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The University of Pittsburgh/UPMC Department of Anesthesiology is widely considered the largest academic program in the country, with 185 faculty members and 386 Certified Registered Nurse Anesthetist full-time equivalents who support more than 300,000 procedures, including more than 95,000 chronic/acute pain visits and 13,000 obstetrical deliveries, at 308 anesthetizing locations annually. We rank in the top 10 anesthesiology departments nationally in federally funded grants, with total research awards exceeding $6.3 million. Our residency program is widely considered one of the top five in the country, and we have 10 active fellowship programs.

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

The mission of the Department of Anesthesiology is to provide superlative service, achieve excellence in education, and conduct world-renowned research. In short, this translates into our motto of the three E’s: 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 more than 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 explore the genetic underpinnings of pain. We continue to enlighten our colleagues not only in Pittsburgh but also around the world with our focused effort on patient safety.
Vice Chairs, Chiefs, & Directors

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The University of Pittsburgh/UPMC Department of Anesthesiology 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. In 2013, CHP was again named in *U.S. News & World Report’s* Honor Roll of America’s Best Children’s Hospitals.

- **Magee-Womens Hospital of UPMC** again ranked among the top five hospitals in the nation for gynecological care in 2013 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. Its Neonatal Intensive Care Unit is the largest in Pennsylvania and one of the largest in the country.

- **UPMC St. Margaret**, a 249-bed acute care and teaching hospital in Aspinwall, is a Magnet-designated hospital. Magnet status is the highest international recognition for nursing excellence and leadership.

- **UPMC Shadyside** also holds Magnet status and is home to the Hillman Cancer Center, one of the nation’s largest and most advanced cancer research and patient care facilities.

- The **VA Pittsburgh Healthcare System** serves as an acute care facility and major surgical tertiary care facility for veterans of the U.S. military.

- **UPMC McKeosports** is an acute care community hospital and an approved site for the Program of All-inclusive Care for the Elderly (PACE).

- **UPMC Mercy** is Pittsburgh’s only Catholic hospital with specialized services, including Level I trauma and burn services, the neurosciences, physical medicine and rehabilitation, and women’s health.

- **UPMC Mercy South Side Outpatient Center** is an ambulatory surgical center that serves as a one-stop location for diagnostic and routine outpatient services such as X-rays, lab work, and same-day surgery.

- **UPMC Passavant** is a tertiary care center north of Pittsburgh with two campuses in McCandless and Cranberry Township (Butler County) focusing on specialties such as cancer, cardiac care, orthopaedics, 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.
Anesthesiology Clinical Sites in Western Pennsylvania

- **UPMC Northwest**, located in Seneca, Cranberry Township (Venango County), has 96 private rooms, including 30 that can be converted for semi-private occupancy, yielding as many as 126 beds.

- **UPMC East** is a brand-new 300+-bed hospital with seven state-of-the-art operating rooms and 140 medical-surgical patient rooms equipped with specially designed SmartRoom software to help monitor, track, and document patient care.

- **UPMC Bedford Memorial** is an acute care general hospital in Everett, Pa. with units for telemetry services and medical, surgical, obstetrical, intensive, and coronary care. The hospital also operates a cardiac-pulmonary rehabilitation program and outpatient and ambulatory surgical units.

- **UPMC Dublin (Beacon Hospital)**, located in Dublin, Ireland, is a full-service hospital that includes eight operating theaters with dedicated rooms for urology and neurological, cardiac, general, orthopaedic, and ophthalmic surgery.

- **UPMC Palermo (ISMETT)** serves as a major transplantation center for southern Italy and other countries in the Mediterranean region.
UPMC Presbyterian/Montefiore

JOSEPH J. QUINLAN, MD, Chief Anesthesiologist

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

The UPMC Presbyterian anesthesiology site is larger than many entire academic departments found elsewhere in the country. It is composed of 40 faculty members who cover 42 operating rooms (ORs) and up to 14 additional non-OR anesthetizing locations. The site is staffed by almost 100 full-time-equivalent Certified Registered Nurse Anesthetists (CRNAs). Up to 15 residents and 10 student nurse anesthetists (SRNAs) rotate at UPMC Presbyterian at any one time. Six Certified Registered Nurse Practitioners (CRNPs) provide care throughout the site as well as at the Pre-anesthesia Evaluation and Testing Center.

In FY13, UPMC Presbyterian faculty supervised 40,534 anesthetics; of these cases, 24,260 were performed in the ORs. Procedures spanned the entire spectrum of surgical and special procedures, from combined thoracic and abdominal transplantation to anesthesia for electroconvulsive therapy. Continuing a trend seen over the last six years, the UPMC Presbyterian anesthesiology faculty managed more cases outside the ORs—16,274 cases during FY13, representing slightly more than 40% of the total cases managed at UPMC Presbyterian. Locations where services were provided included the gastroenterology lab (where up to seven provider teams work each day), bronchoscopy suite, electroconvulsive therapy suite (at Western Psychiatric Institute and Clinic), electrophysiology suite, cardiac catheterization lab, interventional radiology, and the MRI suite (where craniotomies are now occasionally performed).

Anesthesiology services at UPMC Presbyterian are highly subspecialty oriented. Many of the advanced subspecialty resident rotations in anesthesiology (liver transplantation, cardiac, ENT, thoracic, trauma, and neuroanesthesia) are based there. Many novice residents and SRNAs perform their first cases at UPMC Presbyterian. The UPMC Presbyterian faculty is very active in medical student and resident education. Several teaching conferences are held specifically for trainees rotating at UPMC Presbyterian on Wednesday mornings. Monthly Quality Improvement Morbidity and Mortality conferences are provided by a select group of faculty, and problem-based learning discussions also are conducted monthly. Subspecialty services also hold weekly or monthly conferences on topics in their subspecialty areas (e.g., neuroanesthesia, cardiac, hepatic transplantation, and ambulatory anesthesia). Continuing medical education credits are awarded for these activities.
The UPMC Presbyterian Neurosurgical Anesthesiology service carried out more than 5,000 neurosurgical procedures during FY13. Operations included expanded endonasal approaches, craniotomy for tumor, retromastoid craniectomy for microvascular decompression of various cranial nerves, and spinal surgery.

Anesthetic management of the expanding neurosurgical patient population continued to increase in FY13. Services provided included embolization of cerebral vascular aneurism; arterio-venous malformations; tumors and dural and cavernous sinus fistulae; treatment of refractory epistaxis; sclerotherapy; temporary balloon occlusion testing with blood flow evaluation; stroke thrombolysis and thrombectomy; dural sinus thrombolysis and thrombectomy; petrosal sinus sampling, carotid, vertebral artery, subclavian artery, and intracranial arterial stenting; vessel sacrifice; Wada testing; vertebroplasty (methyl methacrylate vertebral body injections); alcohol sclerotherapy; and routine angiography. The rapidly expanding complex spine service tackles spine pathologies that exceed the expertise of other neurosurgical departments in the country. This endeavor provides the neuroanesthesiology service with unique challenges exploited by our residents and other trainees.

The rest of the clinical caseload continues to include various stereotactic procedures, such as magnetic resonance imaging (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.

Same-day Services

Same-day Services at UPMC Presbyterian/Montefiore include both Same-day Surgery (SDS) and the Preoperative Evaluation Center (PEC). In FY13, 14,999 patients were processed through SDS, either as same-day admitted patients (8,135) or outpatient surgery patients (6,864); 5,636 patients were seen in PEC.

Most patients scheduled for both outpatient surgical procedures or same-day admit procedures at UPMC Presbyterian/Montefiore receive care at the SDS unit at UPMC Montefiore. PEC continues to receive referrals from surgeons for prior anesthetic problems, complex medical conditions, patient concerns, or pre-surgical history and physical. 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 show that patients who are seen in 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 Memorial. Patients scheduled for surgery in Pittsburgh are able to receive a comprehensive preoperative evaluation from a nurse practitioner or resident in Oakland using a mobile remote camera, electronic digital stethoscope, and handheld camera for detailed examinations of the airway. Telemedicine evaluations from the Endocrine Surgery service at Falk Clinic have gone live, and patients are now able to receive their comprehensive preoperative anesthetic evaluation without leaving the surgery clinic.

Patients seen in PEC are also now screened for the risk of obstructive sleep apnea. In an initiative between the clinic and Pulmonary Medicine, patients found to be at risk are sent directly to the sleep lab after their PEC visit to receive an at-home sleep study that can be completed and evaluated prior to the day of surgery.
Subdivisions of UPMC Presbyterian/Montefiore

Transplantation Anesthesiology

The Division of Transplantation Anesthesiology (TA) is responsible for the care of patients undergoing liver, intestinal, multivisceral, kidney, pancreas, and composite tissue allograft (CTA) transplantation. TA also provides anesthesiology care and work-up for patients undergoing major hepatic resections. During FY13, nearly 62 liver transplants and 233 total solid organ transplants were performed at UPMC Presbyterian. These included 102 deceased donor kidney, 58 live donor kidney, 3 combined kidney/liver, 43 deceased donor liver, 16 live donor liver, and 11 pancreas-kidney/pancreas transplants. The adult liver and kidney live donor transplantation program also continued to expand; more than 40% of kidney transplants performed in the United States are from live donors, a trend reflected at UPMC.

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

UPMC continues to serve as the referral center for high-risk patients because of diverse expertise and a multidisciplinary approach to managing patients with multiple organ dysfunction. As a result, an increasing number of patients more than 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.

Education in the TA service is composed of a mandatory four-week rotation for post-graduate year (PGY)-3 residents and a three-to-nine-month elective rotation for PGY-4 and PGY-5 trainees. Teaching objectives vary with the level of training. In addition to one-on-one bedside teaching, residents attend seven didactic sessions. 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. PGY-4 and PGY-5 trainees are encouraged to participate in research. Residents beginning their rotation have the additional benefit of training at the Peter M. Winter Institute for Simulation, Education, and Research (WISER) in the Anesthesia for Liver Transplantation course.

