenotypes in American Breast Cancer Survivors Following Mastectomy: Analysis of Clinical, Demographic, Psychosocial, and Psychophysical Correlates.” In addition, Tommy S. Tillman PhD, a postdoctoral scholar and manager of Dr. Yan Xu’s laboratory, won first place among all the oral presentations for “Reversal of Ion Charge Selectivity Renders the Pentameric Ligand-Gated Ion Channels GLIC Insensitive to Anesthetics.”

The second day of the symposium included both the Peter and Eva Safar Lecture, as well as morning and afternoon sessions highlighting current research on breakthroughs in pediatric resuscitation.

Gabriel G. Haddad MD, Professor of Pediatrics and Neuroscience, Chair, Department of Pediatrics, University of California, San Diego, and Physician-in-Chief and Chief Scientific Officer at the Rady Children’s Hospital in San Diego, delivered the 32nd Peter and Eva Safar Annual Lecture in Medical Sciences and Humanities on the topic of “Tolerance and Susceptibility to Hypoxia: New Lessons From Vertebrate and Invertebrate Model Systems.” Patrick M. Kochanek MD (Director, Safar Center for Resuscitation Research) and John P. Williams MD (Peter and Eva Safar Professor and Chair, Department of Anesthesiology) co-host this annual lectureship.

The afternoon session on simulation was held at WISER.
In April 2012, Dr. Rita M. Patel (Program Chair), Dr. Jerry Clark (Course Director), and 40 Department of Anesthesiology academic faculty members recorded a five-day Anesthesiology Board Review Course at the Doubletree Hotel and Suites in Pittsburgh. Each clinician-scholar was responsible for reviewing and presenting a critical topic in anesthesiology, pain, or critical care medicine. Dr. Andrew Murray served as Director of the Simulation Program and Ms. Barbara Chismar as Program Coordinator. The course was based on the highly successful UPP Department of Anesthesiology “A Comprehensive Review of Anesthesiology” that was produced in conjunction with CMEinfo in 2003 and again in early 2007. The company CMEinfo specializes in the production of continuing medical education programs by partnering with strong academic and clinical departments.

The objective of the course is to provide anesthesiologists and other health care professionals with current, relevant information to prepare for the American Board of Anesthesiology Certification and Maintenance of Certification Examinations. Complex principles emphasizing physiology, pharmacology, and physics necessary for state-of-the-art practice are explained in a comprehensive and easy to understand manner. The management of patients in various subspecialty areas and overviews of techniques for regional anesthesia and airway management are presented. In addition, an introductory test-taking skills lecture offers advice on strategically approaching the oral and written board examinations. The program offers a comprehensive, concise, and practical review of important core information in the field.
Under the direction of Drs. Rita M. Patel and Charles Boucek, Director of the Grand Rounds Program, the Anesthesiology Grand Rounds On-Line course continued in FY12. The program allows faculty, fellows, residents, and medical students in the department to view the digitally recorded presentations on-line, from any computer with internet access. The presentations include multiple-choice questions for review and an evaluation form. In addition CME credit may be earned if modules are viewed within 45 days from the date of posting. The modules are kept on-line indefinitely as an educational resource.

In the 2011-2012 academic year, approximately 200 faculty members viewed 26 presentations, obtaining over 3,000 hours of CME credit. Formal evaluations and informal feedback from the faculty have been very positive.

Five University of Pittsburgh Department of Anesthesiology faculty are members of the 67-member University of Pittsburgh School of Medicine Academy of Master Educators. Michael P. Mangione MD, William R. McIvor MD, and Rita M. Patel MD were reappointed for a five year term effective January 1, 2011. Steven L. Orebaugh MD and Paul E. Phrampus MD were appointed for a five year term effective January 1, 2009. Members of the academy must be involved with the education of medical students, graduate students, and/or residents for the duration of appointment to the academy. Drs. Mangione, McIvor, Orebaugh, Patel, and Phrampus were selected from the University of Pittsburgh School of Medicine faculty based upon their exceptional contributions to medical education.

Dr. Rita M. Patel serves as 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, which was implemented in July 2008. The committee also developed and presented “Introduction to Teaching,” which was delivered most recently to almost 500 new residents and fellows at the University of Pittsburgh Medical Center Medical Education Program System-Wide Orientation Program in summer 2012.
The Department of Anesthesiology’s medical student programs are recognized as among the best in the nation. Faculty members continued their enthusiastic participation in clinical teaching during the anesthesiology clerkship and in the electives offered by the department.

