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

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

“Pittsburgh is a dynamic and vibrant community in which to live. The growth of UPMC, Pitt, and the remainder of the academic community (roughly composed of at least 14 different institutions throughout the region) drives an extraordinary renaissance of medical and technological innovation, economic prosperity, and cultural renewal. As we expand each year in size and significance, we continue to recruit outstanding scientists and physicians to contribute innovative ideas and maintain our role as one of the world leaders in anesthesiology research and clinical care.”

- John P. Williams MD
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.

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. The department participates in the medical student core learning experience through an interdisciplinary course designed to integrate patient safety, medical availability, and information technology across the dimensions of training, and a clinical procedures course. Our faculty offer much to the medical students in their courses in pharmacology, physiology, problem-based learning discussions (PLBDs), and other teaching venues. We are also becoming more involved in the life of the medical students during their first year. We provide the basic lectures in anesthetic pharmacology (both general and local); analgesic pharmacology (emphasis on acute pain therapy); and amnestic use (perioperative period), especially in the area of procedural sedation. We have had much success in bringing medical students into the specialty of anesthesiology.

Our current focus is the search for the molecular basis of anesthesia. Even though man has been administering anesthetics for well over 150 years, we are only now beginning to understand this basis. We also have a large clinical trials program and have initiated a serious and sustained effort to not only address the unknown issues surrounding pain mechanisms, but also to explore the genetic underpinnings of pain. We continue to enlighten our colleagues and the rest of Pittsburgh with our focused effort on patient safety. The Peter M. Winter Institute for Simulation, Education, and Research (WISER) uses simulation-based education to improve patient safety; it is the only facility of its kind in the world and is a tremendous resource for the university, the health system, and the city of Pittsburgh.
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University of Pittsburgh School of Medicine
Department of Anesthesiology
Associate Medical and Scientific Director
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Vice Chair for Basic Sciences

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Director, WISER
EXECUTIVE SUMMARY

The Department of Anesthesiology of UPMC and the University of Pittsburgh serves 11 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** 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. The hospital is nationally ranked 3rd in pediatric diabetes and endocrinology and 6th in pediatric gastroenterology.

- **Magee-Womens Hospital of UPMC** is ranked 6th in the nation for gynecological care. Their Neonatal Intensive Care Unit (NICU) is the largest in Pennsylvania and one of the largest in the country.

- **UPMC St. Margaret** was named among the nation’s top 100 hospitals of *Consumers Digest*’s list of “50 Exceptional U.S. Hospitals” and is a Magnet™ designated hospital. Magnet status is the highest international recognition for nursing excellence and leadership.

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

- The **Veterans Affairs Pittsburgh Healthcare System** serves as an acute care facility and major surgical tertiary care facility for veterans of the United States military.

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

- **UPMC Mercy** and **UPMC Passavant** are the newest divisions in our Department. **UPMC Mercy** is Pittsburgh’s only Catholic hospital with specialized services, including Level I trauma and burn services, the neurosciences, physical medicine and rehabilitation, and women’s health. UPMC South Side was absorbed by UPMC Mercy, converting into an ambulatory surgical center and reopening as the **UPMC Mercy South Side Outpatient Center** on July 1, 2009. The center is a one-stop location for diagnostic and routine outpatient services such as x-rays, lab work, and same-day surgery. **UPMC Passavant** is a tertiary care center north of Pittsburgh with two campuses in McCandless and Cranberry focusing on specialties such as cancer, cardiac care, orthopedics, and spine surgery.

- **UPMC Palermo (IsMeTT)** serves as a major transplantation center for Southern Italy and other countries in the Mediterranean region.

- **UPMC Dublin (Beacon Hospital)**, located in Sandyford, Dublin, is a full service hospital that includes eight operating theatres with dedicated rooms for urology and neurological, cardiac, general, orthopedic, and ophthalmic surgery.
UPMC Presbyterian/Montefiore is the largest quaternary care hospital of the UPMC Health System and the largest in Western Pennsylvania. The UPMC Presbyterian division of the Department of Anesthesiology is larger than many entire academic departments found elsewhere in the country. It comprises 55 faculty members who cover 41 operating rooms and up to 11 additional non-operating room (OR) locations. The site is staffed by 111 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 FY10, UPMC Presbyterian faculty supervised a grand total of 35,757 anesthetics, an increase of 2,420 cases from last year. Of these cases, 24,437 were performed in the ORs, an increase of 556 cases from last year. Procedures spanned the entire spectrum of surgical and special procedures, from combined heart-liver transplantation to anesthesia for electroconvulsive therapy. Transplantation continues to be a significant undertaking at UPMC Presbyterian: a total of 521 transplants were performed during the year (an increase of 24 compared to the prior year), and we remain the top lung transplant center in the world (126 lung transplants performed). The number of cases performed outside the OR during the academic year was 11,320—an increase of 1,864 procedures from the previous year.

Anesthesia 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 are very active in medical student and resident education; they not only teach in the OR, but also deliver lectures, coordinate problem-based learning discussions (PBLDs), design and implement rotation curricula, serve on the medical student and resident education committees, interview resident applicants, and teach at the Peter M. Winter Institute for Simulation, Education, and Research (WISER).

JOSEPH J. QUINLAN MD
Chief Anesthesiologist

UPMC Presbyterian was the leading center in the nation in the number of lung transplants performed at a single center in FY10
The neurosurgical anesthesia service at UPMC Presbyterian provided anesthetic care for close to 6,000 neurosurgical procedures during FY10. Operations included expanded endonasal approaches, craniotomy for tumor, retromastoid craniectomy for microvascular decompression of various cranial nerves, and spinal surgery. Two separate neurological intensive care units at UPMC Presbyterian have continued to facilitate innovative approaches to the acute care of cerebral vascular pathologies, in addition to promoting optimal care for patients with neurotrauma and other acute neurological injury.

Our involvement in the anesthetic management of the expanding patient population of the Center for Neurointerventional and Neuroendovascular Therapy (CNNET) has continued to increase. Services provided by this combined interventional neuroradiologic practice include: embolization of cerebral vascular aneurism; arterio-venous malformations; tumors and dural and cavernous sinus fistulae; treatment of refractory epistaxis; sclerotherapy; temporary balloon occlusion testing with blood flow evaluation; stroke thrombolysis and thrombectomy; dural sinus thrombolysis and thrombectomy; petrosal sinus sampling; carotid, vertebral subclavian, and intracranial arterial stenting; vessel sacrifice; Wada testing; vertebroplasty (methylmethacrylate vertebral body injections); alcohol sclerotherapy; and routine angiography.

The Center for Minimally Invasive and Cranial Base Surgery continues to thrive both in terms of volume of cases and uniqueness of surgical approaches. The team is pioneering cutting-edge endoscopic minimally invasive craniotomy techniques, performing close to 500 procedures in the past academic year, attracting national and international recognition. This recognition also manifests itself in their evolving success in filling their fellowship positions for at least the next five years.

An additional critical development is the rapidly expanding complex spine service, tackling spine pathologies that exceed the expertise of other neurosurgical departments in the country.

The remainder 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.

The neuroanesthesiology didactic program currently consists of a weekly and monthly subspecialty conference, intraoperative teaching, and a manual of guided reading. In addition, residents may now access an online multimedia version of neuroanesthesia instruction. Increasing attendance at the monthly neuroanesthesia conference has fostered lively and informative discussion. Twenty-four lectures were given in the last academic year, eight by faculty members and 16 by residents rotating through neuroanesthesia. Faculty lectures included guest lectures by neurosurgeons, neurophysiologists, and neuroradiologists, all of whom brought refreshing new perspectives and productive dialogue.
Same Day Services at UPMC Presbyterian/Montefiore includes both Same Day Surgery (SDS) and the Preoperative Evaluation Center (PEC). During FY10, 15,225 patients went through Same Day Surgery either as same day-admit patients (8,471) or outpatient surgery patients (6,754); 5,051 patients were seen in the PEC.