TA members participate in diverse academic activities. During FY13, TA faculty were very productive and participated in numerous meetings and symposiums, presenting their work related to organ transplantation. Ongoing TA research topics include monitoring and treating cardiovascular problems in transplant patients, monitoring and treating coagulopathy in transplant patients, effects of immunosuppression on coagulation in transplantation, mediators to minimize preservation/reperfusion injury in transplanted organs, the impact of expanding marginal organ use in transplantation, intraoperative management of CTA transplantation, and comparing epidural versus paravertebral blocks for perioperative pain management for patients undergoing open liver resections.
The Children’s Hospital of Pittsburgh of UPMC (CHP) anesthesiology clinical site comprises 30 faculty members, 13 full-time equivalent (FTE) CRNAs, and eight CRNPs who provide both anesthesia 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 FY13, the division provided anesthesia services for a total of 28,268 procedures at the main CHP campus in Lawrenceville and all CHP satellites. The CHP North satellite surgical center in Wexford was specifically designed for family-centered care for surgical patients; anesthesia services are provided every day of the week, as well as on two Saturdays per month.

The pediatric anesthesiology education programs continued to provide special training for critical care medicine (CCM) fellows, pediatric dentists, emergency medical residents, and nurse anesthesia students rotating through the service. In addition to the anesthesiology residency, an ACGME-approved combined anesthesiology and pediatric residency will soon begin. The program will accept one resident per year. Applications for the match will begin in FY14. Further information on medical student programs and the pediatric anesthesiology fellowship is available in the education section of this report.

Research at CHP focuses on pediatric anesthetic pharmacology, respiratory physiology, and outcomes-based protocols. Clinical trials also are conducted and are an active research component at CHP. More details can be found in the research section of this report.
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 preanesthesia 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. MWH anesthesiologists’ primary focus, however, is providing in-house, 24-hour anesthesia coverage in two primary anesthetizing locations: the Womancare Birth Center and the main Surgical Services Center.

Most state-of-the-art anesthesia and obstetric care is provided in the Womancare Birth Center. The obstetric anesthesia section oversaw 10,935 deliveries in FY13, a 7.3% increase from FY12. Of these deliveries, 7,700 were vaginal births and 3,235 (29.5%) were cesarean deliveries. 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.

Beyond the birthing suite, MWH provided anesthetic management for 16,866 cases in the surgical services center. The site total (including deliveries) was 27,801 cases. The Surgical Services Center consists of 14 general operating rooms, a cystoscopy suite, and two minor procedure rooms. Of these, four state-of-the-art minimally invasive suites were used to accommodate a growing variety of minimally invasive surgical procedures.

MWH is a primary educational site for medical students, SRNAs, residents, and fellows. The division provides both obstetrical anesthesia and general gynecology anesthesia rotations. In addition, anesthesia residents from other programs in the city rotate through the division for subspecialty obstetrical anesthesia training. MWH also serves as the principal site for the department’s Obstetric Anesthesiology Fellowship. Fellows rotate through maternal fetal medicine as well as the neonatal ICU.
UPMC Shadyside’s anesthesiology division consists of 22 faculty members and 52 CRNAs. The division provides adult anesthesiology services for a 22-room main operating suite, a six-room ambulatory surgery center, and a two-room comprehensive urological center as well as coverage for two gastrointestinal labs, two electrophysiology labs, and invasive radiology.

During FY13, clinical anesthesiology services were performed for 22,717 cases in the main OR and ambulatory surgery center. Our off-site volume remained steady at approximately 1,300 cases.

Our caseload spans the full range of adult surgical procedures, including major thoracic, cardiovascular, neurosurgical, orthopaedic, urologic, gynecologic, oncologic, and general surgery as well as outpatient orthopaedic, plastic, dental, gynecologic, and general surgery. Subspecialty-trained and credentialed faculty members provide cardiac anesthesiology and neuroanesthesiology care. The cardiac anesthesiology team provides 24/7 coverage for cardiac surgical cases. All are board certified in transesophageal echocardiography. Drs. Edward Teeple, Mahesh Sardesai, and Sharad Khetarpal provide neuroanesthesiology expertise. UPMC Shadyside anesthesiology also provides 24-hour in-house coverage for emergency surgical cases and emergency airway management.

The division provides educational opportunities for its staff and faculty as well as for a diverse set of students from other departments. UPMC Shadyside is designated as a primary instruction site for the University of Pittsburgh School of Nursing’s nurse anesthesia program. Our CRNAs and faculty anesthesiologists actively participate in the education and training of these students. Airway management training also is provided for paramedic students from the Center for Emergency Medicine. Department faculty members also participate in the didactic educational program.

UPMC Shadyside has become a major center for clinical research, generating publications on the topics of acute pain management, surgical outcomes, OR management, and economics.
The VA 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, gastrointestinal (GI) lab, cardiac electrophysiology (EP) suite, preoperative evaluation clinic, and pain clinic. The staff also is involved in a wide range of administrative, educational, research, and quality assurance activities at both the University of Pittsburgh School of Medicine and VAPHS.

VAPHS anesthesiology managed 5,679 OR cases in FY13. Transplant activity increased 13% compared to the prior year, with a total of 94 solid organ transplants. Off-site anesthesiology coverage continued to expand, with 1,883 cases in the GI lab and 414 cases in the EP lab, a total increase of 46% compared to FY12.

Pain management continued to increase as well. The pain clinics themselves continued to run at 100% capacity, with 844 new consults and 834 follow-up encounters (1,678 compared to 1,706 in FY12). To meet the excess demand, telehealth services were expanded and a total of 138 e-consults were completed, making the total new consults number for the year 982. Interventional procedures continued to increase; 468 interventional procedures were performed, an increase of 18% compared to the previous year. Acute pain medicine/regional anesthesia expanded to all orthopaedic services, with a total of 625 patients receiving regional anesthesia with lower postoperative pain scores and decreased rebound pain compared to those from the previous multimodal perineural analgesia model.

During the course of the year, both third-and fourth year medical students rotated through VAPHS. The rotation continues to be highly successful and highly rated. The VAPHS anesthesiology division continues to provide clinical experience for two to four anesthesiology residents per month. Evaluations of both the rotations and the individual faculty members remain consistently excellent. The VA remains a prime location for PGY-4 residents looking for experience in substaffing at a junior attending level. VAPHS anesthesiologists also provide clinical training for SRNAs, dental residents, and anesthesia technology students.
At UPMC St. Margaret, which bridges the gap between community anesthesiology practice and tertiary care center, 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 ANCC Magnet Recognition status, the highest international recognition for nursing excellence and leadership, granted by the American Nurses Credentialing Center. The anesthesiology division was very active in the Magnet designation process and upcoming recertification efforts.

UPMC St. Margaret’s anesthesiology division has maintained a growing perioperative environment for the past five years at a time when the local population has continued 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 an invasive radiology suite. A large variety of surgical procedures were performed at St. Margaret, including orthopaedic (spine, total joint, sports, and foot and ankle); general; thoracic; urologic; gynecological; vascular; ophthalmologic; plastic; and ear, nose, and throat surgery. In FY13, St. Margaret’s designation as a Healthcare Bariatric Surgery Center of Excellence continued, and the hospital added a robotic bariatric surgery program. Minimally invasive knee and hip replacement surgeries were routinely performed here, and regional anesthesia with nerve blocks and postoperative pain control were used for orthopaedic and general surgery cases. The combination of the two sites encompasses a large ultrasound-based regional anesthesiology and perioperative pain control program and manages the largest of UPMC’s outpatient peripheral nerve block catheter programs. In addition, UPMC St. Margaret’s Anesthesiology division is an integral member of the hospital’s geriatric fracture program.

In FY13, UPMC St. Margaret was a rotation site for anesthesiology residents, medical students, SRNAs, dental anesthesiology residents, and pain and critical care fellows. The hospital also was a popular rotation site for senior residents in the advanced clinical track focusing on perioperative pain management and OR management. In addition, UPMC St. Margaret anesthesiologists participated in didactic sessions for the hospital medical staff and family practice residents. The group at UPMC St. Margaret has become increasingly involved in clinical research, participating in several industry-supported projects.
UPMC McKeesport is a 215-bed community hospital serving patients along the Monongahela Valley. The UPMC McKeesport anesthesiology division is staffed by four anesthesiologists, eight full-time CRNAs, and one part-time and one casual CRNA. The division provides anesthesiology services for inpatients and ambulatory surgical patients as well as at non-OR sites such as the GI unit, cardiac catheterization lab, bronchoscopy lab, and invasive radiology unit.

In FY13, UPMC McKeesport provided anesthesia for 5,331 surgical cases and off-OR site procedures. In addition, anesthesiologists performed 188 acute pain regional blocks for immediate postoperative pain control. Consultations for mostly chronic low back pain (188) and subsequent performance of epidural steroid injections (73) were provided.

Typical of a community hospital, the surgical procedures performed at UPMC McKeesport include major noncardiac vascular surgery, thoracic surgery, lumbar laminectomies, spinal fusions, total joint replacements/orthopaedic cases, abdominal surgery, gynecologic surgery, urologic surgery, ENT surgery, ophthalmologic surgery, plastic surgery, and minimally invasive chronic pain procedures. The division provides back-up support for emergency department physicians, intensivists, and hospitalists in managing patients with difficult airways. The division has been instrumental in creating difficult airway carts in strategic locations within the hospital. The division also actively participated in the implementation of a hands-off protocol for transportation of postsurgical patients from the postanesthesia care unit to the ICU/cardiovascular unit.

Teaching activities at UPMC McKeesport include teaching airway management to nonanesthesiology-trained chronic pain fellows, internal medicine and family practice residents, and EMT students. Residents in both disciplines also receive training and gain experience with insertion of invasive lines. UPMC McKeesport anesthesiologists and CRNAs are committed to the clinical teaching and training of student nurse anesthetists.
UPMC Mercy is a 488-bed tertiary care hospital in the uptown district of Pittsburgh. UPMC Mercy remains the only Catholic hospital in the region, providing specialized services such as women’s health and neurological, cardiac, and orthopaedic care as well as serving as a Neuroradiology Stroke Intervention Center, Level 1 Adult Trauma Center, and American Burn Association-verified Adult and Pediatric Burn Center. The hospital has been a focal point for student and resident teaching for the University of Pittsburgh Schools of Medicine, Dental Medicine, and Nursing for many years and continues to provide educational experience for our residents in multiple specialties, including neuroanesthesiology, cardiothoracic anesthesiology, regional anesthesiology, and acute pain management.