The Summer Preceptorship Program in Anesthesiology was again offered during academic year 2011-2012. This program is designed to expose first-year medical students to clinical medicine and to the field of anesthesiology, including acute pain management and the use of regional anesthesia. During this eight-week work-study program, students engage in clinical activities for 40 hours per week, with afternoons reserved for case discussions and student case presentations. Responsibilities include anesthesiology and operating room technical work, as well as observation and participation in the perioperative care of patients as part of the anesthesia care team. Students keep patient logbooks, attend weekly discussions, and are required to present cases. Evaluations indicate that the program continues to be well received, providing students with a highly valued opportunity for direct patient contact and early exposure to clinical procedures correlating with their didactic instruction. This year’s preceptorship was conducted at Magee-Womens Hospital of UPMC and UPMC Presbyterian.

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. They received a brief introduction to hemodynamic monitoring and interpretation of blood-gas reports in the session. Students 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.

This department is unique among anesthesiology departments because of our faculty’s extensive involvement in medical student education. In very few US medical schools are pre-clinical courses directed by clinical department faculty members. Based on written evaluations from the medical students, the Clinical Procedures Course received an overall approval rating of 86%. Students said they valued the opportunity to learn these basic procedures prior to performing them for patients.

The mandatory Surgery and Perioperative Care Clerkship consists of an eight-week course including an anesthesiology segment and a surgery segment. The surgery and anesthesiology portions of the course are fully integrated, and the curriculum for the anesthesiology portion is well established. Thanks to the teaching efforts of the faculty, this course enjoyed another very successful year, as evidenced by excellent evaluations and an increasing number of medical students considering anesthesiology as a career. The students continue to rate the overall quality of the clerkship as good or outstanding.

A total of 35 students participated in our electives; these month-long electives provide in-depth exposure to anesthesiology. Four electives are offered: General Anesthesiology, Anesthesiology Research, Subspecialties in Anesthesiology, and Pain Medicine.

The Anesthesiology Interest Group 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. Meeting topics have included the application process, residency programs, and the residency match.

Our faculty participated in the various Medical Student ECU categories, such as Instructional Activities, which include small group sessions and problem-based learning sessions in the first year course “Introduction to Being a Physician.” Second year courses taught by our faculty include “Integrated Case Studies,” “Basic Science of Care,” and “Clinical Procedures.” Our faculty served as facilitators for the mandatory Simulator Sessions taught to the third and fourth year students during the Surgery and Perioperative Care Clerkships and the Anesthesiology Elective. Several faculty participated in the lecture series conducted during the Surgery and Perioperative Care Clerkships.
### SCHOLARLY PROJECTS

Anesthesiology faculty members mentored medical student scholarly projects in FY12:

<table>
<thead>
<tr>
<th>Mentor</th>
<th>Student</th>
<th>Project</th>
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<tbody>
<tr>
<td>Lawrence Borland MD</td>
<td>Alan Leung</td>
<td>Postoperative Risks of Apnea in Term Infant Inguinal Hernia Repair under General Anesthesia</td>
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<tr>
<td>Barbara Brandom MD</td>
<td>James Wilde</td>
<td>A Survey of Musculoskeletal Pain in Malignant Hyperthermia Susceptible Individuals</td>
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<tr>
<td>Franklyn P. Cladis MD</td>
<td>Jessica Ascensio</td>
<td>Tranexamic Acid for the Reduction of Allogenic Transfusion Requirements in Infants and Children having Craniofacial Surgery</td>
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<tr>
<td>Patricia L. Dalby MD</td>
<td>Hanzi Zhan</td>
<td>Patient and Family Satisfaction following Emergency Obstetric Crisis: Development of a Valid and Reliable Questionnaire</td>
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<tr>
<td>Tomas Drabek MD</td>
<td>Caleb Wilson</td>
<td>Effects of Depletion of Microglia on Neurologic Outcome using Intraparenchymal Clodronate Injection in Prolonged Cardiac Arrest Treated with Moderate and Deep Hypothermia in Rats</td>
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<tr>
<td>Gregg Homanics PhD</td>
<td>David Mazariegas</td>
<td>Epigenetic Effects of Alcohol</td>
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<tr>
<td>William McIvor MD</td>
<td>Sean Flynn</td>
<td>Assessing the Educational Value of Screen Based Simulations for USMLE Step I Pharmacology Review</td>
</tr>
<tr>
<td>William McIvor MD</td>
<td>Peter LaRossa</td>
<td>Using a Screen-Based Simulation Tool to create an Expert-Validated Solution to a Mannequin-based Simulation of an Uncal Herniation</td>
</tr>
<tr>
<td>William McIvor MD</td>
<td>Roger Huijon</td>
<td>Assessment of the Role of Simulation in Graduate Surgical Education: A Systematic Review of the Literature</td>
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<tr>
<td>William McIvor MD</td>
<td>Eric Wise</td>
<td>A Screen Based Simulation and Tutorial of Inserting a Pulmonary Artery Catheter into a Patient</td>
</tr>
<tr>
<td>William McIvor MD</td>
<td>Seth Linakis</td>
<td>Screen-Based Medical Simulation</td>
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<tr>
<td>Khoa N. Nguyen MD</td>
<td>Jonathan Zipkin</td>
<td>Pushing Boundaries: Investigating the Role of the Da Vinci Surgical Robot in Free Flap Supercrancelosurgery</td>
</tr>
<tr>
<td>Tetsuro Sakai MD, PhD</td>
<td>Jacob Esquenazi</td>
<td>A Retrospective Chart Review to Assess Incidence, Outcome, and Risk Factors for Postoperative Pulmonary Complications in Patients who Underwent Head and Neck Cancer Surgeries with or Without the Free Flap Reconstructions</td>
</tr>
<tr>
<td>William Simmons MD</td>
<td>Kevin Proctor</td>
<td>Incorporating Family-Based Culturally Specific Health Education and Promotion with Medical Field Focused Youth Mentorship</td>
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</tbody>
</table>