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

Anesthesiology faculty members at Montefiore are active in resident education, teaching principles of ambulatory, ENT, orthopedic, and regional anesthesia. Residents participate in outpatient evaluations and learn a variety of regional anesthesia techniques and principles of outpatient anesthesia. The PEC is the site of the CA-1 preoperative evaluation rotation, which is mandated by the ACGME for anesthesiology residency programs. Residents see a variety of patients prior to the day of surgery, order appropriate testing, and obtain consultations if necessary. The residents then create a note available to the attending or resident assigned to the case on the day of surgery. A monthly Montefiore subspecialty meeting is also held on the fourth Wednesday of each month, highlighting ambulatory anesthesia, preoperative evaluation, and regional anesthesia. This meeting is attended by faculty, residents, medical students, CRNAs, and SRNAs.
The Children’s Hospital of Pittsburgh of UPMC (CHP) division of anesthesiology comprises 31 faculty, 13 FTE CRNAs, and eight CRNPs (4.5 FTE) who provide both anesthesia and surgical perioperative care. The hospital is one of the first fully-digital hospitals in the nation and sits on a 10-acre, environmentally-sustainable campus. In June 2010, the electronic anesthesia record was implemented.

In FY10, the division provided anesthesia service for 26,528 procedures, an 8% increase over the prior year (24,515). Anesthesia services were also provided at off-site outpatient surgical centers in Wexford and Bethel Park (CHP North and South, respectively). During FY10, these sites oversaw 8,683 anesthesia cases (up from 8,463 the previous year); 6,381 at CHP North (up from 6,080); and 2,302 at CHP South (down from 2,383).

Anesthesiologists at CHP performed 26,528 procedures, an 8% increase from last year.

The perioperative pain control service continues to serve a large number of patients. In addition to the pain service, attending physicians provide hands-on anesthesia service for children requiring radiation therapy. The use of patient-controlled analgesia, epidural narcotics, epidural local anesthetics, and pediatric caudal anesthetics and regional blocks is now routine. The perioperative pain control service at CHP has improved patient care and provides opportunities for training residents and fellows.

Teaching activities—including mini-lectures, core lectures, and case conferences—were prepared and presented by CHP fellows with faculty supervision. Faculty actively participated in medical student courses, including introduction to medicine (a first-year course), clinical problem-based learning (second-year), clinical skills (third-year), and various anesthesiology clerkships for third- and fourth-year students. The pediatric anesthesia education programs continued to provide special training for Critical Care Medicine (CCM) fellows, pediatric dentists, emergency medical residents, and nurse anesthesia students on rotation through the service. In addition, faculty have participated in an oral board preparation course for senior residents (CA-3 and CA-4).
Beyond the birthing suite, the division provided anesthetic management for 17,225 cases in the surgical services center, a 1% increase from the previous year. The Surgical Services Center consists of 14 general ORs, a cystoscopy suite, and two minor procedure rooms. In FY10, approximately 40% of surgical patients were evaluated preoperatively in the MWH pre-anesthesia evaluation and testing center.

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

The Magee-Womens Hospital (MWH) division of anesthesiology comprises 21 faculty members, 24 Certified CRNAs, and one full-time CRNP who provide care within the operating and delivery suites and in the pre-anesthesia evaluation and testing center. The division also provides emergency airway management in conjunction with members of the Department of Critical Care Medicine at all cardio-respiratory arrests. The primary focus of the division, however, is providing in-house, 24-hour anesthesia coverage in two primary anesthetizing locations: the Womancare Birth Center and the main Surgical Services Center.

MWH provides state-of-the-art anesthesia and obstetric care. The largest component of services is provided in the Womancare Birth Center. The obstetric anesthesia section oversaw 9,731 deliveries from July 2009 through June 2010, a 1% increase over the previous year. Of these deliveries, 6,732 were vaginal births and 2,999 were cesarean deliveries. Additional procedures performed on the unit include combined cesarean/abdominal hysterectomy, external cephalic version (ECV), percutaneous umbilical blood sampling (PUBS), manual placental extraction, urogenital laceration repair, and postpartum tubal ligation (PPTL). Fetal surgery continues to increase as the hospital focuses more resources on this activity.

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The MWH student nurse anesthesia (SRNA) program has doubled in size over the last year with increasing focus on training in epidural and spinal blocks. These students rotate through both labor and delivery and the general operating suites. MWH conducts an anesthesia clerkship for third-year medical students during their surgery and perioperative care rotation. In addition, many fourth-year medical students opted to take a one-month elective to further expand their knowledge of anesthesia.
The UPMC Shadyside division of anesthesiology consists of 23 faculty and 52 CRNAs. During FY10, clinical anesthesiology services were performed for 15,509 cases in the main ORs and 5,313 cases in the ambulatory surgery center, for a total of 20,822 cases. Off-site volume remained steady at approximately 1,300 cases performed.

The division caseload spans the full range of adult surgical procedure patients, including: major thoracic, cardiovascular, neurosurgical, orthopedic, urologic, gynecologic, oncologic, and general surgical patients as well as outpatient orthopedic, plastic, dental, gynecologic, and general surgical procedures. The division provides subspecialty care in cardiac anesthesiology and neuroanesthesiology, with subspecialty trained and credentialed faculty. All cardiac faculty are board-certified in transesophageal echocardiography.

The acute pain team, led by Dr. Jacques E. Chelly, offers 24-hour postoperative pain management for the majority of orthopedic, thoracic, and urologic patients. The team performed 8,133 blocks in FY10 on 4,104 patients. Shadyside anesthesiology also provides 24-hour in-house coverage for emergency surgical cases and emergency airway management.

The division provides educational opportunities to its staff and faculty, as well as to a diverse set of students from other departments. Teaching activities, including monthly case presentations and lectures, are prepared and presented by the faculty. A monthly morbidity and mortality conference is presented by Dr. Lawrence Marr, the department’s director of quality assurance. Shadyside faculty actively participated in the medical student anesthesiology rotation, organized and administered by Dr. William Simmons. UPMC Shadyside is designated as a primary instruction site for the nurse anesthesia master’s program of the University of Pittsburgh School of Nursing. Airway management training is also provided for paramedic students from the Center for Emergency Medicine.

UPMC Shadyside has become a major center for clinical research, generating numerous publications in acute pain management, surgical outcomes, OR management, and economics. The division received a grant to study a video teleconferencing system that would allow PACU patients to communicate with their families in the waiting room.
The Veterans Affairs Pittsburgh Healthcare System (VAPHS) anesthesiology staff consists of seven full time anesthesiologists, three half time anesthesiologists, and 15 CRNAs who provide care for veterans in a nine-room operating suite, GI lab, cardiac EP suite, preoperative evaluation clinic, and pain clinic. The staff is also involved in a wide range of activities at both the University of Pittsburgh School of Medicine (UPSOM) as well as the VAPHS.

Clinical service for FY10 consisted of a total of 5,229 OR cases, a 6% increase over the previous year. Transplant activity increased 30% over the prior year with 43 liver transplants and 36 kidney transplants. Off-site anesthesia coverage continued to increase, primarily in the GI lab where the volume doubled to over 600 cases in the past year. Three hundred and seventy nine cases were performed in the EP lab, a 7% increase over the prior year.