Seventeen clinical FTE UPMC Mercy anesthesiologists cover 16 inpatient ORs, six outpatient ORs, an obstetrical suite with two cesarean section rooms, a busy endoscopy suite, an interventional neuroradiology suite, MRI, a hydrotherapy unit for burn care, and an electrophysiology suite. A preanesthesia evaluation (PEC) center is staffed by two CRNPs with faculty oversight. The case selection includes all but solid organ transplants. Highlights include voice surgery, airway-modifying surgery, robotic surgery, and thoracic surgery. Burn care is a focal point at UPMC Mercy for both children and adults. UPMC Mercy’s Level I trauma service has a team dedicated to care for the parturient who suffers either blunt or penetrating trauma.

In FY13, UPMC Mercy clinicians supervised more than 25,000 anesthetics. The vast majority of anesthetics were performed in the ORs. The cases included 12,258 cases in the inpatient OR suite, 5,107 in the outpatient OR suite, 1,102 cardiothoracic procedures, and 7,077 endoscopy procedures. There were 1,643 deliveries during FY13. The endoscopy, electrophysiology, and radiology suites played a greater role in total anesthetic activities, which parallels a local and national trend. Anesthesia for burn hydrotherapy patients of all ages contributed to the off-site trend, with pediatric burn hydrotherapy activity increasing significantly in FY13.
FY13 was UPMC Mercy Southside Outpatient Center’s fourth full year of service after its conversion from an inpatient facility to an ambulatory surgical center. The orthopaedic sports medicine service and the ophthalmology service remain the primary source of surgical cases, along with a lesser number of podiatry cases. Off-site provision of anesthesia for GI cases continued as well. UPMC Mercy South Side continues to be the primary core site for resident peripheral nerve block training, with two residents rotating here each month, each of whom typically provides 50–80 nerve blocks.

The division continued to provide high-quality ambulatory services to patients using multimodal analgesia, aggressive prophylaxis against postoperative nausea and vomiting, and regional anesthesia (when practical) to mitigate against postoperative pain. The total number of cases performed at this center, including off-site GI cases, was 5,327 during FY13, while more than 2,000 peripheral nerve blocks were provided.

UPMC East

MICHAEL L. KENTOR, MD, Chief Anesthesiologist

FY13 was UPMC East’s first full year of service after opening on July 2, 2012. Located in the heart of Monroeville, UPMC East is a full-service community hospital providing patient-centered care. It is a 156-bed facility—140 medical/surgical beds and, 16 ICU beds—and houses seven operating rooms with 31 preop/PACU bays, two endoscopy rooms, and two integrated interventional procedural catheterization labs. The faculty at UPMC East are the same as those who staff the UPMC Mercy South Side Outpatient Center.

Case volumes at UPMC East cover a wide spectrum of surgical specialties, including general surgery, orthopaedics, podiatry, plastics, ENT, urology, thoracic, gynecology, vascular, and neurosurgery (consisting mainly of procedures of the spine). In addition, it has a very active GI lab, scheduling both inpatients and outpatients, which uses anesthesiology services for almost all of its cases. Requests for anesthesiology services in the interventional procedure suites also continue to grow. The volume at UPMC East steadily and consistently increased over FY13, surpassing the budget, and continues to grow.
The Certified Registered Nurse Anesthetist (CRNA) professional staff continued to recruit strong candidates to remain at full capacity in FY13 to meet patient care delivery needs. Three hundred eighty-six full-time equivalent CRNAs cover all service lines at UPMC.

The nurse anesthesia professionals have been actively involved in quality improvement projects to benefit both efficiency and quality of care delivery to meet the demands of a rapidly changing health care environment. Teamwork in anesthesiology was heightened, and multidisciplinary committees were formed to harness, focus, and showcase the talents of our anesthesiologists and nurse anesthetists. Simulation-based continuing education was further enhanced this year to include topics such as difficult airway management, advanced airway techniques and fiber-optic bronchoscopy, central venous catheterization, regional anesthesia, liver transplant anesthesia, and advanced adult and pediatric life support recertification.

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

The division consists of physicians and CRNAs who work primarily at UPMC Shadyside and UPMC Mercy South Side Hospitals. Expertise in peripheral nerve blocks and anesthesia for healthy pediatric patients is available as indicated. The caseload for FY13 increased to 3,558. 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 assist anesthesiologists in tracking their own outcomes, comparing them with national benchmarks, and meeting regulatory requirements. We also hope this data collection will help to better define best practices as well as identify rare but serious events to further improve anesthesia safety. With more than 2,500 cases entered into the registry to date, our outcome data compares very favorably to national benchmarks.

GREGORY J. GODLA, MD
Chief Anesthesiologist

BRENT DUNWORTH, MSN, CRNA
Senior Director, Nurse Anesthesia

UPMC South Surgery Center

Certified Registered Nurse Anesthetists

The Certified Registered Nurse Anesthetist (CRNA) professional staff continued to recruit strong candidates to remain at full capacity in FY13 to meet patient care delivery needs. Three hundred eighty-six full-time equivalent CRNAs cover all service lines at UPMC.

Mentoring continues to be a key component in the socialization and success of new members of the 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 ensuring 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 advanced practice nurses. In FY13, 42 CRNAs graduated from the program, which has consistently been ranked as a top 10 nurse anesthesia program in U.S. News & World Report’s Best Graduate Schools for the past decade.
As UPMC’s tertiary care center north of Pittsburgh, UPMC Passavant is a 434-bed state-of-the-art hospital offering world-class medical care at campuses in McCandless and Cranberry. Our staff and physicians, dedicated to quality and innovation, provide exceptional service, including all the capabilities of an academic medical center, by using cutting-edge technology in a patient- and family-centered atmosphere.

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

UPMC Passavant’s 35-bed campus in Cranberry Township includes six operating/procedure rooms; a recently expanded emergency department; a comprehensive breast center; a complete diagnostic services department, including CT, MRI, ultrasound, general and cardiac nuclear medicine, and echocardiography; and outpatient surgical services.

The UPMC Passavant anesthesiology division consists of 58 physicians and 125 CRNAs. The division supports the surgical volume and numerous cases outside the OR, including the EP lab, GI lab, and minimally invasive image-guided procedures suite. In FY13, UPMC Passavant’s combined surgical volume exceeded 18,000 procedures ranging from complex quaternary/tertiary cases to more community-based procedures. All surgical subspecialties are represented, with the exception of transplant and complex pediatric surgery. The hospital’s neurosurgical program performs both spinal and intracranial procedures. UPMC Passavant has a multispecialty robotic surgery service line.

Three anesthesiology fellowship programs (acute pain/regional anesthesiology, pain medicine, and cardiac anesthesiology) are active at UPMC Passavant. The hospital is a rotation site for senior anesthesiology residents and University of Pittsburgh and La Roche College anesthesia MSN students.
UPMC Bedford Memorial is a 49-bed acute care general hospital located in Bedford County, Pa. The hospital has units for medical, surgical, obstetric, intensive care, coronary care, and telemetry services and offers a variety of diagnostic capabilities, including CT, MRI, and the region’s only digital mammography with 3-D 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. Two MDs and seven CRNAs provide both anesthesia and surgical perioperative care in the UPMC Bedford Memorial anesthesiology division. UPMC Bedford Memorial was one of the first hospitals in the UPMC system to implement an electronic medical record system.

In FY13, 3,555 cases were performed: 567 inpatient OR procedures, 2,231 outpatient procedures, 25 inpatient GI procedures, and 732 outpatient GI procedures. The obstetric case count was 310 total births, with 182 vaginal and 128 C-section deliveries.

The UPMC Bedford Memorial anesthesiology division was instrumental in the design and installation of a new GI lab/endoscopy suite (two rooms) on the hospital’s second floor, which opened in December 2012. The new lab offers a larger operating area to accommodate more complicated cases and to administer general anesthesia when needed. In addition, an anesthesiology-run preoperative clinic opened in late June 2013.

UPMC Bedford Memorial hospital and its medical staff are committed to teaching residents from UPMC St. Margaret, medical students from the University of Pittsburgh School of Medicine and Philadelphia College of Osteopathic Medicine, and physician assistant students from Saint Francis University and the UPMC Physician Assistant Program. Students rotate through surgery, obstetrics and gynecology, emergency medicine, radiology, pathology, and family medicine.
UPMC Northwest is a 180-bed community-based hospital in Seneca, Pa., that opened in October 2004, merging the Franklin and Oil City hospitals. Since that time, the hospital has provided state-of-the-art medical care to the citizens of Venango County and the surrounding areas in a spacious new facility that includes a 28-bed inpatient behavioral health unit, a nine-bed inpatient rehabilitation unit, and a 16-bed inpatient transitional care unit. UPMC Northwest provides comprehensive cardiology and radiology services and a wide range of technical and medical services, including a nationally recognized stroke program, cancer center, and diabetes center.

As Venango County’s only hospital, UPMC Northwest represents more than a place of healing. One of the top three employers in Venango County, the hospital generates $152.3 million annually and employs a total of 725 workers at the hospital and an additional 246 at UPMC facilities such as the Visiting Nurses Association of Venango County and Sugarcreek Station Skilled Nursing and Rehabilitation Complex.

Although open since 2004, the UPMC Department of Anesthesiology only began oversight of anesthesiology services at UPMC Northwest in spring of 2012. The UPMC Northwest anesthesiology division is staffed by four full-time anesthesiologists and seven full-time nurse anesthetists covering five general ORs, one cesarean section OR, three labor and delivery suites, two endoscopy suites, and one cystoscopy suite. Therefore, a wide range of anesthesia cases are performed, covering general, urologic, radiologic, thoracic, vascular, neurologic, obstetric, orthopaedic, ENT, plastic, and ophthalmologic surgery. Most of the cases performed are ambulatory in nature (85.7%).