### AWARDS

- **Best Student in Anesthesiology Award**: Dionne Okafor
- **Department of Anesthesiology Peter M. Winter Award for Excellence in Medical Student Teaching**: William Simmons MD

### MATCHING

Ten UPSOM students (Class of 2012) matched into anesthesiology residencies:

<table>
<thead>
<tr>
<th>Student</th>
<th>Match</th>
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<tbody>
<tr>
<td>Douglas Bentley</td>
<td>UPMC</td>
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<tr>
<td>Julie Garringer</td>
<td>Johns Hopkins Hospital</td>
</tr>
<tr>
<td>Erica John</td>
<td>Beth Israel Deaconess Medical Center, Boston, MA</td>
</tr>
<tr>
<td>Michael Kolan</td>
<td>Northwestern McGaw Medical Center</td>
</tr>
<tr>
<td>Giang Le</td>
<td>Columbia University Medical Center</td>
</tr>
<tr>
<td>David McGovern</td>
<td>Northwestern McGaw Medical Center</td>
</tr>
<tr>
<td>Dionne Okafor</td>
<td>Brigham &amp; Women’s Hospital</td>
</tr>
<tr>
<td>Lumei Tuomala</td>
<td>Columbia University Medical Center</td>
</tr>
<tr>
<td>James Wilde</td>
<td>Loma Linda University Medical Center</td>
</tr>
<tr>
<td>Eric Wise</td>
<td>UPMC</td>
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</table>
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 Accreditation Council of Graduate Medical Education (ACGME) to provide training and education in anesthesiology leading to certification by the American Board of Anesthesiology. In academic year 2012 (AY12), the ACGME granted the maximum allowable five-year accreditation to the residency program with no citations.

Excellent clinical teaching and experience combined with a high volume and diversity of cases has always been a prominent feature of the program. Residents complete subspecialty rotations in pediatric anesthesiology, obstetric anesthesiology, critical care medicine, geriatric anesthesiology, and pain medicine. The program provides additional training in the management of advanced medical and surgical cases in subspecialty areas including cardiac anesthesiology, neuroanesthesiology, thoracic anesthesiology, liver-transplantation anesthesiology, regional/ambulatory anesthesiology, and the post anesthesia care unit (PACU). Twenty residents graduated from the program in 2012.

AY12 was notable for the continuation of our excellent didactic program. The committee coordinated core topics for PGY-2, PGY-3, and PGY-4 residents in seminar and lecture series formats. The PGY-1 and PGY-3 lectures and pertinent multiple-choice questions are posted to a special web site that allows residents unlimited access and review. Third-year 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 (ASA) Problem-Based Learning Discussion (PBLD) format to facilitate active learning in small groups. The educational program is augmented by biweekly Grand Rounds, in which local speakers and visiting professors provide up-to-date reviews of relevant topics. Again this year, a monthly journal club was included in the Grand Rounds curriculum. During these sessions, residents from each class research and present important articles with the goals of increasing their understanding of scientific literature and the 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 include mock oral board examinations. In addition to regular attendance at lectures and Grand Rounds, residents are required to participate in at least one Clinical Procedures Course session. This allows them the opportunity to teach medical students in a traditional classroom setting, in addition to clinical teaching during the medical student clerkships and electives.