Reflecting an increased attention to pain management, as well as the needs of wounded veterans returning from Afghanistan and Iraq, pain clinic volume continued to increase. In a 5% increase from the prior year, 848 new outpatient consults were completed in FY10. The total number of outpatient encounters was 1,417, a 10% increase over the prior year. The number of invasive procedures tripled from 64 the prior year to 190 in FY10. Dr. Mangione is chair of the VAPHS Pain Committee and is involved in VA pain management initiatives throughout the region and nationally.

During the course of the year, both third and fourth year medical students rotated through VAPHS under the direction of Dr. Catalin Ezaru. The rotation continues to be highly successful and highly rated, as do the teaching scores of the faculty.

The VAPHS division of anesthesiology continues to provide clinical experience for two to three anesthesiology residents at a time. Dr. Todd M. Oravitz coordinates the resident rotations and has consistently been one of the most recognized and respected teachers in the Department of Anesthesiology. The VAPHS division provides clinical training for SRNAs, dental residents, respiratory therapists, and anesthesia technology students. Dr. Shashank Saxena directs an emergency airway course, in which respiratory therapists are trained in airway management techniques and non-anesthesiologist physicians are credentialed. Dr. Andrew Murray directs the Anesthesia Crisis Leadership Training (ACLT) program for resident training, and Dr. Oravitz coordinates the 20-day program for newly-orienting residents.
UPMC St. Margaret retains the atmosphere of a community anesthesiology practice where efforts center on patient care in the ORs and GI suite of both the main hospital and Harmar Ambulatory Center. The division of anesthesiology at UPMC St. Margaret comprises 10 full-time physicians and 60 certified anesthetists. 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.

UPMC St. Margaret and Harmar Ambulatory Center administered almost 24,000 anesthetics in FY2010. Anesthetics were provided in 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. A large variety of surgical procedures were performed at St. Margaret, including: orthopedic (spine, total joint, sports, and foot and ankle); general; thoracic; urologic; gynecological; vascular; ophthalmologic; plastic; and ear, nose, and throat surgery. This variety of procedures was coupled with growing neurosurgical and liver resection surgery practices. In FY10, St. Margaret’s designation as a Healthcare Bariatric Surgery Center of Excellence continued. Minimally invasive surgeries for knee and hip replacements were routinely performed here, and regional anesthesia with nerve blocks for anesthesia and post-operative pain control were used for orthopedic and general surgery cases. The two sites encompass a large ultrasound-based regional anesthesia and perioperative pain control program, and manage the largest UPMC outpatient peripheral nerve block catheter program.

In FY10, St. Margaret was a rotation site for anesthesiology residents, medical students, SRNAs, dental anesthesia residents, and pain (acute and chronic) and critical care fellows. The hospital was also a popular rotation site for senior residents in the advanced clinical track, focusing on perioperative pain management and operating room management. The faculty also provided an educational experience for other UPMC facility faculty members in the practice of ultrasound-based regional anesthesia. In addition, St. Margaret anesthesiologists participated in didactic sessions for the hospital medical staff and family practice residents. The group at UPMC St. Margaret has become increasingly involved in clinical research, participating in several industry-supported projects.
EVELYN T. GONZALEZ-ABOLA MD
Chief Anesthesiologist

UPMC McKeensport is a 215-bed community hospital serving the patients along the Monongahela Valley area. The McKeensport division of the Department of Anesthesiology consists of three full-time anesthesiologists and seven full-time, one part-time, and three casual CRNAs. The division provides anesthesia services for inpatients and ambulatory surgical patients, as well as off-OR sites such as the GI unit, invasive cardiology, and invasive radiology.

In FY10, the division provided anesthesia for 4,464 procedures. In addition, clinicians provided acute pain services for immediate post operative pain control. The division also responded to consultation requests for chronic pain and the subsequent performance of 97 epidural steroid injections.

Typical of a community hospital, the surgical procedures performed at UPMC McKeensport included major vascular surgery, thoracic, laminectomies/spinal fusions, total joint replacements/orthopedic, abdominal surgery, gynecologic surgery, urologic, ENT, ophthalmologic, plastic surgery, and invasive chronic pain procedures. Anesthetics were also provided outside the operating room for GI procedures, cardioversions, and invasive radiologic procedures. The division provided support for the emergency physicians and hospitalists in treating patients with difficult airways, was instrumental in acquiring difficult airway carts for placement in strategic locations within the hospital, and formulated a hospital-wide policy for procedural sedation. Morbidity and mortality conferences, journal club meetings, and appropriate clinical updates are conducted on a regular basis.

Teaching activities at McKeensport include teaching airway management to internal medicine and family practice residents as well as the EMT students. The residents in both disciplines also receive training and gain experience in insertion of invasive lines. The staff anesthesiologists and CRNAs are committed to the clinical training of the Student Nurse Anesthetists. The division is committed to maintaining and improving proficiency of the staff in the use of supraglottic devices.
In FY10, UPMC Mercy Anesthesiology joined the UPMC Department of Anesthesiology. UPMC Mercy is a large tertiary hospital located in the uptown district of Pittsburgh, with a rich history of caring for the underserved population in the region in addition to all other patients. Early in FY10, the program underwent a Residency Review Committee (RRC) review and received a full four year approval (up from a three year approval from previous reviews). Only 15% of anesthesiology residencies have a four or five year approval. Later in the fiscal year, the decision to merge the anesthesiology residencies of the UPMC Mercy campus and Oakland campus was announced and well received.

The Mercy anesthesiology faculty consist of 14 full-time anesthesiologists who cover 16 in-patient ORs, six out-patient ORs, an obstetrical suite with two cesarean-section rooms, a busy endoscopy suite, interventional neuroradiology suite, MRI, hydrotherapy unit for burn care, and electrophysiology suite. A pre-anesthesia evaluation center is staffed by one CRNP and two physician assistants, with faculty oversight. The case selection includes all but solid organ transplants. Highlights include voice surgery, airway modifying surgery, and thoracic surgery. Burn care is a focal point at UPMC Mercy, and it is a Level I trauma center.

In FY10, Mercy clinicians supervised more than 20,000 anesthetics, which is an increase of over 20% from the previous year. The vast majority of anesthetics were performed in the ORs. The breakdown of cases included 9,171 cases in the inpatient OR suite, 5,552 in the outpatient OR suite, and 982 cases in the cardiothoracic suite.

The division serves as an educational site for 15 residents, four to six SRNAs, as well as rotating residents and students from the emergency medicine, surgery, and transitional year programs. The core residency program lecture series follows the requisites of the ACGME in addition to four to five lectures per week. The lectures include basic science, specialty rotation lectures for all residents, a weekly Chair’s conference that focuses on a particular case of the week, grand rounds, board review questions, PBLD, regional block series, TEE series, and keyword conferences.
During FY10, UPMC South Side converted into an ambulatory surgical center and reopened as the UPMC Mercy South Side Outpatient Center. A number of employees were transitioned to other institutions in the UPMC system.

By July 1, 2009, the transition to a surgical center had been completed, and the center experienced a brief decline in the number of OR cases. By September this had reached a nadir, and cases began to increase.