During FY13, 6,743 total cases were performed at UPMC Northwest. Of those cases, 2,261 required general anesthesia and 961 were inpatients. In addition, due to recent recruitment efforts, the Department of Obstetrics and Gynecology expanded, resulting in a record 597 deliveries for FY13. Of those deliveries, 198 patients were delivered via cesarean section and 363 epidurals were placed for labor and delivery analgesic purposes.

As an educational resource, UPMC Northwest provides on-site training for those wishing to pursue careers in nursing, phlebotomy, radiation technology, and respiratory therapy. Moreover, there are 13 annual internships for physical therapy students and three residency rotation positions in orthopaedics as well as pharmacy internships, family practice residency rotations, and physician assistant clinical rotations.
The Division of Cardiothoracic Anesthesiology is composed of 33 faculty subspecialty experts at five hospitals: UPMC Presbyterian, UPMC Shadyside, UPMC Passavant, UPMC Mercy, and the VA Pittsburgh Healthcare System (VAPHS). The total number of cardiac and thoracic surgical procedures performed at these hospitals (excluding VAPHS) was 2,948 cardiac and 4,988 thoracic cases in FY13. Surgical procedures spanned the full spectrum of adult cardiothoracic practice: coronary artery bypass graft surgery (including minimally invasive coronary and off-pump coronary artery bypass), conventional cardiac valve replacement and repair, minimally invasive/robotic valve and MAZE surgery, thoracic aorta repair/reconstruction, pulmonary thromboendarterectomy, repair of ventricular and atrial septal defects, removal of cardiac tumors/myxomas, transcatheter aortic valve implantation, pulmonary resection, pneumonectomy, minimally invasive esophagectomy, complex endoscopy procedures, tracheal resection, and minimally invasive procedures for digestive disorders.

UPMC Presbyterian is a recognized world leader in heart, lung, and heart/double lung transplants and is the designated UPMC site for these procedures. During FY13, 131 cardiothoracic transplants were performed: 30 heart transplants and 101 lung transplants, which included two heart/double lung transplants. UPMC Presbyterian was one of the leading centers in the nation in the number of lung transplants performed at a single center during FY13. This campus also is the primary site for the surgical treatment of patients with end-stage heart failure. A variety of mechanical ventricular assist devices are used as a bridge to transplantation or for “destination” therapy; 44 devices were implanted at UPMC Presbyterian. Cardiothoracic anesthesiologists perform diagnostic intraoperative transesophageal echocardiography (TEE) on all patients undergoing cardiac and transplant surgery.

The division offers world-class basic and advanced training in adult cardiothoracic anesthesiology. Most PGY-3 residents receive their initial exposure to cardiac anesthesiology at UPMC Presbyterian. PGY-4 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-4 year in an ACGME-accredited program. Cardiothoracic anesthesiology fellows obtain extensive experience with TEE to develop their skills in advanced diagnostic 2-D and 3-D intraoperative TEE. In addition to their intraoperative experience performing and interpreting TEEs under the supervision of the cardiothoracic anesthesiology faculty, all fellows may choose to spend one month in the UPMC Presbyterian echocardiography laboratory learning transthoracic echocardiography (TTE) skills.
During FY13, ISMETT continued to build on the success of past years. ISMETT’s clinical responsibilities are quite diverse and include OR anesthesia; 24-hour ICU staffing; and coverage of all invasive procedures in radiology, the cardiac catheterization lab, gastrointestinal clinical laboratory, and PACU.

During FY13, ISMETT’s Department of Anesthesiology and Critical Care Medicine treated a total of 2,511 cases. One hundred twenty-eight transplants were carried out, including 25 cadaveric kidney transplants, 15 living donor kidney transplants, 59 cadaveric liver transplants, three living donor liver transplants, 13 lung transplants, 10 heart transplants, and three combined kidney/pancreas transplants. Additionally, UPMC Palermo treated 1,039 ICU admissions, 921 cardiothoracic surgeries, and 423 abdominal surgeries. ISMETT continued to receive patient referrals for both adult and pediatric complex surgery or ICU treatments.

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

In FY13, ISMETT continued to host students and anesthesiology residents who wish to spend part of their elective time in Palermo, Italy. Residents from other Italian medical schools also have participated in ISMETT ICU and OR rotations. Active planning is still under way to bring ISMETT faculty to the United States for varying terms. The ISMETT anesthesiology and critical care medicine department grew clinically and academically thanks to the close relationship and teamwork between the UPMC anesthesiology faculty in Palermo and Western Pennsylvania.
UPMC Dublin is located in Sandyford, Dublin, Ireland. It is a full-service hospital with a 214-bed capacity, including two critical care units comprising 14 isolated beds. The hospital contains eight operating theaters—specific rooms dedicated for neurosurgery, urology, cardiothoracic, general, orthopaedic, and ophthalmic surgery. Anesthesiology services also are provided for endoscopy, interventional radiology, and cardiology. The ER facilities and the hospital act 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 FY13, 11,769 procedures were carried out at UPMC Dublin, a 7% increase in activity from FY12. An ICU group was formed to provide structured ICU and on-call services. The group established critical care standards, implemented audits, and led the hospital’s ICU Committee, retaining a role in quality assurance and expert analysis of complex cases.

Three anesthesiology registrars (trainee specialists) were employed; one registrar was in house at all times to cover the ICU and emergencies and to assist in the operating theater when needed. A specific group of registrars provided services as required to cover leave. The registrars’ scope of duty was modified to broaden the depth of patient care and improve the perioperative care of our patients.

Anesthesiology and ICU coverage was available at all times by dual roster. A small group provided specific cardiac coverage on a voluntary basis. UPMC Dublin continues to grow, and anesthesiology/ICU services grow with it to provide a comprehensive, patient-focused service for the hospital.
In FY13, the mission of the Acute and Interventional Perioperative Pain Service (AIPPS) remained 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, UPMC Mercy, and UPMC Passavant; in 2013, a new regional service opened at UPMC South Surgery Center in Bethel Park. Plans are under way to train at least two anesthesiologists in regional anesthesiology/acute interventional perioperative pain to help support the regional service at UPMC East.

In FY13, AIPPS performed 26,805 blocks; 11,710 blocks were performed using an ultrasound-guided technique. The division performed a total of 7,093 paravertebral blocks, including 5,317 continuous paravertebral blocks and 1,776 single paravertebral blocks.

In August 2013, the division organized an ultrasound workshop for pediatric and regional anesthesiology fellows. In April 2013, the division held the Ninth Update in Regional Anesthesia and Ultrasound Techniques: Update in Acute and Chronic Pain and Liver Transplantation Anesthesiology at Nemacolin Woodlands Resort, which included an ultrasound workshop. In addition, several members of the division participated in various national and international ultrasound workshops.

Fifteen regional anesthesiology fellows, two mini fellows, and nine clinical base year residents rotated through AIPPS in FY13.
The UPMC Chronic Pain Medicine Program, consisting of nine faculty members, is a multidisciplinary clinical, teaching, and research endeavor spread over eight clinic locations: UPMC St. Margaret, Centre Commons in East Liberty, Oakland campus, Monroeville, UPMC Passavant, UPMC Mercy, UPMC Shadyside, and UPMC South 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 health care system; and facilitate, as appropriate, the patient’s return to gainful employment and usual household and leisure activities.

During FY13, Department of Anesthesiology Chronic Pain Medicine physicians completed 49,493 visits. Interventional modalities are carried out at all eight 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.

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

The Chronic Pain Medicine Program offers a one-year pain medicine fellowship that is fully accredited by the Accreditation Council of Graduate Medical Education (ACGME). The program was recently reaccredited for the maximum five-year time frame with no citations and with commendation. This is the third time the program has received this honor. UPMC has one of the largest chronic pain fellowships in the country, graduating nine fellows per year.

Fellows rotate through the outpatient services at UPMC St. Margaret, Centre Commons, Oakland campus, Monroeville, and UPMC Passavant and provide inpatient consultation at UPMC St. Margaret, UPMC Shadyside, UPMC Mercy, WPIC, UPMC Passavant, UPMC Passavant Cranberry, UPMC Montefiore, and UPMC Presbyterian.
FY13 was a productive year for basic research in the Department of Anesthesiology. It received a total of $6,325,664 in extramural grants, $5,769,520 of which was from the National Institutes of Health (NIH) (totals include direct and indirect funds).

Department of Anesthesiology researchers authored 68 peer-reviewed publications in FY13, 58 of which were published in journals with impact factors above three. Please see the publications section of this report for a detailed list of publications.

The Department of Anesthesiology held a multidepartmental trainee research day on May 16, 2013, in conjunction with the Departments of Critical Care Medicine, Emergency Medicine, and Physical Medicine and Rehabilitation and as part of the annual Safar Symposium. A range of trainees (postdoctoral scholars and associates, graduate students, undergraduates, and other research fellows) presented research posters and lectured on cutting-edge research being conducted in their respective departments. The event featured 51 posters and four oral presentations, with almost half of the abstracts submitted from Department of Anesthesiology trainees.