Residents are also encouraged to participate in the Western Pennsylvania Society of Anesthesiologists’ monthly lecture series, where topics of interest to anesthesiologists are presented by local and national faculty members.

Many resident courses are taught at the Peter M. Winter Institute for Simulation, Education and Research (WISER). These courses provide both didactic and hands-on experience in the management of problems that are uncommon, or common but difficult. In simulation courses offered this year, residents were able to sharpen skills and build confidence in crisis leadership, fiberoptic intubation, central venous cannulation, and difficult-airway management. In addition, residents were given the opportunity to orient or receive additional training for their subspecialty rotations in regional, obstetric, and liver transplantation anesthesiology.

One clear result was an improvement in residents’ management of difficult airways. An introductory program consisting of simulation sessions, one-on-one instruction in the OR, and didactic teaching is also offered. Simulation exercises during the first week of PGY-2 training provide new residents with a safe and instructive setting in which to gain experience. The introductory course culminates with a performance test held in the simulator prior to residents beginning work in the actual OR.
GRADUATING RESIDENTS

Graduate

Kathleen Barrett MD
Jeremy Benger DO
Adam Childers MD
William Ehrman MD
Brian Gierl MD
Kevin Hibbard MD
John Hoffman DO
Arun Jayaraman MD
Tara Knizner MD
Randy Legault DO
Matthew LoDico MD
Ana Manrique MD
Samer Melhem MD
Scot Muir DO
Daniel Mulcrone MD
Kristin Schreiber MD, PhD
Anthony Silipo DO
Paul Tarasi MD
Ryan Wilson MD
Joseph Yurigan DO

Post-Residency

Pediatric Anesthesiology Fellowship at Cincinnati Children’s Hospital
unknown
Pediatric Anesthesiology Fellowship at Children’s Hospital of Pittsburgh of UPMC
Private practice (Chief of Anesthesiology, Lake Erie Regional Health Systems of NY, Brooks Memorial Hospital)
Neuroanesthesiology Fellowship at University of San Diego
Pain Medicine Fellowship at UPMC
Joining the UPMC Faculty
Adult Cardiothoracic Anesthesiology Fellowship at Duke University
Joining the UPMC Faculty
Adult Cardiothoracic Anesthesiology Fellowship at Cleveland Clinic
Pain Medicine Fellowship in New York
Pediatric Anesthesiology Fellowship at Children’s Hospital of Pittsburgh of UPMC
Critical Care Medicine Fellowship with UPMC
Joining the UPMC Faculty
Critical Care Medicine Fellowship at Johns Hopkins University
Regional Anesthesiology/Research Fellowship at Brigham and Women’s Hospital
Joining the UPMC Faculty
Adult Cardiothoracic Anesthesiology Fellowship at UPMC
Pediatric Anesthesiology Fellowship at University of Colorado
unknown

TEACHING AWARDS

Dr. Leroy Harris Excellence in Teaching Award: Steven L. Orebaugh MD

Excellence in Clinical Teaching of Residents: Shawn T. Beaman MD, Neal F. Campbell MD, Jerry R. Clark MD, FASE, Mario Montoya MD, Huminangala Rakesh MD, and Brenda Raphael MD
RESIDENT AWARDS

2012 Western Pennsylvania Society of Anesthesiologists (WPSA) Resident Research Competition:

First Place: Philip Adams DO “Cardiac Tamponade after Kidney Transplant: Possible Result of Alemtuzumab Induced Cytokine Release Syndrome” (case report)

First Place: Trent Emerick MD “Can Scholarly Activity Points During Residency Predict the Research Productivity of an Anesthesiologist?” (scientific paper)

Second Place: Stephen McHugh MD “Use of Succinylcholine Infusion for a Laparoscopic Sigmoid Colectomy Due to a Shortage of Neostigmine” (case report)

Second Place: Phillip Adams DO “Use of the STOP-BANG Questionnaire to Identify Patients at Risk for Obstructive Sleep Apnea at a Tertiary Care Medical Center” (scientific paper)