Despite a significant reduction in the volume of surgical cases during the first half of the academic year, the actual number of peripheral nerve blocks has diminished to a lesser extent, since the sports medicine orthopedic service remains anchored at Mercy South Side Ambulatory Surgical Center. Two new sports surgeons have been added to the staff at UPMC Mercy South Side Surgical Center. The anesthesia division continues to provide high-quality ambulatory services to these patients, using multi-modal analgesia, aggressive prophylaxis against postoperative nausea and vomiting, and regional anesthesia (when practical) to mitigate against postoperative pain. The total number of cases performed at this center, including off-site GI cases, was 3,950 during FY10, with approximately 2,200 peripheral nerve blocks. In the coming year, case counts should increase significantly, as 10 ophthalmologists and one hand surgeon have just joined the staff, with planned transfer of their ambulatory cases from UPMC Mercy to Mercy South Side.

Dr. Brian Williams has continued his noteworthy research during the past year, with resultant publication of two review articles in *Regional Anesthesia and Pain Medicine* related to diabetic neuropathy and peripheral nerve blockade. His seminal work has been funded by a grant from the U.S. Department of Defense. Drs. Steven Orebaugh and Williams collaborated with Drs. Michael Kentor, Monica Bolland, Tina Nowak and Steven Mosier on a clinical study in which the efficiency of ultrasound-guided interscalene blocks by anesthesiology residents was evaluated, with the resultant manuscript published in *Acta Anaesthesiologica Scandinavica*. Dr. Orebaugh also co-authored a text on ultrasound-guided regional anesthesia with Drs. Paul Bigeleisen and Jacques Chelly.
UPMC Passavant is an acute care hospital located on two campuses in the northern suburbs of Pittsburgh. The 132-acre McCandless campus boasts 21 ORs, an EP lab, a GI lab, and a large cancer center. A recently completed seven-story tower provided an additional 220,000 square feet of space, more than doubling the size of the OR suite, the emergency department, and the cancer center. The smaller Cranberry campus is a 32-bed institution with six operating/procedure rooms. UPMC Passavant’s combined surgical volume exceeds 16,000 procedures annually, ranging from complex quaternary/tertiary cases to community-based medicine.

The anesthesiology division at UPMC Passavant consists of 16 FTE physicians who support not only the surgical volume but numerous out-of-the-OR cases, which include cases in the EP lab and GI lab and minimally invasive image-guided procedures. All surgical subspecialties are represented, with the exception of transplant and complex pediatric surgery. In 2010, UPMC Passavant expanded its busy neurosurgical program to include intracranial procedures and initiated a multispecialty robotic surgery service line. Members of the Department of Anesthesiology recently organized a Passavant division of the Acute Interventional Perioperative Pain Service (AIPPS). Under the leadership of Drs. Jacques Chelly and Charles Luke, AIPPS provides comprehensive postoperative pain management for appropriately selected patients.

Three anesthesiology fellowship programs (acute pain/regional anesthesia, pain medicine, and cardiac anesthesiology) are active at UPMC Passavant. The hospital also serves as a rotation site for the nurse anesthesia master’s program at the University of Pittsburgh as well as St. Vincent College.
The Certified Registered Nurse Anesthetist (CRNA) staff has grown tremendously during FY10. CRNAs provide services at all UPMC sites; with the addition of UPMC Mercy and UPMC Passavant to the department and the significant surgical growth across existing UPP facilities, the number of full time CRNAs has grown from 276 to 321 in the past year.

Mentoring is a key component in the socialization and success of new members of our profession. Given the complexity of the UPMC system and the many other demands on our students, the work of active CRNA mentors has been invaluable in assuring student success. All CRNAs also serve as clinical instructors for the University of Pittsburgh Nurse Anesthesia program, which prepares Registered Nurses to become CRNAs. This year the program graduated 43 CRNAs and also received its second “perfect” (no citation) 10-year accreditation from the American Association of Nurse Anesthetists Council on Accreditation.

Awards

- **Michael K. Chaklos**: 2009 Gold Star for Excellence in Service Award, Physician Services Division; 2009 Award for Commitment and Excellence in Service (ACES) - the highest honor that can be awarded to a UPMC employee
- **Ted Gavel**: 2010 Outstanding Student of the Year, Pennsylvania Association of Nurse Anesthetists
- **Robert Lorah**: 2010 Clinical Instructor of the Year, Pennsylvania Association of Nurse Anesthetists
- **Michael Neft**: 2010 Didactic Instructor of the Year, Pennsylvania Association of Nurse Anesthetists
- **Mitchell D. Oblak**: 2009 Cameos of Caring Advanced Practice Award, University of Pittsburgh School of Nursing
- **Kathy Pyros**: KIDS First Award, Children’s Hospital of Pittsburgh of UPMC
- **Derek Reckard**: 2010 Mary DePaolis Lutzo Clinical Instructor of the Year, University of Pittsburgh School of Nurse Anesthesia Program
- **Maureen Tannous**: 2009 Cameos of Caring Award, University of Pittsburgh School of Nursing
- **Maureen Tannous, Les Watson, Paul Butler, Ricker Henker, Skye DeDi, Adam Freis, Sorena Ostlund**: Above And Beyond Award, UPMC
- **Wendy Veith**: 2010 Outstanding Clinical Coordinator of the Year, University of Pittsburgh School of Nurse Anesthesia Program
IsMeTT continued to build on the success of previous years in FY10. In summer 2009, the Italian National Healthcare Service identified a total of 14 medical centers to coordinate and address the care of H1N1 influenza infected patients developing acute respiratory distress syndrome (ARDS). IsMeTT was the sole designated center to provide coordination and assistance within the extended regional area (Sicily) and was also available to provide assistance within a second Italian bordering region (Calabria). The referral population included a total of approximately seven million inhabitants.

During FY10, 1184 surgical procedures were performed, including 15 kidney transplants, 10 living related kidney transplants (one pediatric), 60 liver transplants (three living related and nine pediatric), 647 cardiac and thoracic surgeries, 10 lung transplants, 18 heart transplants, one combination liver kidney transplant, and 769 ICU admissions. IsMeTT continued to receive referrals of both adult and pediatric patients for complex surgery or ICU treatments. Four ORs, 12 PACU beds, and 14 ICU beds are currently staffed. Anesthesiology faculty from UPMC came to IsMeTT for various teaching and clinical activities during FY10.

IsMeTT continued to host students and anesthesia residents who wish to spend part of their elective time in Palermo. Residents from other Italian medical schools have also participated in an IsMeTT ICU and OR rotation. We also had an elective rotation in anesthesia and hosted critical care medicine residents and students from different universities and countries. Planning is underway to bring IsMeTT faculty to the United States for varying terms, and at the same time to encourage University of Pittsburgh faculty to visit the Institute. The growth of the clinical and academic aspects of our department was achieved thanks to the close relationship and team work between the Palermo and UPMC teams.
Beacon Hospital

UPMC Beacon Hospital, located in Sandyford, Dublin, is a full service hospital with a 183-bed capacity, including two critical care units comprising 14 isolated beds. 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. The hospital contains eight operating theatres - specific rooms dedicated for neurosurgery, urology, cardiac, general, orthopedic, and ophthalmic surgery.

In FY10, 8,216 procedures were carried out at Beacon. There were two attached anesthetists (Drs. John Magner and Silviu Gligor) and three anesthetists who practiced full-time at Beacon without formal attachment. Two other key anesthetists covered specific days, and approximately 10 others worked regularly there, though the exact personnel varied from time to time.

Consultant anesthetic and ICU coverage was available at all times. A small group provided specific cardiac coverage on a voluntary basis. Dr. Michael Power was appointed Medical Director of the ICU to establish critical care standards, implement an audit, and to lead the hospital’s ICU committee.