The department continues to place a major focus on research training, fostering research activity among the next generation of anesthesiology investigators and physician-scientists. The director of resident research and the junior chief resident for research facilitate resident research and scholarly activities, and the department offers research opportunities to University of Pittsburgh medical students throughout the year, matching students with anesthesiology faculty for their scholarly projects. The department, one of 35 departments in the nation, was again selected to serve as a host site for the Foundation for Anesthesia Education and Research (FAER) Medical Student Anesthesia Research Fellowship (MSARF) program. The 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. Finally, the department is one of only 13 anesthesiology departments in the nation with an NIH T32 training grant and the only department to hold two T32 training grants.
Basic Research Investigators

**Inna Belfer, MD, PhD:** Genetic and Nongenetic Factors Contributing to Chronic Postmastectomy and Postlumpectomy 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 Sympathetic Postganglionic Neurons in the Link between Stress and Migraine; The Impact of Persistent Inflammation on the Regulation of Intracellular Ca^{2+} 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 Posttraumatic Pain Relief with Alternative Perineural Drugs (collaboration with Brian Williams, MD); Mechanisms of Chemotherapeutic-induced Peripheral Neuropathy; Effects of Artemin on Nociceptors (collaboration with Kathryn Albers, PhD); Herpes Simplex Virus Vectors for the Selective Silencing of Subpopulations of Afferents (collaboration with Joseph Glorioso, PhD)

**Gregg E. Homanics, PhD:** G Protein Modulation of Glycine Receptor Function and Ethanol Action; Ethanol Mechanisms in GABAA-R Gene-targeted Mice; Genetically Engineered Rodents Core; Single Molecule Detection of Ion Channels in Neurons (collaboration with Allison Barth, PhD)

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

**Jun-Ho La, DVM, PhD:** Role of Cytokines in Functional Visceral Pain; Involvement of ERK Phosphorylation in Colorectal Mechanosensation; Role of TRPV1 and TRPA1 in the Transition of Acute to Chronic Pancreatitis and Pain; Inhibition of Colorectal Afferent Sensitization by Guanylate Cycase-C Activation

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

**Joseph Samosky, PhD:** BodyExplorer: A Sensor and Augmented Reality Enhanced Interactive Simulator for Learning Anatomy, Physiology, and Clinical Procedures; A Novel, Intravenous Drug Recognition System for Medical Simulators Based on Direct Fluid Identification; A Simulator for Training Needle Chest Decompression for Tension Pneumothorax; PleurAlert: An Augmented Chest Drainage System with Electronic Sensing, Automated Alerts, and Internet Connectivity; A Comprehensive Training Simulator of Peripheral Anesthesia with Ultrasound and Neurostimulator Guidance: A Hybrid Physical/Virtual Reality System

**Erica S. Schwartz, PhD:** Asymmetric Anesthetic Binding Facilitates Conformational Transitions in Pentameric Ligand-gated Ion Channels; Signal Transduction Pathways in Pentameric Ligand-gated Ion Channels

**Pei Tang, PhD:** Asymmetric Anesthetic Binding Facilitates Conformational Transitions in Pentameric Ligand-gated Ion Channels; Signal Transduction Pathways in Pentameric Ligand-gated Ion Channels

**Yan Xu, PhD:** Nuclear Magnetic Resonance Studies of Mechanisms of General Anesthesia; Registration of Olfactory Events during General Anesthesia; Anesthetic Effects on Ion Channel Structures and Dynamics (collaboration with Pei Tang, PhD); Reversal of Ion Charge Selectivity Renders the Pentameric Ligand-gated Ion Channel GLIC Insensitive to Anesthetics; Cannabinoids Suppress Inflammatory and Neuropathic Pain by Targeting A3 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 continues to maintain its own industry-sponsored Clinical Trials Program (CTP). The self-contained program has been designed to provide, within the department, all the services necessary for faculty members as both principal investigators and subinvestigators to fully execute clinical trials. Services include contract and budget negotiations, clinical research coordinator support, and Institutional Review Board (IRB) submissions. CTP also is committed to developing new study opportunities by promoting departmental resources to the pharmaceutical industry as a whole. In FY13, we built relationships with six additional pharmaceutical companies with whom we have contracted trials. Next year brings even more new opportunities. In addition, CTP supports the regional anesthesiology fellowship programs’ introduction to and involvement with clinical research.

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

During FY13, CTP experienced unique challenges, as the number of active clinical trial studies increased from 14 in FY12 to 21 in FY13. CTP contracted 13 new clinical trials and completed 10 of the 21 ongoing clinical trials. More than 70 faculty members at six UPMC sites conducted trials with sponsor companies. FY13 contracted grants totaled $1,905,342 (direct contracted revenue, $1,492,969; indirect contracted revenue, $412,373). This represents a 177% increase from FY12.
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<th>PRINCIPAL INVESTIGATOR(S)</th>
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<tr>
<td>Bruce Ben-David, MD (UPMC Shadyside); Emerson S. Conrad III, MD (UPMC Mercy); Kevin King, DO (UPMC Passavant); Darrin Taormina, MD (UPMC St. Margaret)</td>
<td>AcelRX Pharmaceuticals, Inc.</td>
<td>A Multicenter, Randomized, Double-blind, Placebo-controlled Trial to Evaluate the Efficacy and Safety of the Sufentanil NanoTab PCA System/15 mcg for the Treatment of Postoperative Pain in Patients after Knee or Hip Replacement Surgery</td>
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<td>Jacques E. Chelly, MD, PhD, MBA (UPMC Shadyside); Patricia Dalby, MD [Magee-Womens Hospital of UPMC (MWH)]</td>
<td>GlaxoSmithKline LLC</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 Postoperative Nausea and Vomiting after Failed Prophylaxis with an Ondansetron-containing Regimen in Patients Undergoing Nonemergency Surgical Procedures</td>
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<td>Peter J. Davis, MD [Children’s Hospital of Pittsburgh of UPMC (CHP)]</td>
<td>Cumberland Pharmaceuticals</td>
<td>A Multicenter, 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>
</tr>
<tr>
<td>Peter J. Davis, MD (CHP)</td>
<td>Arizant Healthcare Inc./3M</td>
<td>3M SpotOn Temperature Monitoring System</td>
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<tr>
<td>Peter J. Davis, MD (CHP)</td>
<td>Hospira Inc.</td>
<td>Dexmedetomidine as a Rapid Bolus for Treatment and Prophylactic Prevention of Emergence Agitation in Anesthetized Children</td>
</tr>
<tr>
<td>Peter J. Davis, MD (CHP)</td>
<td>J&amp;J Pharmaceutical Research</td>
<td>Open-label Evaluation of the Pharmacokinetics Profile and Safety of Tapentadol Oral Solution of the Treatment of Postoperative Pain in Children and Adolescents Aged from 6 to Less Than 18 Years</td>
</tr>
<tr>
<td>Rama Joshi, MBBS, MPM (UPMC Shadyside)</td>
<td>AbbVie Inc.</td>
<td>A Phase 2b, Randomized, Double-blind, Placebo-controlled, Safety and Efficacy Trial of Multiple Dosing Regimens of ABT-719 for the Prevention of Acute Kidney Injury in Subjects Undergoing High-risk Cardiac Surgery</td>
</tr>
<tr>
<td>Lois Pizzi, RN (UPMC Shadyside)</td>
<td>Avancen MOD Corporation</td>
<td>A Prospective Randomized Trial of an Oral PCA Device versus SOC Delivery of As-needed Oral Pain Medications following Total Hip Arthroplasty</td>
</tr>
<tr>
<td>Nashaat N. Rizk, MD (UPMC St. Margaret)</td>
<td>Purdue Pharma L.P.</td>
<td>A Randomized, Double-blind, Double-dummy, Placebo-controlled, Active-controlled, Parallel-group, Multicenter Trial of Oxydone/Naloxone Controlled-release Tablets to Assess the Analgesic Efficacy (Compared to Placebo) and the Management of Opioid-induced Constipation (Compared to Oxydone Controlled-release Tablets) in Opioid-experienced Subjects with Moderate to Severe Chronic Low Back Pain and History of Opioid-induced Constipation Who Require Around-the-Clock Opioid Therapy</td>
</tr>
<tr>
<td>Erica L. Sivak, MD (CHP)</td>
<td>Hospira Inc.</td>
<td>Phase IV, Open-Label, Safety Study Evaluating the Use of Dexmedetomidine in Pediatric Subjects Undergoing Procedure-Type Sedation</td>
</tr>
<tr>
<td>Anna Uskova, MD (UPMC Shadyside)</td>
<td>Pacira Pharmaceuticals, Inc.</td>
<td>A Multicenter, Randomized, Double-Blind, Parallel-Group, Placebo-Controlled, Dose-Ranging Study to Evaluate the Safety, Efficacy, and Pharmacokinetics of Single Injection Femoral Nerve Block with Liposome Bupivacaine for Postsurgical Analgesia in Subjects Undergoing Total Knee Arthroplasty</td>
</tr>
<tr>
<td>Mihaela Visoiu, MD (CHP)</td>
<td>Cadence Pharmaceuticals, Inc.</td>
<td>A Randomized, Placebo-controlled, Multicenter Study of the Efficacy, Pharmacokinetics, and Pharmacodynamics of Intravenous Acetaminophen for the Treatment of Acute Pain in Pediatric Patients</td>
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<tr>
<td>Jonathan H. Waters, MD (MWH)</td>
<td>Haemonetics</td>
<td>Clinical Evaluation of the OrthoPAT Advance System in Orthopaedic Procedures</td>
</tr>
<tr>
<td>Jonathan H. Waters, MD (MWH)</td>
<td>Coramed Pharmaceuticals</td>
<td>Equivalency Study of the CORA and TEG 5000 Systems</td>
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<tr>
<td>Charles I. Yang, MD (CHP)</td>
<td>Purdue Pharma L.P.</td>
<td>An Open-label, Multicenter Study of the Safety of Twice Daily Oxydone 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>
</tr>
<tr>
<td>Charles I. Yang, MD (CHP)</td>
<td>Endo Pharmaceuticals, Inc.</td>
<td>A Multicenter Study of the Safety, Tolerability, Effectiveness, and Pharmacokinetics of Oxymorphone HCL Extended-Release Tablets in Pediatric Subjects Requiring an Around-the-Clock Opioid for an Extended Period of Time</td>
</tr>
</tbody>
</table>
Nicholas G. Bircher, MD, FCCM: Improving Overall and Neurological Outcomes after Resuscitation and Critical Care; Analysis of the Get With the Guidelines-Resuscitation Database (collaboration with Yan Xu, PhD); Delphi Method Validation of the Revised Cerebral Performance Categories (collaboration with Margo B. Holm, PhD); Development of a Reliable and Valid Instrument to Determine Whether Diagnosis and Severity Is Accurately Assessed in Preoperative Anesthesia Evaluation (collaboration with A. Murat Kaynar, MD, MPH, and Sean M. DeChancie, DO); Effect of a Structured Facebook Study Assistance Program (collaboration with Rose Ferrara-Love, RN, DNP)