Third Place: John Henao MD “First Experience in 14 Years of Fulminant Extrapyramidal Symptoms Caused by a Single Dose of Oral Perphenazine 8 mg for PONV Prophylaxis” (case report)

Third Place: Tony Silipo DO “Effect of Buprenorphine on Epidural Redosing in Laboring Parturients” (scientific paper)

2012 ASA Practice Management Conference

Second Place: Trent Emerick MD “From Idea to Innovation: Hurdles and Milestones in Developing a Scholarly Activity Points Website”
The Department of Anesthesiology offers ten fellowship training programs, including ACGME accredited fellowships in adult cardiothoracic anesthesiology, anesthesiology critical care medicine, obstetric anesthesiology, pediatric anesthesiology, and pain medicine.

**CARDIAC:** Erin A. Sullivan MD
Fellows receive advanced training in adult and pediatric cardiothoracic anesthesiology inclusive of emergency and elective surgery, TEE, perfusion/ventricular assist device theory and operation, cardiothoracic critical care medicine, and heart/lung transplantation. Fellows are also eligible to take the PTEeXAM administered by the National Board of Echocardiography; **CRITICAL CARE MEDICINE:** 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; **HEPATIC TRANSPLANTATION:** Raymond M. Planinsic MD
Fellows complete a three to nine month rotation. They perform anesthetic care at a high level of independence and are strongly encouraged to participate in research activities. This rotation is intended to train fellows to become a transplantation consultant and/or a director of a liver transplantation anesthesia program; **NEUROANESTHESIOLOGY:** Steven L. Whitehurst MD
Rotations include neurophysiologic monitoring, neuroradiology, neurosurgical intensive care, and pediatric neuroanesthesia. Research opportunities are available, including collaborative work with members of Neurosurgery and the Safar Center for Resuscitation Research; **RESEARCH:** 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; **OBSTETRIC:** Manuel C. Vallejo Jr. MD
This fellowship provides advanced experience in all aspects of obstetric anesthesiology, including research, administration, and clinical management of the complex obstetrical-gynecological patient; **ORTHOPEDIC:** Jacques E. Chelly MD, PhD, MBA
This one-year program includes clinical training in orthopedic anesthesia, acute pain and rehabilitation, along with research activities and educational curricula; **PAIN MEDICINE:** Nashaat Rizk MD (Interim Director)
The one-year program is fully accredited by ACGME. Fellows rotate through outpatient services at various UPMC locations and collaborate with psychologists, physical therapists, occupational therapists, and pain medicine physicians from other disciplines; **PEDIATRIC:** Franklyn P. Cladis MD
The ACGME-accredited fellowship is designed to develop clinical expertise in caring for routine and complicated pediatric surgical patients. Based at Children’s Hospital of Pittsburgh of UPMC (a Level 1 Trauma Center), fellows will also understand the complex airway management needs and resuscitation procedures of pediatric trauma patients; **REGIONAL:** Jacques E. Chelly MD, PhD, MBA
The fellowship develops expertise in the practice and theory of regional anesthesiology and acute pain management techniques and understanding of the related physiology and pharmacology in the provision of patient care.

**2012 DEPARTING FELLOWS**

**PAIN MEDICINE**
Daniel Kohane MD; Ryan McHugh MD; Jorge Rivero Becerra MD; Gokul Toshniwal MBBS, MD; Gabriel Yacob MD; Charles Yang MD; Wadid Zaky Salama MD

**PEDIATRIC ANESTHESIA**
Brian Blasiole MD, PhD; Christopher Broussard MD; Anna L. Clebone MD; Charles Honsinger MD; R. Scott Lang MD; Amelia Randall MD; Gregory D. Schnupper MD; Giorgio Veneziano MD; Audra Webber MD

**OBSTETRIC ANESTHESIA**
Fenny Anthikad MD; Olajide Kowe MBBS

**CARDIAC ANESTHESIA**
Ryan Ball MD; Benjamin Grable MD; Joshua Hensley MD; Dennis Phillips DO

**REGIONAL ANESTHESIA**
Joel Barton MD; Nikhil Bhatnagar MD; Vanpraseuth Fongnaly MD; Christopher Gleis MD; Kinga A. Klimowicz MD; Sarah A. LaSalle DO; Elizabeth Leweling MD; Lori-Ann C. Oliver MD; Garth C. Skoropowski MD

In May 2012, the ACGME granted continued five-year accreditation (the maximum allowable) for the Pediatric Anesthesiology, Critical Care Medicine, and Pain Medicine fellowship programs, with no citations.
The Peter M. Winter Institute for Simulation, Education, and Research (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 to 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 the health system. The anesthesiology difficult airway management course for residents, SRNAs, CRNAs, and attending physicians was created to allow participants the opportunity to obtain a working knowledge and proficiency of the 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 principles and psychomotor skill sets necessary to rapidly become clinically proficient in the basic and advanced uses of the fiberoptic bronchoscope in the anesthesiology domain. A central venous cannulation (CVC) 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, CVC indications and alternatives, as well
as complication recognition and corrective maneuvers. WISER also 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.