UPMC Beacon also provides an acute pain/regional service, chronic and palliative care, and has a pain nurse. Chronic pain treatment is provided on a multidisciplinary level.
Transplantation Anesthesiology (TA) is responsible for the care of patients undergoing liver, intestinal, multivisceral, kidney, and pancreas transplantation. TA also provides anesthesia care and work-up for patients undergoing major hepatic resections. During FY10, a total of 340 solid organ transplants were performed at UPMC and Children’s Hospital of Pittsburgh of UPMC, including over 125 liver transplants and more than 215 other solid organ transplants.

UPMC continues to be the referral center for high-risk patients because of our diverse expertise and multidisciplinary approach to managing patients with multiple organ dysfunction. As a result, an increasing number of patients over 65 years of age, those with significant cardiopulmonary disease, and those with 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.

FY10 was notable for continued expansion of the adult living related liver and kidney transplantation program at UPMC. Over 40% of kidney transplants performed in the United States are from live donors, and this trend is reflected at UPMC.

Education in the TA service comprises a mandatory four week rotation for CA-2 trainees and an elective three to nine month rotation for CA-3 and CA-4 trainees. In addition to one-on-one bedside teaching, each resident attends seven didactic sessions on topics such as 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. TA residents now have the additional benefit of training at WISER in a course entitled “Anesthesia for Liver Transplantation.”

CA-3 and CA-4 trainees are also encouraged to participate in research activities. Ongoing research activities in TA include: a review of small bowel transplantation designed to describe intraoperative hemodynamic changes, fluid management, and hypercoaguability in this complex group of patients; effects of immunosuppression on coagulation in transplantation; mediators to minimize preservation/reperfusion injury in transplanted organs; and the impact of expanding marginal organ use in transplantation.
The cardiothoracic anesthesiology division is spread over five hospitals: UPMC Presbyterian, UPMC Shadyside, UPMC Passavant, UPMC Mercy, and the Veterans Affairs Pittsburgh Healthcare System. In FY10, 3,272 cardiothoracic surgical procedures were performed system-wide, including 1,935 cardiac and 1,337 thoracic (non-cardiac) cases. These totals include transplant procedures. Surgical procedures span the full spectrum of adult cardiac surgical practice, including minimally invasive coronary artery bypass (Mid-CAB) and off-pump coronary artery bypass (OP-CAB), cardiac valve replacement and repair, thoracic aorta repair/reconstruction, arrhythmia ablation, pulmonary thromboendarterectomy, repair of ventricular and atrial septal defects, and removal of cardiac tumors/myxomas.

The UPMC Presbyterian campus is recognized as a world leader for heart, single lung, double lung, and heart-double lung transplants and is the designated site for these procedures. During FY10, 182 transplants were performed, consisting of 56 heart transplants, 33 single-lung transplants, 89 double-lung transplants, and four heart-double-lung transplants. UPMC Presbyterian was the leading center in the nation for the number of lung transplants performed at a single center during FY10, with a total of 126. This campus is also the primary site for surgical treatment of patients with end-stage cardiac disease. A variety of mechanical ventricular assist devices are used as a bridge to transplantation or “destination” therapy (Heartmate, Ventrassist, Levotronix, Heartware, Novocor, Abiomed and Thoratec); 42 devices were implanted at UPMC Presbyterian in FY10.

The division is composed of 23 faculty who are experts in their subspecialty and offers world-class opportunities for both basic and advanced training in adult cardiothoracic anesthesiology. The majority of CA-2 residents receive their initial exposure to cardiac anesthesiology at the UPMC Presbyterian campus. CA-3 residents are offered a three-month elective in advanced adult cardiac anesthesiology. Adult cardiothoracic anesthesiology fellows (CA-4) have the opportunity to receive advanced training in the subspecialty beyond the CA-3 year, inclusive of: emergency and elective surgery, TEE, perfusion/ventricular assist device theory and operation, management of patients with electrophysiologic cardiac disturbances requiring ablation therapy or implantation of AICD/pacemakers, management of patients for minimally invasive implantable cardiac devices in the cardiac cath lab, cardiothoracic critical care medicine, and heart/lung transplantation.

The cardiothoracic anesthesiology faculty perform intraoperative transesophageal echocardiography (TEE) on all patients undergoing cardiac and transplant surgery. Cardiothoracic anesthesiology fellows have the opportunity to obtain extensive exposure to intraoperative TEE to develop their skills in diagnostic TEE. Fellows who successfully complete the training program are strongly encouraged to take the PTEeXAM administered by the National Board of Echocardiography.
In FY10, the mission of the Acute Interventional Perioperative Pain Service (AIPPS) remained the coordination and standardization of the perioperative pain management of patients undergoing surgery at UPMC. AIPPS performed 43,380 regional procedures, consults, and follow-up visits. In FY10 the division performed 20,267 nerve blocks, which represented an increase of 16% compared to FY09. Two hundred and eighty five epidurals were performed by the members of AIPPS at their respective hospitals. AIPPS performed a total of 5,841 paravertebral blocks, including 4,600 continuous paravertebral blocks and 1,241 single paravertebral blocks.

In November 2009, the division held its Fifth Annual UPMC Pain Management Symposium, with over 250 attendees. The Fourth Update in Regional Anesthesia and Ultrasound Techniques Workshop, held in the spring, had an attendance of over 100. Both meetings were held at the Nemacolin Woodlands Resort. In addition, several members of the division participated in various national and international ultrasound workshops.

The division hosted five regional anesthesia fellows, one Schertz Research Fellow, and two international fellows from July 2009 through the end of April 2010. Fellows rotated at UPMC Presbyterian, UPMC Montefiore, UPMC Shadyside, and UPMC Mercy, beginning in February 2010. Furthermore, a total of four pediatric and four chronic pain fellows rotated for one month at the UPMC Shadyside campus.

During FY10, a total of nine CBY residents rotated with AIPPS at UPMC Presbyterian; 10 CA1 and CA2 residents rotated for at least a week at the UPMC Presbyterian campus for an acute pain rotation, while 11 CA3, 10 CA2, and five CA1 residents rotated at UPMC South Side for the regional rotation. A total of seven CA-3 residents rotated for one month at the UPMC Shadyside or UPMC Mercy for an elective advanced regional anesthesia/acute pain rotation, while 17 CA-2 residents rotated at UPMC Shadyside or UPMC Mercy for an acute pain rotation.
The UPMC Pain Medicine Program is a multidisciplinary clinical, teaching, and research endeavor spread over six clinic locations: UPMC St. Margaret, Centre Commons in East Liberty, Oakland campus, Monroeville, UPMC Passavant, and UPMC Mercy. 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 program’s physicians treat conditions such as 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 treatment team develops and coordinates programs designed to reduce pain and suffering whenever possible and assist patients in coping with any remaining discomfort; reduce disability to restore a more normal, meaningful, and satisfying life; reduce emotional distress caused by chronic pain; reduce dependency on drugs and on the healthcare system; and facilitate, as appropriate, the patient’s return to gainful employment and usual household and leisure activities.

During FY10, Pain Medicine physicians oversaw 43,580 visits: 6,894 at UPMC St. Margaret, 15,503 at Centre Commons, 2,543 at Oakland campus, 3,992 at Monroeville, 4,838 patient visits at UPMC Passavant, 7,281 at UPMC Mercy, 228 at the South Hills Surgery Center, and 2,301 at UPMC Shadyside. Interventional modalities are carried out at all six 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.
FY10 was a productive year for the division of basic research. Researchers received a total of $5,463,573 in extramural grants, $5,175,575 of which was from the National Institutes of Health (NIH). The department continues to rank in the top ten anesthesiology departments in NIH funding nationwide.