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

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

Patricia L. Dalby, MD: Patient and Family Satisfaction with “Condition O” Emergency Care Questionnaire Development; Genetic Determinants of Antepartum, Parturition, and Postpartum Pain and Labor Analgesia (collaboration with Inna Belfer, MD, PhD)

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

Stephen A. Esper, MD: Role of Administration of Beta-blockers Intraoperatively during Cardiac Surgery and Their Association or Nonassociation with Mortality and Morbidity at 30 Days and One Year

Ferenc E. Gyulai, MD: Rodent Studies to Elucidate the Impact of Anesthesia on Spinal Pain Gating in the Presence of Inflammation; Human in vivo Imaging Studies of Memory Circuits That May Be Responsible for the Amnestic Effects of Midazolam (collaboration with Carnegie Mellon University); Development and Validation of a Computer-driven Approach toward Robust Electroctographic-based Brain Control of an Anthropomorphic Prosthetic Arm and Hand in Individuals with Spinal Cord Injury (research collaboration among the Departments of Physical Medicine and Rehabilitation, Neurosurgery, Neurobiology, and Bioengineering); Assessment of Peri- and Intraoperative Ketamine Use for Improved Pain Relief in Patients Undergoing Spinal Fusion with the History of Chronic Opioid Use (collaboration with the Department of Neurosurgery); Validation of Diffuse Correlation Spectroscopy and Diffuse Optical Spectroscopy (research collaboration with the University of Pennsylvania)

Ibtesam A. Hilmi, MB, CHB, FRCA: Outcomes of Jehovah Witness Orthotopic Liver Transplantation (OLT) Recipients; Primary Graft Nonfunction in Adult Recipients Undergoing OLT: a Single Center Experience; STOPBang Questionnaire to Preoperatively Identify Patients at Risk for Obstructive Sleep Apnea at a Tertiary Care Medical Center; Incidence, Risk Factors, and Outcome of Acute Kidney Injury in Patients Undergoing Live Donor Liver Transplantation; Evaluation of Postoperative Coagulation Profile in Living Liver Donors

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; Imaging Pain Phenotype and Genotype: Identifying the Brain Areas That Underlie Individual Differences in Pain

Qing Liu, MD, PhD: Advancing the Understanding of the Mechanisms Underlying Loss of Local Anesthetic Potency

Venkat R.R. Mantha, FFARCSI: Nanoanesthesia: Ankle Block in the Rat with Magnetic Nanoparticle/Ropivacaine Complex
Other Research by Full-time Academic/Clinical Faculty

**Dawn A. Marcus, MD:** Use of a Self-administered Screening Questionnaire to Identify Chronic Pain Patients Likely to Have Fibromyalgia; The Effects of Brief Therapy Dog Visits on Fibromyalgia Patients Attending a Tertiary Outpatient Pain Management Facility Compared with Time Spent in a Waiting Room; The Role of Milnacipran for Fibromyalgia; Behavior of Adult Migraineurs' Dogs Before and During Migraines; Use Patterns and Potential Impact of Accessing Online Migraine Resources on Migraine Management; Relationships between Migraine and Motion Sensitivity

**William McIvor, MD:** Assessing Performance in Board-certified Anesthesiologists during Simulations of Perioperative Crises; Automation of the Debriefing Process after Mannequin Simulations; Comparing the Effectiveness of Screen vs. Mannequin Simulation

**Etsuro Motoyama, MD:** Effect of Serial Vertical Expandable Prosthetic Titanium Rib (VEPTR) Expansion Thoracoplasty on Lung Growth and Function in Children: A Longitudinal Study; Longitudinal Effect of VEPTR Thoracoplasty on Lung Growth and Function vs. Outcome of Kyphoscoliosis in Children with Early Onset Scoliosis; The Effect of Rocuronium and Cisatracurium on Lung Function in Anesthetized Children

**Steven L. Orebaugh, MD:** Assessment of a Checklist-based Educational Tool for Ultrasound-guided Interscalene Peripheral Nerve Blockade; Assessing the Need for Postoperative Sciatic Nerve Block for Pain Relief after Nonhamstring ACL Repair; A Cadaver Simulation Laboratory for Airway Management Skills Training in Critical Care Medicine Fellows; Interscalene Nerve Block in Patients with Obstructive Sleep Apnea Undergoing Ambulatory Shoulder Arthroscopy

**Jerome Parness, MD, PhD:** Mechanism of Dantrolene Action; Molecular Mechanisms in the Genesis of Malignant Hyperthermia; Intracellular Calcium Regulation

**Tetsuro Sakai, MD, PhD:** Prospective, Randomized, Comparative Study between Epidural and Bilateral Paravertebral Blocks for Perioperative Pain Management in Patients Undergoing Open Liver Resection; 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 the Control Group; Prospective Observational Study Comparing Rotational Thromboelastometry and Thromboelastometry for Coagulation Parameters in Patients Undergoing Liver Transplantation

**Kenichi Tanaka, MD, MSc:** Thrombin Generation after Cardiac Surgery in Pediatric Patients; Fibrinogen Replacement after Adult Cardiac Surgery

**Manuel C. Vallejo Jr., MD, DMD:** 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

**Haibin Wang, MD, PhD:** Modulating Visceral Hypersensitivity with Spinal Cord Stimulation

**Jonathan Waters, MD:** Shear-induced Hemolysis in Pregnant and Nonpregnant Patients; Implementation of a Patient Blood Management Program for UPMC; Comparative Effectiveness of Allogeneic Transfusion to Blood Recovery during Gynecologic Cancer Debunking Surgery

**Brian A. Williams, MD, MBA:** Outcomes after ACL Reconstruction: Femoral Nerve Block; Process Reengineering 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 Toll-like Receptor 4 Signaling in Ventilator-induced Lung Injury
The North American Malignant Hyperthermia Registry (NAMHR) consists of more than 3,000 reports of in vitro testing for malignant hyperthermia (MH) susceptibility and more than 750 reports of adverse metabolic reactions in anesthetized patients (AMRA) as well as more than 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 United States are being added to the NAMHR database.

NAMHR was selected, through a competitive process, by the Global Rare Disease Registry (GRDR) to be one of 12 existing groups to participate in this open, deidentified, Web-based registry of common data elements describing subjects with different rare diseases. In 2013, NAMHR prepared a report on 268 subjects for GRDR.

NAMHR acquires data under the rules of the University of Pittsburgh Institutional Review Board and makes it available for research purposes. NAMHR has supported several studies by UPMC investigators and elsewhere, including investigation of RYR1 variants in patients and families with MH susceptibility, a survey of complaints of muscular pain or weakness in patients with positive versus negative muscle contracture test results, 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 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” (Postanesthesia Care Unit) but also predicts successful same-day discharge (i.e., no unplanned hospital admission). In August 2010, the WAKE score was rolled out for daily clinical use en route to becoming the official recovery criteria for UPMC. This important initiative for standardizing recovery criteria systemwide 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 FY13, 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 obtained grant funding from the U.S. Department of Defense in FY13 to establish a clinical research program at the VA Pittsburgh Healthcare System to test comparative efficacy of multimodal analgesic nerve blocks in veterans.

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 10 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 postsurgical 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 FY13 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.

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

Due to changes in the accreditation system, the Accreditation Council for Graduate Medical Education (ACGME) extended our residency program accreditation to the maximum time available (until the year 2022). Increasing emphasis in graduate medical education on integrating residents and fellows into patient safety and quality activities in the clinical learning environment led to increased involvement of residents and faculty in patient safety activities and the development of a residency program patient safety committee in FY13. Our annual Resident and Fellow Graduation Ceremony was held on June 7, 2013, at the University Club. Twenty residents and 25 fellows graduated.

Our residents lead the nation in scholarly activity. Collectively, this past year, they published 18 peer-reviewed papers and more than 30 book chapters and presented at national meetings more than 50 times.

We host 10 fellowship training programs. Our ACGME-accredited fellowships are in the specialties of adult cardiothoracic anesthesiology; anesthesiology critical care medicine; pediatric anesthesiology; pain medicine; and obstetrical anesthesiology, which just received its initial accreditation in 2012. Additional fellowships include those in hepatic transplantation anesthesiology; neuroanesthesiology; research; orthopaedic anesthesiology; and acute pain and regional anesthesiology, one of the largest U.S. programs in the specialty.
Grand Rounds Online

The Anesthesiology Grand Rounds Online course program continued in FY13. The program allows faculty, fellows, residents, and medical students in the department to view digitally recorded grand rounds presentations online 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 of the date of posting. The modules are kept online indefinitely as an educational resource.

In the 2012–13 academic year, approximately 210 faculty members viewed 34 presentations, obtaining more than 2,800 hours of CME credit. Formal evaluations and informal feedback from the faculty have been very positive.

Academy of Master Educators

The Academy of Master Educators recognizes and rewards excellence in education, advances education through innovation and professional development of faculty, and supports and promotes educational scholarship. Seven University of Pittsburgh Department of Anesthesiology faculty members are members of the 62-member University of Pittsburgh School of Medicine Academy of Master Educators. Steven L. Orebaugh, MD, and Paul E. Phrampus, MD, were appointed for a five-year term effective January 1, 2009. Michael P. Mangione, MD; William R. McIvor, MD; and Rita M. Patel, MD, were reappointed for a five-year term effective January 1, 2011. Shawn T. Beaman, MD, and Manuel C. Vallejo Jr., MD, DMD, were appointed in 2012. Members of the academy must be involved in the education of medical students, graduate students, and/or residents for the duration of their appointment to the academy. Drs. Beaman, Mangione, McIvor, Orebaugh, Patel, Phrampus, and Vallejo 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. The Introduction to Teaching Program is provided for all residents and fellows who join UPMC Medical Education (approximately 600) in June and July of every academic year.
The Department of Anesthesiology's medical student programs are recognized as being 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 the 2012–13 Academic Year. 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. 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/Montefiore.

The Clinical Procedures course is designed for second-year medical students just prior to the start of clinical rotations. This four-week course consists of brief introductory lectures followed by hands-on sessions. Medical students studied the details of airway assessment and endotracheal intubation, received a brief introduction to hemodynamic monitoring and interpretation of blood-gas reports, learned how to assess back pain and perform lumbar punctures and Foley catheter insertion, used universal precautions, and performed intravenous cannulation and venipuncture. The department is unique among anesthesiology departments because of the faculty’s extensive involvement in medical student education. Very few U.S. medical schools have preclinical 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 88%.