WISER finished another busy year in June 2012. During FY12, WISER conducted 1,317 classes, with 12,362 educational encounters. Over 3,260 individual students, ranging from undergraduate nurses to anesthesiologists with decades of experience, logged almost 51,000 hours of class time. WISER was fortunate to have over 310 instructors teach in 139 separate courses during the year. Classes occupied 13,770 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 2013.

WISER offers a simulation course for Maintenance of Certification in Anesthesiology Program® (MOCA®). This simulation course fulfills one requirement of the American Board of Anesthesiology’s (ABA) MOCA® Part IV. WISER’s MOCA® 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, and pediatric surgery settings. The curriculum focuses on relevant and challenging perioperative crises that a clinician might face. Instructors for this course are authors and experts in the field, and well versed in practical training for our anesthesiology colleagues.

Improving Diversity

The Gateway Medical Society (GMS), a component of the National Medical Society, has a mission of addressing underserved minority medical needs, “closing the gap” to medical care provided to these communities, and increasing the numbers of minority providers. GMS aims to address the community’s needs and create a pipeline of African American males to pursue careers in medicine. To correct African American males’ low graduation rate, disproportionate suspensions, high rate of placement into special education, and disproportionately low representation in healthcare, GMS strives to reach these students far sooner in the academic pipeline. Hence, they created the long term “Journey to Medicine” mentorship program (JTM) for African American males in grade six and up. JTM is organized into three phases; Phase I is a 10-month curriculum that involves monthly scheduled lessons at WISER. Planned lessons for the students incorporate the use of sophisticated, computerized mannequins in simulated emergency rooms, simulated ambulances, and simulated ORs. The students are trained in etiquette and to articulate their thoughts, and are challenged to prepare and deliver oral presentations. Students are also trained in basic CPR. In Phase II, students continue to interact with the human simulators, but at a higher, more challenging level, and begin learning pre-algebra. The students can earn cash rewards each quarter for a 4.0 grade point average. In 2012, JTM started their first Phase III class, ninth graders. The pipeline will continue adding new classes of sixth graders to Phase I every year, while the older kids matriculate up to Phase VI and graduate from high school. JTM has received press coverage in the *Pittsburgh Post Gazette*, the *Pittsburgh Tribune Review*, the *Bulletin of the Allegheny County Medical Society*, and the *New Pittsburgh Courier*. The Pittsburgh Public School Board honored the GMS and JTM at their January 2012 meeting, which was televised on Pittsburgh Community Television.

Dr. William Simmons, Visiting Clinical Associate Professor and Attending Physician at UPMC Shadyside Hospital, is president of the GMS. He is also Chair of our department’s Committee on Diversity and Co-Chair of the UPMC/University of Pittsburgh Physician Inclusion Council’s Committee on Retention. These efforts are intended to promote and improve diversity in healthcare for not only the Department of Anesthesiology, but also for the University of Pittsburgh, UPMC, and the nation.
Research at the Simulation and Medical Technology Research and Development Center focuses on the development of next-generation enabling technologies for simulation-based healthcare training and new medical devices with the end goal of improving patient care and enhancing patient safety. The center is a highly interdisciplinary team with a mission to invent both basic enabling technologies for healthcare and practical system prototypes with a focus on user-centric design. Projects typically foster multidisciplinary collaborations among designers, engineers, clinicians, and healthcare educators. The center also engages students in healthcare technology research at both the undergraduate and graduate levels and serves as a pan-departmental bridge-building effort between the University of Pittsburgh Schools of Engineering and Medicine, bringing clinicians and engineers together and serving as an incubator for innovation and prototyping. We strive to lower barriers to innovation and enable creative translation of ideas into prototypes.

Twenty research prototypes have been developed in the center over the past four years, including 14 bioengineering and electrical engineering senior design projects that have led to seven invention disclosures and provisional patent applications. Through classes and interactive “do-learn” workshops, the center has to date introduced over 400 University of Pittsburgh and Carnegie Mellon University students to systems design, medical engineering and healthcare technology.