Building on the success of last year’s inaugural Anesthesiology Research Day, the Department of Anesthesiology joined forces with the departments of Critical Care Medicine, Emergency Medicine, and Physical Medicine and Rehabilitation (PM&R) and the Peter M. Winter Institute for Simulation, Education, and Research (WISER) to present the first ever Safar Symposium Multi-Departmental Trainees’ Research Day in June 2010. This collaborative event was designed to highlight research in areas spanning the interests of the late Dr. Peter Safar. Over 90 scientific abstracts encompassing a range of basic and clinical research were submitted, and the department was well represented with 35 posters from postdoctoral fellows, residents, graduate and medical students, and undergraduates.

The division continues to encourage and foster research activity among the anesthesia residents. As a follow up to the Resident Research Symposium held in FY09, a Problem Based Learning Discussion (PBLD) on the topic of “Research” was developed and presented to the residents. Using a clinical case scenario, this PBLD was designed to educate residents on the practical aspects of conducting a research project, from the formulation of a research idea to completion and submission of a manuscript. The program was developed and presented jointly with the University’s Clinical and Translational Science Institute (CTSI). Over the last several years, the basic research division has developed a strong relationship with CTSI staff, who have proven to be a valuable institutional resource for our faculty and trainees.

The division also hosted three postdoctoral scholars in the NIH funded T32 program “Research Training in Anesthesiology and Pain Management.” This training program is designed to develop clinician-scientists who will be leaders in the field of anesthesiology research. The division continues to cultivate residents with research interests as future T32 trainees and has several in the pipeline to join the program as T32 postdoctoral scholars in the future.

The department was awarded a FAER (Foundation for Anesthesia Education and Research) grant beginning in summer 2008, with two slots for a Medical Student Anesthesia Research Fellowship (MSARF). This program encourages talented medical students to consider careers in anesthesiology research and perioperative medicine and offers them an eight-week anesthesia-related research experience and the opportunity to present research findings at the American Society of Anesthesiologists (ASA) Annual Meeting. In the summer of 2009, the department hosted two MSARF fellows, as well as one in the summer of 2010.
Basic Research Investigators

**Inna Belfer MD, PhD, Associate Professor and Director, Molecular Epidemiology of Pain Program**  Genetic and Non-Genetic Factors Contributing to Chronic Postmastectomy and Postlumpectomy Pain; Genetic Determinants of Labor-Related Pain and Analgesia; Expression of Pain Candidate Genes in Human DRG; Genotyping of Overlapping Hits from Drosophila, Rat and Human Genome-Screen Studies

**Feng Dai PhD, Assistant Professor**  Genome Scan for Sex-specific Obesity Susceptibility Loci Among Samoans; New Statistical Methods for Pain and Symptom Research; Statistical Analysis Plan for Genome Wide Association Study (GWA) of Human Pain

**Gerald F. Gebhart PhD, Professor and Director, Pittsburgh Center for Pain Research**  Mechanisms and Modulation of Visceral Pain; Peripheral Contributions to Bladder Sensitivity

**Michael S. Gold PhD, Professor**  Mechanisms Underlying the Sensitization of Dural Afferents; The Impact of Gonadal Hormones on Ion Channels Controlling the Excitability of Dural Afferents; The Impact of Persistent Inflammation on the Regulation of Intracellular Ca2+ and its Impact on Ca2+-Dependent Potassium Channels; 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; Effects of Artemin on Nociceptors (Collaboration with Department of Medicine Professor Kathryn Albers PhD)

**Brian Williams MD, MBA, Professor**  Enhancing Post Traumatic Pain Relief with Alternative Perineural Drugs

**Gregg E. Homanics PhD, Professor**  G Protein Modulation of Glycine Receptor Function and Ethanol Action; Ethanol Mechanisms in GABAA-R Gene-Targeted Mice

**Eric E. Kelley, PhD, Research Instructor**  Nitric Oxide Production from Xanthine Oxidase; Critical Reevaluation Of Xanthine Oxidase-Derived Reactive Species; Febuxostat Is a More Potent Inhibitor of Gag-Immobilized Xor than Allo/Oxypurinol: Implications for Targeting Vascular Ros Production

**William Lariviere PhD, Assistant Professor**  Genetics of Variation in Mechanosensation; Genetic Risk Factors of Susceptibility to Inflammatory and Neuropathic Pain; Genetic Risk Factors for Opioid-Induced Side Effects

**Joseph Samosky PhD, Assistant Professor & Director of Simulation and Medical Technology Research and Development Center**  A Comprehensive Training Simulator of Peripheral Anesthesia with Ultrasound and Neurostimulator Guidance: A Hybrid Physical-Virtual Reality System; The Tool Positioning Tutor: A Laryngoscope Pose Targeting System with Real-Time 3D Tracking; Pac-Sim: A Pulmonary Artery Catheterization Trainer; Biomimetic Materials and 3d Fabrication Techniques for Anatomic Models; Real-Time “X-Ray Vision” for Healthcare Simulation: An Interactive Projective Overlay System to Enhance Intubation Training; The Smart Mattress: A Closed-Loop Air Mattress Control System to Reduce Pressure Hot Spots and Promote Prevention of Pressure Ulcers

**Pei Tang PhD, Professor**  General Anesthetic Binding To α4β2 nAchR And its Effects On Global Dynamics; Higher Susceptibility to Halothane Modulation in Open-Than in Closed-Channel α4β2 nAchR Revealed by Molecular Dynamics Simulations; Unresponsive Correlated Motion in α7 nAchR to Halothane Binding Explains its Functional Insensitivity to Volatile Anesthetics; Anesthetic Effects on the Structure And Dynamics of the Second Transmembrane Domains Of nAchR α4β2; NMR Structure of the Transmembrane Domain of the N-Acetylcholine Receptor Beta2 Subunit

**Yan Xu, PhD Professor and Vice Chair of Basic Research**  NMR Studies of Mechanisms of General Anesthesia; Maintaining Brain Tissue Viability and Improving Neurological Outcomes After Severe Blood Loss Injuries; Post Treatment of Delayed Cerebral Injuries After Cardiac Arrest by Exogenous Stem Cell Signaling; Registration of Olfactory Events During General Anesthesia; Anesthetic Effects on Ion Channel Structures and Dynamics
The Department of Anesthesiology maintains 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 anesthesiology faculty, as both principal investigators and sub-investigators, to initiate and follow through with a clinical trial. These services include clinical research coordinator (CRC) support and assistance with contract and budget negotiations and Institutional Review Board (IRB) submissions. The CTP is also committed to developing new study opportunities by promoting departmental resources to the pharmaceutical industry as a whole. In addition, the CTP supports the introduction of clinical research to the fellowship program and involvement of fellows. To ensure satisfaction of all legal and ethical requirements, the CTP prepares research protocols and patient consent forms, verifies compliance with federal regulations and good clinical practices, and submits IRB materials. The program also manages all the financial aspects of the clinical trials by developing and negotiating budgets.

CTP staff oversee ongoing trials by training and supervising six full-time clinical research coordinators, coordinating trial initiation, facilitating and monitoring patient enrollment and study progress, and sustaining quality control of data collection and record keeping. Current year consolidated budgets totaled 43% percent over initially proposed sponsor budgets. Several studies met the contracted enrollment and negotiated additional enrollment.