The mandatory Surgery and Perioperative Care Clerkship consists of an eight-week course with fully integrated surgery and anesthesiology portions. 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 feedback. Students continue to rate the overall quality of the clerkship as good or outstanding.

One month long electives provide in-depth exposure to anesthesiology. Four electives are offered in general anesthesiology, anesthesiology research, subspecialties in anesthesiology, and pain medicine. Thirty-one students participated in electives in FY13; 29 took the general anesthesiology course, one took the research course, and one took the pain medicine course. As evidenced by evaluations, these electives continue to be well received, due primarily to the enthusiastic involvement of the faculty.
**SCHOLARLY PROJECTS**

Anesthesiology faculty members mentored the following medical student scholarly projects in FY13:

<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>Inna Belfer, MD, PhD</td>
<td>Duane Koh</td>
<td>Measuring Changes in Pain Sensitivity throughout Antepartum and Postpartum Periods</td>
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<tr>
<td>Gregg Homanics, PhD</td>
<td>David Mazariagos</td>
<td>Epigenetic Effects of Alcohol</td>
</tr>
<tr>
<td>James Ibinson, MD, PhD</td>
<td>Kevin Taylor</td>
<td>A Study of the Functional Connectivity of the Insula and the Anterior Cingulate Gyrus during Pain Processing</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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Kevin Taylor’s scholarly project won awards for Best of Meeting in Patient-oriented Research and Best of Category in Pain Mechanisms and also was a finalist for the Best of Meeting Award at the 2013 International Anesthesia Research Society (IARS) Annual Meeting. The abstract was chosen by the 2013 meeting judges for these distinctions from more than 400 submissions.

**AWARDS**

**Best Student in Anesthesiology Award:** Benjamin Cobb  
**Department of Anesthesiology Peter M. Winter Award for Excellence in Medical Student Teaching:** Hulimangala Rakesh, MD

**MATCHING**

Eight UPSOM students (Class of 2013) matched into anesthesiology residencies:

<table>
<thead>
<tr>
<th>Student</th>
<th>Match</th>
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<tbody>
<tr>
<td>Benjamin Cobb</td>
<td>Hospital of the University of Pennsylvania, Philadelphia, Pa.</td>
</tr>
<tr>
<td>Jacob Esquenazi</td>
<td>Einstein/Montefiore Medical Center, Bronx, N.Y.</td>
</tr>
<tr>
<td>Amy He</td>
<td>Loyola University Medical Center, Maywood, Ill.</td>
</tr>
<tr>
<td>Cyrus Hui</td>
<td>University of Washington Affiliated Hospitals, Seattle, Wash.</td>
</tr>
<tr>
<td>Dev Patel</td>
<td>University of Virginia, Charlottesville, Va.</td>
</tr>
<tr>
<td>Jonathan Scholl</td>
<td>Western Pennsylvania Hospital, Pittsburgh, Pa.</td>
</tr>
<tr>
<td>Lisa Tseng</td>
<td>Barnes-Jewish Hospital, St. Louis, Mo.</td>
</tr>
<tr>
<td>Ying Xu</td>
<td>Penn State Hershey Medical Center, Hershey Pa.</td>
</tr>
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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 ACGME to provide training and education in anesthesiology leading to certification by the American Board of Anesthesiology.

Excellent clinical teaching and experience combined with a high number and variety of cases have always been prominent features 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 postanesthesia care unit.

Twenty residents graduated from the program in 2013. As in previous years, academic year 2012–13 was a period of excellence and innovation in education as well as adaptation to the emergent and evolving changes that characterize contemporary graduate medical education.

The academic year was notable for the continuation of our excellent didactic program. Core topics for the postgraduate year (PGY)-1, PGY-2, PGY-3, and PGY-4 residents were presented in seminar and lecture series formats. The lectures are cataloged online, allowing residents unlimited access and review. Fourth-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 Anesthesiologists' Problem-based Learning Discussion format to facilitate active learning in small groups. The educational program is augmented by weekly grand rounds in which local speakers and visiting professors provide up-to-date reviews of relevant topics. Again this year, a monthly journal club was included in the Grand Rounds curriculum. During these sessions, residents research and present important articles with the goals of increasing their understanding of scientific literature and sharpening their presentation skills.

The PGY-2 and PGY-4 curriculum continues to include mock oral examination sessions proctored by department faculty in the fall and spring of each year. Subspecialty rotations during the PGY-3 year also continue to include mock oral board examinations as part of the rotation. A standard requirement in the residents’ curriculum is participation in at least one session of the Clinical Procedures course sponsored by the School of Medicine. This provides them with the opportunity to teach medical students in a traditional classroom setting in addition to clinical teaching during the medical student clerkships and electives.

Many resident courses are conducted at WISER. These courses provide both didactic and hands-on experience in the management of problems that are either uncommon or common but difficult. In simulation courses offered this year, residents were able to sharpen their skills and build their confidence in crisis leadership, fiber-optic 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.
GRADUATING RESIDENTS

Graduate | Postresidency Position
---|---
Ali Abdullah | Critical Care Medicine Fellowship, UPMC, Pittsburgh, Pa.
Joshua Baisden | Cardiothoracic Fellowship, Cleveland Clinic, Cleveland, Ohio
Michael Boisen | Cardiothoracic Anesthesiology Fellowship, UPMC, Pittsburgh, Pa.
Seth Cohen | Cardiothoracic Fellowship, University of Texas Southwestern, Dallas, Texas
Daniel Cormican | Critical Care Medicine Fellowship, University of Michigan, Ann Arbor, Mich.
Jonathan Estes | Private Practice, King’s Daughters Medical Center, Ashland, Ky.
John Henao | Pediatric Fellowship, Boston Children’s Hospital, Boston, Mass.
Kristi Langston | Pediatric Anesthesiology Fellowship, UPMC, Pittsburgh, Pa.
Janice Leahy | Private Practice, MedStar Southern Maryland Hospital Center, Clinton, Md.
Stephen McHugh | Cardiothoracic Fellowship, UPMC, Pittsburgh, Pa.
Katherin Peperzak | Pain Medicine Fellowship, Western Pennsylvania Hospital, Pittsburgh, Pa.
Max Rohrbaugh | Pediatric Anesthesiology Fellowship, UPMC, Pittsburgh, Pa.
Gail Shaffer | Pediatric Anesthesiology Fellowship, UPMC, Pittsburgh, Pa.
Pranav Shah | Cardiac Fellowship, Vanderbilt University, Nashville, Tenn.
Sukhdip Singh | Private Practice, Guthrie Clinic, Sayre, Pa.
Kyle Smith | Pediatric Fellowship, Ohio State University, Columbus, Ohio

TEACHING AWARDS

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

Excellence in Clinical Teaching of Residents: Patrick M. Callahan, MD; Andrew Herlich, DMD, MD, FAAP; Michael T. Maromonte, DO; Derek Davis, MD; Shiv K. Goel, MD; and Catalin Silviu Ezaru, MD

Mark H. Gilliand, MD Award for Best Clinical Resident: Daniel Cormican, MD
RESIDENT AWARDS

2012 American Society of Anesthesiologists (ASA) Annual Meeting

ASA Resident Research Award: **Kristin Schreiber, MD, PhD**, Pain Phenotypes in American Breast Cancer Survivors following Mastectomy: Analysis of Clinical, Demographic, Psychosocial, and Psychophysical Correlates

2013 Society for Education in Anesthesia Annual Meeting

Best Research Abstract: **Nicholas Schott, MD**, “Cost of Resident Scholarly Activity and Its Effect on Resident Clinical Experience”

2013 Pennsylvania Anesthesiology Resident Research Conference (PARRC)

Second Place for Oral Presentation of Research: **Keith Vogt, MD**, “Temporal Dynamics of the Blood Oxygen Level-dependent Functional MRI Signal in Response to Painful Electric Nerve Stimulation of Short and Long Duration”

Other Honors

**Trent D. Emerick, MD**, was named president-elect (president for 2013–14) of the Pennsylvania Society of Anesthesiologists Resident Component. Dr. Emerick also was named a Foundation in Anesthesia Education and Research scholar for 2012.

**Michael W. Best, MD**, continued his role as trustee of the Pennsylvania Medical Society.
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.

**ADULT CARDIOTHORACIC:** Erin A. Sullivan, MD Fellows receive advanced training primarily in adult 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 also are 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, obstetrics, 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 anesthesiology 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. **ORTHOPAEDIC:** Jacques E. Chelly, MD, PhD, MBA This one-year program includes clinical training in orthopaedic anesthesiology and 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 the 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 This 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 also will understand the complex airway management needs and resuscitation procedures of pediatric trauma patients. **REGIONAL:** Jacques E. Chelly, MD, PhD, MBA Fellows develop 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.

**2013 DEPARTING FELLOWS**

**CRITICAL CARE MEDICINE:** Samer Melhem, Dena Noghrehkar, Dennis Phillips, and Sridhar Tirumala

**PAIN MEDICINE:** Jonathan Gardes, Donald Greco, Stuart Gross, Adeel Haq, Eric Helm, Kevin Hibbard, Mohammed Khan, and James Miranti

**PEDIATRIC ANESTHESIOLOGY:** Adam Childers, Igor Galay, Ashley Kelley, Ana Manrique, and Julie Smolinski

**OBSTETRIC ANESTHESIOLOGY:** Fatima Zahir and Fatoumata Kromah

**CARDIAC ANESTHESIOLOGY:** Clint Humpherys, Swapnil Khoche, Mark Lischner, and Paul Tarasi

**REGIONAL ANESTHESIOLOGY:** Joshua Auerbach, Lucien Catania, Paul Delonay, Emily Draper, Ryan Guffey, Jason Hanks, Amir Hanna, Vadim Ioselevich, Mojhan Moallempoor, Eliilary Montilla Medrano, Arvind Murthy, Vihang Shah, Shruthima Thangada, David Webb, and Mataliya Yakoleva
Simulation

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

PAUL E. PHRAMPUS, MD
Director

WISER is dedicated to health care education and educational research. Using 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 to create a safer environment for patients and improve health care operational efficiency by using simulation and other state-of-the-art educational technologies in the training and assessment of the health care system professionals, to serve as a laboratory to research the use of simulation and other advanced instructional technology in healthcare education and publish the results, to create simulation-based education programs for primary education in various domains of the health care delivery system, to develop and validate simulation-based technology as a competency assessment evaluation tool for health care professionals, and to contribute to the education and mentorship of future generations of health care system educators and education researchers interested in creating or evaluating simulation-based teaching methodologies.