The center collaborates with local centers of excellence, most closely with the University of Pittsburgh Department of Bioengineering and the Peter M. Winter Institute for Simulation, Education and Research (WISER), as well as other groups at the University of Pittsburgh, UPMC, and Carnegie Mellon University with expertise in technology, education, and patient safety.

Simulation-based training in healthcare is experiencing explosive growth. It enables hands-on, experiential learning while not exposing real patients to risk during training. Just as flight simulation revolutionized crew training and dramatically improved safety in aviation, simulation-based experiences can promote learning and enable objective, standardized competency assessment for medical students, physicians, nurses and other healthcare providers. A growing body of evidence demonstrates the effectiveness of simulation-based training in improving actual clinical performance.

Dr. Samosky's laboratory’s primary research focus is the user-centric design and engineering of real-time interactive systems that promote learning, measure performance and enhance the efficacy and safety of patient care. There is a tremendous need in simulation-based training to sense, record, and objectively quantify performance, whether in the domains of cognitive, affective, or psychomotor skills. In addition, learner-adaptive, semi-autonomous interactive systems can support self-learning, offloading work from instructors, and enabling “on-demand, anytime” guided training and performance assessment. The team is therefore currently pursuing four overarching grand challenges in their work: 1) Sensor systems to enable quantitative measurement and objective assessment of human performance and skills, enabling direct feedback to trainees on their proficiency and safety; 2) Advanced information display methods to enable enhanced communication, feedback and guidance during medical education; and 3) Highly interactive, autonomous learning systems with built-in intelligent tutoring that can adapt to the learner and support on-demand, 24/7 learning and assessment; and 4) Development of smart medical devices—systems that incorporate sensors, information displays, and automation to enhance accurate, effective device use in life-critical medical applications.
Faculty, residents, fellows, and medical students participate in numerous scientific meetings. Here are some highlights from the department’s many scholarly activities:

**American Society for Anesthesiology (ASA)**

Each year, many Department of Anesthesiology members participate in the ASA Annual Meeting. The 2011 meeting was held from October 15-19 in Chicago, IL. Thirty residents, three fellows, and over 40 faculty members delivered 125 presentations. Additionally, 12 faculty members served on over 25 ASA committees.

ASA also hosts an annual Practice Management Conference, which was held on January 27-29, 2012 in Orlando, FL. Mark E. Hudson MD, MBA and PGY-2 resident Trent D. Emerick MD received first and second place abstract awards for “Impact of a Flexibility Tiered Compensation Structure on Locum Tenens Use and Cost in a Large Multi-Hospital Health Care System” and “From Idea to Innovation: Hurdles and Milestones in Developing a Scholarly Activity Points Website,” respectively.

**Society for Education in Anesthesia (SEA)**

The following faculty members and residents presented at the Society for Education in Anesthesia (SEA) 2012 Spring Annual Meeting in Milwaukee, WI, May 31 – June 3, 2012:

Tetsuro Sakai MD, PhD (Faculty Leader): Workshop - “How to Improve Resident Scholarly Activity in Your Department”

Joseph P. Resti MD: "Creation of a Web-Based Education Module Using the Knowledge Gaps Report from ABA/ASA Joint Council of Anesthesiology"

Trent D. Emerick MD: "Can Scholarly Activity Points during Residency Predict the Research Productivity of an Anesthesiologist?" and "From Idea to Innovation: Hurdles and Milestones in Developing a Scholarly Activity Points Website"

Daniela Damian MD: "Incidence, Risk Factors, and Outcome of Acute Kidney Injury in Liver Transplant Recipients from Live-Liver Donors"

**International Anesthesia Research Society (IARS)**

The following department faculty members participated in the International Anesthesia Research Society (IARS) Annual Meeting, May 18-21, 2012 in Boston, MA:

Jacques E. Chelly MD, PhD, MBA: “Thoracic Paravertebral Space and Parasacral Sciatic Nerve” as part of the Advanced Ultrasound Guided Nerve Block Workshop. Dr. Chelly also participated in the Ultrasound, Simulation and Stimulation for Peripheral Nerve Blocks Workshop.