During FY10, the CTP contracted eight new and completed 12 ongoing clinical trials involving over 30 faculty members at five UPMC sites with the following sponsor companies: Avancen LLC, Endo Pharmaceuticals, Merck and Co., Organon (a part of Schering Plough), Quark Pharmaceuticals, Hospira Inc., Javelin Pharmaceuticals, NePathe Inc., and Pfizer Inc. FY10 contracted grants totaled $980,124; direct contracted revenue was $817,226 and indirect contracted revenue was $162,897.
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<td>Jacques E. Chelly MD, PhD, MBA, et al.</td>
<td>A Phase III, Randomized, Double-Blind, Placebo and Active-Comparator-Controlled, Multiple-Dose Clinical Trial to Study the Safety and Efficacy of MK-0663/Etoricoxib and Ibuprofen in the Treatment of Postorthopedic Knee Replacement Surgery Pain</td>
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<td>Jacques E. Chelly MD, PhD, MBA, et al.</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>
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Lawrence Borland MD, et al. Outcomes For Premature Infants Having Herniorrhaphy Surgery Under General Anesthesia: Frequency Cofactor Predictors and Sequelae; Review: A Single Tertiary-Care Pediatric Center’s Experience With Minimally Invasive Surgery And Associated Anesthetic And Surgical Complications

Patricia L. Dalby MD, et al. The Incidence Of Bacteriuria In Women Receiving Labor Epidural Analgesia and Associated Characteristics; Obstetric Crisis Team Training Course (OCTT): 12 Month Review

Tomas Drabek MD, et al. Emergency Preservation with Delayed Resuscitation for Victims of Exsanguination Cardiac Arrest ; Development of a Rat Model of Prolonged Deep Hypothermic Circulatory Arrest (DHCA) to Test Novel Therapies and Improve Neurologic Outcome After DHCA; Development of a Normovolemic Ventricular Fibrillation (VF) CA Model to Further Explore the Potential Benefits of EPR Method

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

Ibtesam Hilmi MD, et al. Prospective Clinical Study Protocol (PI): Pre-emptive Hemodynamic Optimization of High-Risk Patients Undergoing Elective Major Surgical Procedures; Perioperative MI and the Use of Beta Blockers in High-Risk Surgical Patients; Postanesthesia Confusion and Delirium; The Evaluation of Different Oxygen Saturation Monitoring Equipment to Be Used in High-Risk Surgical Population


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

Tetsuro Sakai MD PhD, et al. Role of Tissue Inhibitor of Metalloproteinase – 1 and -2 in Stem Cell Mediated Neuronal Protection in Vitro; Role of Tissue Inhibitor of Metalloproteinase Instem Cell Mediated Neuronal Protection in Vitro

Manuel C. Vallejo Jr. MD, DMD A Randomized, Prospective, Placebo-Controlled, Double Blind Trial to Evaluate The Efficacy Of Preoperative Aprepitant In Patients At Moderate-To-High Risk For Postoperative Nausea (PONV) Undergoing Ambulatory Plastic Surgery; The Use Of The Sonosite® Micromaxx® Ultrasound System To Decrease The Failed Epidural Placement Rate At Magee-Womens Hospital; Prevention Of Dental Injury Under Anesthesia: The Dental Risk Reduction And Injury Prevention Program (DRRIPP); An Audit Of Postdural Puncture Headaches, Wet-Taps, And Failed Regional Anesthetics At Magee-Womens Hospital

Jonathan H. Waters MD Modification of Shear Induced Hemolysis by Anesthetic Agents

Brian A. Williams MD, MBA Outcomes after ACL Reconstruction: Femoral Nerve Block; Psychometric Evaluation of Patient Outcomes after Ambulatory Surgery That Includes Regional Anesthesia; Process Re-Engineering and Health Care Economic Considerations with Regional Anesthesia In Ambulatory Surgery; Benefits of Routine Antiemetic Prophylaxis; Peripheral Nerve Blocks with Multimodal Analgesics; Perineural Analgesics and the Stz-Diabetic Rat Sciatic Nerve

Charles I. Yang MD, et al. Deep Sigh With Air Mix Techniques in Infants and Children; The Effects of Artemin on Nociceptors and Acetylcholine Levels in the Pancreatic Mice Model (PI: Kathryn Albers PhD)

Li-Ming Zhang MD Functional Genomics of Ventilator-Induced Lung Injury (VILI); TLR4-MYD88 Signaling Contributes to VILI; Signaling of S-Nitrosoalbumin in Pulmonary Endothelium
The principal focus of the Pittsburgh Center for Pain Research (PCPR) is the investigation of mechanisms of enhanced pain sensitivity (i.e., hyper-sensitivity or hyperalgesia) that develop following tissue insult. Because pain arising from internal organs is least well understood among sources of pain, recent research has addressed mechanisms of visceral pain and visceral hypersensitivity. Experimental approaches include: use of knock-out mice to study research questions, in vitro single sensory nerve fiber recording, whole cell patch clamp recording from identified (labeled) sensory neurons, and procedures for quantification or localization of peptides, G protein-coupled receptors, and ion channels that play an important role in pain and hypersensitivity.

GERALD F. GEBHART PhD, Director

The Safar Center for Resuscitation Research (SCRR) addresses “resuscitation medicine” in its broadest sense through programs focusing on traumatic brain injury, cardiopulmonary arrest, hemorrhagic shock, and emergency preservation and resuscitation. Center investigators work closely with the departments of Critical Care Medicine, Surgery, Neurological Surgery, Anesthesiology, Emergency Medicine, and Physical Medicine and Rehabilitation at UPMC.

Several Anesthesiology faculty members conduct research at the SCRR. In FY10, a research team led by Tomas Drabek MD studied methods to improve outcomes after cardiac arrest. The group established a novel concept of emergency preservation with delayed resuscitation (EPR) for victims of exsanguination cardiac arrest. “Emergency preservation” utilizes an ice-cold aortic flush to rapidly achieve deep hypothermia that would prevent further damage and allows time for transport and damage control surgery. Delayed resuscitation is then achieved via cardiopulmonary bypass. Dr. Drabek’s group developed a rodent EPR model to define potential therapeutic targets and develop drugs that would augment the effect of hypothermic preservation. They found that rapid induction of deep hypothermia (15°C) allowed rodents to survive an otherwise lethal insult with excellent outcome. The group also established a rat model of prolonged deep hypothermic circulatory arrest (DHCA) to test novel therapies and improve neurologic outcome after DHCA and developed a normovolemic ventricular fibrillation CA model to further explore the potential benefits of EPR. Dr. Drabek’s work in these models is funded by the American Heart Association and the Laerdal Foundation and is focused on the role of microglia in the evolution of secondary injury and repair along study of the interaction between hypothermia and the microglial response.
The North American Malignant Hyperthermia Registry (NAMHR) contains over 3,000 reports of *in vitro* diagnostic testing for Malignant Hyperthermia (MH) susceptibility (muscle contracture tests, or CHCTs), over 700 reports of adverse metabolic reactions in anesthetized patients (AMRAs), and 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. The MH Association of the United States (MHAUS) provides financial support for maintenance and development of the NAMHR. Results of genetic screening of the ryanodine receptor gene type one (RYR1) in diagnostic molecular genetics labs such as that at UPMC are being added to the NAMHR database.

In the past several years the NAMHR has supported several studies by investigators from UPMC and elsewhere, including documentation 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 CHCT 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 the recrudescence after malignant hyperthermia reactions.