WISER offers many anesthesiology- and nonanesthesiology-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 give participants the opportunity to obtain working knowledge and proficiency of the American Society of Anesthesiologists’ (ASA) Difficult Airway Management Guidelines and associated airway management techniques and equipment. WISER also offers a fiber-optic bronchoscopy course, which provides the trainee with a firm foundation in all aspects of principles and psychomotor skill sets necessary to rapidly become clinically proficient in the basic and advanced uses of the fiber-optic bronchoscope in the domain of anesthesiology. A central venous cannulation course focuses on proper central line placement, including the use of ultrasound guidance and manometry for locating and verifying venous access sites.

WISER offers a liver transplantation anesthesiology course, which provides hands-on experience in a simulation setting. Participants include anesthesiologists, residents, CRNAs, SRNAs, and fellow-visitors. This course emphasizes a multidisciplinary team approach that includes preoperative assessment; OR 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.

In FY13, WISER was granted Society for Simulation in Healthcare accreditation in the Core Competency domain as well as all four elective areas of assessment, research, teaching, and systems integration. WISER is only the second program to earn accreditation in all four focus areas and the first civilian simulation center to have achieved this distinction.
During FY13, WISER conducted 1,639 classes, with 11,913 educational encounters. More than 3,600 individual students, ranging from undergraduate nurses to anesthesiologists with decades of experience, logged almost 50,000 hours of class time. WISER was fortunate to have more than 314 instructors teach 139 separate courses during the year. Classes occupied 14,078 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 2014.

WISER offers a simulation course for the Maintenance of Certification in Anesthesiology Program (MOCA). This simulation course fulfills one requirement of the American Board of Anesthesiology’s (ABA) MOCA Part IV. WISER’s MOCA program incorporates simulation-based training in a fast-paced and challenging experience. Improving Simulation Instructional Methods (iSIM), a three-day internationally renowned program, was created collaboratively between WISER and the Gordon Center for Research in Medical Education at the University of Miami. iSIM is designed as an introduction to fundamental skills and abilities for delivering simulation-based health care education.

WISER also participates in the Gateway Medical Society (GMS) Journey to Medicine mentorship program (JTM). GMS’s goal is to address underserved minority medical needs, close the gap in medical care provided to these communities, and increase the numbers of minority providers. The long-term JTM program was created to address the community’s needs and create a pipeline of African American males to pursue careers in medicine by reaching these students far sooner in the academic pipeline. JTM mentors African American boys in grade six and up. The young trainees attend monthly sessions at WISER to incorporate the use of mannequins in simulated ORs, emergency rooms, and ambulances.
Simulation

Simulation and Medical Technology Research and Development Center

Research at the Simulation and Medical Technology Research and Development Center focuses on the development of next-generation enabling technologies for simulation-based health care 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 health care and practical system prototypes with a focus on user-centric design. Projects typically foster multidisciplinary collaborations among designers, engineers, clinicians, and health care educators. The center also engages students in health care technology research at both the undergraduate and graduate levels and serves as a pan-departmental bridge-building effort between the University of Pittsburgh Swanson School of Engineering and School of Medicine, bringing clinicians and engineers together and serving as an incubator for innovation and prototyping. The center collaborates with local centers of excellence, most closely with the University of Pittsburgh Department of Bioengineering and WISER, as well as with other groups at the University of Pittsburgh, UPMC, and Carnegie Mellon University with expertise in technology, education, and patient safety. We strive to lower barriers to innovation and enable creative translation of ideas into prototypes.

Simulation-based training in health care 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 health care providers. A growing body of evidence demonstrates the effectiveness of simulation-based training in improving actual clinical performance.

The center’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, semiautonomous interactive systems can support self-learning, off-loading work from instructors and enabling on-demand, anytime guided training and performance assessment. The team is therefore currently pursuing four challenges: 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; 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.

Twenty-one prototypes have been developed in the center to date, including 14 bioengineering and electrical engineering senior design projects that have led to seven invention disclosures and provisional patent applications. Through classes and interactive workshops, the center has to date introduced more than 400 University of Pittsburgh and Carnegie Mellon students to systems design, medical engineering, and health care technology.
Conferences and Scholarly Activity

Faculty, residents, fellows, and medical students participate in numerous scientific meetings, such as the following:

American Society for Anesthesiology (ASA)
The ASA Annual Meeting is a major departmental event, with an impressive number of medical students, residents, fellows, and faculty presenting every year. The 2012 meeting was held October 13–17 in Washington, D.C. Department members delivered 85 presentations. Additionally, 11 faculty members served on ASA and ASA-related committees. The ASA also hosts the annual Practice Management Conference, which was held in Las Vegas, Nev., from January 25 to 27, 2013. Two posters from the department were presented at the conference.

Regional Anesthesiology and Acute Pain Medicine Meeting
Department members delivered 17 presentations and conducted three workshops at the 38th Annual Regional Anesthesiology and Acute Pain Medicine Meeting in Boston, Mass., May 2–5, 2013.

The department also organized, hosted, or conducted several conferences in FY13, such as the following:

MedTASS
The department, WISER, UPMC, ISMETT, and the Renato Fiandaca Simulation Center held the 3rd Mediterranean Transplantation Anesthesiology and Simulation Symposium (MedTASS) in Palermo, Italy, April 12 and 13, 2013. International experts presented reviews of current standards of practice in anesthesiology for transplantation and advanced specialty surgery. In addition, anesthesia-based medical simulation scenarios and problem-based learning discussions were incorporated into the conference to enhance the participants’ learning experience. More than 190 registrants attended the conference. Antonio A. Arcadipane, MD (Chief Anesthesiologist at ISMETT), and Raymond M. Planinsic, MD (Professor and Director of Transplantation Anesthesiology at UPMC) were the course directors.

Safar Symposium and Annual MultiDepartmental Trainees’ Research Day
The 11th annual Safar Symposium and third annual MultiDepartmental Trainees’ Research Day were held on May 16 and 17, 2013. This yearly event honors the late Dr. Peter Safar and his wife, Eva, for their contributions to the scientific community and highlights current research in areas spanning Dr. Safar’s interests. The research day event, a collaboration among the Departments of Anesthesiology, Critical Care Medicine, Emergency Medicine, and Physical Medicine and Rehabilitation and WISER, featured 51 posters and four oral presentations from trainees in the four collaborating departments. Forty-six percent of the abstracts were submitted by trainees in the Department of Anesthesiology. Kevin Taylor, BA, BS, MS, a medical student working with Jim Ibinson, MD, PhD, won the first place poster award from the Department of Anesthesiology for “A Study of the Functional Connectivity of the Insula and the Anterior Cingulate Gyrus during Pain Processing.” Nicole Scheff, BS, a research scholar working with Michael S. Gold, PhD, won the second place poster award from the Department of Anesthesiology for “Na+/Ca2+ Exchanger Contributes to an Inflammation-induced Increase in Evoked Ca2+ Transients in Rat Dorsal Root Ganglion Neurons.”
Department of Anesthesiology faculty members generated more than 300 published peer-reviewed journal papers and numerous book chapters, abstracts, and editorials during 2012 and 2013. The following are peer-reviewed journal papers that were published in high-impact journals (20,000 or more citations).

**Publications**


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

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

- Ranked among the top two U.S. universities and fourth among universities worldwide in the 2013 edition of *The Scientist*'s Best Places to Work in Academia survey
- Ranked among the top 10 recipients of National Institutes of Health (NIH) research funding since 1998
- Ranked 12th in the nation and eighth among public institutions in the National Science Foundation's ranking of federally funded research
- Consistently ranked in the top 20 U.S. public universities in *U.S. News & World Report*'s annual "America's Best Colleges" listing, and Pitt graduate schools and programs perennially earn high grades in *U.S. News*' "Best Graduate School" rankings

To learn more about the University of Pittsburgh, visit www.pitt.edu.
UPMC is one of the leading nonprofit health systems in the United States. A $10 billion integrated global health enterprise headquartered in Pittsburgh, Pa., 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 nongovernmental employer, with more than 62,000 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 2.3 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

U.S. News & World Report ranked UPMC 10th in the nation in its 2013 “Best Hospitals” ranking. UPMC also was ranked first in Pennsylvania and in the Pittsburgh metro area. Furthermore, eight 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 and Nightlife**
- Pittsburgh Zoo & 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 Theater
- Carnegie Science Center
- Phipps Conservatory
- National Aviary

**Distinctions**
- Most Livable City in the United States, Forbes (2010), Yahoo! (2010), and The Economist (2011)
- 29th Most Livable City in the World, The Economist (2011)
- Fourth Best Zoo in the Country, Parents Magazine (2009)
- One of the Best Worldwide Travel Destinations, National Geographic (2012)

To learn more about life in the “most livable city,” visit www.coolpgh.pitt.edu or www.visitpittsburgh.com.
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# Department of Anesthesiology at a Glance

*FY 2013*

- **Total Anesthesiology Cases**: 307,827
- **Non-pain Cases**: 212,725
- **Chronic and Acute Pain Visits**: 95,102
- **OB Deliveries**: 13,485
- **Faculty Full-time Equivalents (FTEs)**: 185
- **Total ORs Covered**: 226
- **Total Anesthetizing Locations**: 308
- **CRNA FTEs**: 386
- **Graduating SRNAs**: 42
- **Residents and Fellows**: 123
- **Active Clinical Trials**: 21
- **Total NIH Awards**: $5,769,520
- **Total Awards**: $6,325,664

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