Franklyn P. Cladis MD, FAAP: Society for Pediatric Anesthesia Panel

Peter J. Davis MD: Review Course - “Pediatric Anesthesia: Little People With Lots of Problems!” Dr. Davis also moderated the General Pediatric Anesthesia and Neonatal Safety and Anesthetics poster sessions

Doreen E. Soliman MD: "A Phase III, Randomized, Double-Blind, Dose-Controlled, Multicenter Study of the Safety and Efficacy of Dexmedetomidine in Mechanically Ventilated Children"

Manuel C. Vallejo Jr. MD, DMD: Dr. Vallejo moderated the Obstetrics Poster Discussion Rounds and the Challenging Case Reports poster session.
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Publications

Department of Anesthesiology faculty members generated over 200 published peer-reviewed journal papers and numerous book chapters, abstracts, and editorials during 2011 and 2012. The following are peer-reviewed journal papers that were published in high-impact journals (20,000 or more citations).


Hahm ER, De Moura MB, Kelley EE, Van Houten B, Singh SV. Withaferin A-Induced Apoptosis in Human Breast Cancer Cells is Mediated by ROS-Dependent Activation of Bak. PLOS ONE 2011; 6(8): e23354.


University of Pittsburgh

- 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.

- Ranked among the top two U.S. universities and No. 4 among universities worldwide in *The Scientist*’s "Best Places to Work in Academia" survey.

- Ranks fifth overall and third among public institutions in the U.S. National Science Foundation’s ranking of federally funded research. The University also ranks seventh in funding from the National Institutes of Health (NIH) and No. 1 in funding from the NIH’s National Institute of Mental Health.

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 of Pittsburgh’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.

- University of Pittsburgh Graduate and Professional Bulletin
UPMC is one of the leading nonprofit health systems in the United States. A $10 billion integrated global health enterprise headquartered in Pittsburgh, Pennsylvania, UPMC develops and delivers Life Changing Medicine by harnessing the power of technology, translating science into cures, and accelerating the pace of innovation worldwide. As Pennsylvania’s largest employer, with more than 55,000 employees, UPMC is comprised of more than 20 hospitals, more than 400 clinical locations that encompass long-term care and senior living facilities, a nearly 1.8 million member health plan, and a growing international and commercial segment. A passion for innovation lies at the heart of UPMC’s success. UPMC’s unique strategy of combining clinical and research excellence with business-like discipline translates into high-quality patient care for both western Pennsylvanians and the global community. Closely affiliated with the University of Pittsburgh Schools of the Health Sciences, UPMC continues to successfully develop internationally renowned programs in transplantation, cancer, neurosurgery, psychiatry, orthopaedics, and sports medicine.

To learn more about UPMC, visit www.upmc.com.

- UPMC Media Relations

US News and World Report ranked UPMC #10 in the nation in their 2012 “best hospitals” ranking. UPMC was also ranked #1 in Pennsylvania and in the Pittsburgh Metro Area. Further, nine UPMC specialties were ranked in the national top 10 list.
Pittsburgh is a hidden gem. 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. Pittsburgh is home to many “greats”:

Fun & Nightlife
- Pittsburgh Zoo and PPG Aquarium
- Kennywood Park; Sandcastle Waterpark
- Rivers Casino

Sports
- Pittsburgh Steelers football
- Pittsburgh Penguins hockey
- Pittsburgh 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

Distinctions
- “Most Livable City in the US,” Forbes (2010), Yahoo! (2010), and The Economist (2011)
- 29th Most Livable City in the World, The Economist (2011)
- 4th Best Zoo in the Country, Parents Magazine (2009)

To learn more about life in the “Most Livable City,” visit www.coolpgh.pitt.edu or www.visitpittsburgh.com.
Acknowledgements

**Writing:** Division Chiefs, Vice Chairs, and Directors; John P. Williams MD; Christine Heiner

**Design:** Christine Heiner

**Photography:** UPMC Media Relations; Dan Battista; Chris Edwards; Rich James; Max Leake; Christine Heiner

Wikimedia Commons: Nineteenninety; Daderot; Matthew Field; SteelCityHobbies; Breemiko8

**Printing:** University Marketing Communications

**Special Thanks** to Sandra Hirsch and Bernadette Bove for their editorial assistance
Department of Anesthesiology at a Glance

FY 2012

Anesthesiology Cases  208,216
Chronic and Acute Pain Visits  92,003
OB Deliveries  12,116
Faculty FTEs  185
Total ORs covered  221
Total Anesthetizing Locations  262
CRNA FTEs  370
Graduating SRNAs  47
Residents and Fellows  112
Active Clinical Trials  14
Total NIH Awards  $5,027,889
Total Awards  $6,232,118

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