Relatively few doctors specialize in MH. In an effort to increase MH awareness and educate physicians on MH treatment and diagnosis, MHAUS obtained a grant from the National Institute of Arthritis and Musculoskeletal and Skin Diseases, and with additional support from the Office of Rare Disease Research, MHAUS, and UPMC, conducted a conference entitled, “Malignant Hyperthermia (MH) - New Insights and Connections with other Myopathies” at UPMC Mercy Hospital in April 2010. Physicians from around the world attended the conference and several world-renowned MH experts presented and shared their research expertise. The NAMHR staff was pleased to introduce the directors of the MH Diagnostic Centers in North America to the new offices of the NAMHR in Mercy Hospital.
The Division of Ambulatory Anesthesia 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, entitled the “WAKE Score,” which outline recovery parameters after ambulatory surgery. 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). The clinical research foundations of the WAKE Score and the Division of Ambulatory Anesthesia originated in the Sports Medicine Anesthesia Clinical Pathway, which was created at UPMC Montefiore in 1996 and became known later as the Outpatient Regional Anesthesia Service (1998–2008 at UPMC Montefiore, then UPMC South Side). The WAKE score was authored by Brian A. Williams MD, MBA and Michael L. Kentor MD, Chief Anesthesiologist at UPMC South Side. Several ambulatory anesthesia research studies were conducted in FY10, including investigating femoral nerve block effectiveness, measuring patient outcomes after ambulatory surgery, comparing regional and general anesthesia, developing recommendations for low-risk antiemetic prophylaxis, and developing a multimodal analgesic single-injection nerve block.

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 eight years, MEPP researchers have simultaneously addressed the development and extension of analytic approaches for identifying and characterizing genotype-phenotype relationships and the application of those approaches to a variety of complex phenotypes for conditions such as postsurgical and chronic neuropathic pain, pain-related mood and motor disorders, and psychiatric diseases. A complementary research focus is the analysis of human Dorsal Root Ganglia (DRG) sensory neurons using genomic and proteomic tools. In addition, the MEPP is utilizing histology and immunocytochemistry and the study of pain candidate gene expression patterns as functional genomics follow-up for significant hits from association studies.
In April 2010, Dr. Rita M. Patel (Program Chair), Dr. Shawn T. Beaman (Course Director), and 39 academic faculty of the Department of Anesthesiology presented a five-day Anesthesiology Board Review Course at the Renaissance Hotel in Pittsburgh. The course’s objective is to provide anesthesiologists and other health care professionals with current, relevant information to prepare for the American Board of Anesthesiology Certification Examination and Maintenance of Certification Examination. Complex principles emphasizing physiology, pharmacology, and physics necessary for state-of-the-art practice are explained in a comprehensive and easy to understand manner. The program offers a comprehensive, concise, and practical review of important core information in the field and management of patients in various subspecialty areas, and overviews of techniques for regional anesthesia and airway management are presented. In addition, an introductory test-taking skills lecture offers advice on strategically approaching the oral and written board examinations. The course also offers participants the opportunity to participate in simulation sessions at the Peter M. Winter Institute for Simulation, Education, and Research (WISER). Each clinician-scholar was responsible for reviewing and presenting a critical topic in anesthesiology, pain, or critical care medicine. Topics included: Acute Pain Management; Ambulatory Anesthesia; Anesthesia Equipment; Anesthesia for Endocrine Disorders; Anesthesia for Obesity and GI Disorders; Anesthesia for Organ Transplantation; Anesthesia for Trauma and Burns; Anesthesiology and the Geriatric Patient; Anesthetic Implications of Perioperative Medications; ASA Difficult Airway Guideline Concepts; Autonomic Nervous System; Cardiovascular Anesthesia; Cardiovascular Drugs and Resuscitation; Cardiovascular Physiology; Chronic Pain; Chroni c Pain Management and Autonomic Blocks; Critical Care Medicine and Anesthesiology; Ethical and Professional Issues in Anesthesiology; Fluids, Electrolytes, and Acid-Base Balance; Hemostasis and Hemotherapy; Inhalational Anesthetics; Interactions and Genetics; Intravenous Anesthetic Agents; Introduction to Test-Taking Skills and the Written and Oral Boards; Legal Issues in Anesthesiology; Local Anesthetics; Monitoring, Positioning, and Temperature; Neuromuscular Blockades Drug Effects, Monitoring and Reversal Agents; Neurophysiology and Neuroanesthesia; Obstetric Anesthesia; Off-Site Anesthesia; Otolaryngology and Ophthalmology; Patient Safety and Risk Management; Pediatric Anesthesia; Peripheral Nerve Blocks and Orthopedic Surgery; Physics and Statistics; Postoperative Care; Preanesthesia Evaluation; Renal Physiology, Disease and Urologic Procedures; Spinal and Epidural Anesthesia; and Thoracic Anesthesia.
GRAND ROUNDS ONLINE  In response to concerns over time and distance constraints limiting physician attendance at grand rounds, Drs. Rita M Patel and Charles Boucek, Director of the Grand Rounds Program, developed the Anesthesiology Grand Rounds On-Line. This program allows viewing of digitally recorded presentations on-line from any computer with internet access. Multiple-choice review questions and an evaluation form are included with each presentation, and CME credit may be earned for review of modules up to 45 days from the date of posting. The modules are archived on-line indefinitely as an educational resource. In FY10, approximately 174 faculty members viewed 24 presentations, obtaining over 2,900 hours of CME credit. Evaluations and informal feedback from the faculty has been extremely positive, and the program continues to be refined.

ACADEMY OF MASTER EDUCATORS The University of Pittsburgh School of Medicine Academy of Master Educators (AME) recognizes and rewards excellence in education, advances education through innovation and professional development of faculty, and supports and promotes educational scholarship. Five department faculty are members of the 67-member academy: Drs. Michael P. Mangione, William R. McIvor, Rita M. Patel, Steven L. Orebaugh, and Paul E. Phrampus. Members of the academy must be involved with the education of medical students, graduate students, and/or residents for the duration of appointment to the academy. Drs. Mangione, McIvor, Orebaugh, Patel, and Phrampus were selected from the University of Pittsburgh School of Medicine faculty based upon their exceptional contributions to medical education. Dr. Patel serves as a member and former chair of the AME Task Force on Teaching Residents to Teach, which implemented the “Applying Principles and Practice of Learning and Education” (APPLE) curriculum in July 2008. The committee also developed and presented “Introduction to Teaching” to approximately 500 new residents and fellows at the UPMC Medical Education Program System-Wide Orientation Program in June 2010.
The Department of Anesthesiology medical student programs are recognized nationally as among the best in the nation. Faculty members continued their enthusiastic participation in clinical teaching during the anesthesiology clerkship and in the electives offered by the department.

The summer preceptorship program was again offered in FY10. This program exposes first-year medical students to clinical medicine and to the field of anesthesiology, including management of acute pain 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. This year’s preceptorship was conducted at UPMC Presbyterian and Montefiore hospitals.

The Clinical Procedures Course is directed by Drs. Rita Patel and Ryan Romeo and is designed for second-year medical students just prior to the start of third-year 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 and received a brief introduction to hemodynamic monitoring and interpretation of blood-gas reports. Students learned how to assess back pain, perform lumbar punctures and insert nasogastric tubes and Foley catheters. Students performed intravenous cannulation and venipuncture using universal precautions. The Department of Anesthesiology is unique because of our faculty’s extensive involvement in medical student education. Very few U.S. medical schools offer 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 96%. Students said they valued the opportunity to learn these basic procedures prior to performing them on patients.

The mandatory Surgery and Perioperative Care Clerkship consists of an eight-week course with fully integrated anesthesiology and surgery segments. Students also participate in month-long electives, which provide in-depth exposure to anesthesiology. Four electives are offered: General Anesthesiology, Anesthesiology Research, Sub-specialties in Anesthesiology, and Pain Medicine. A total of 33 students participated in anesthesiology electives; 29 in the general anesthesiology course and four in the pain medicine course. Student evaluations show that these courses continue to be well received, primarily due to the enthusiastic involvement of the faculty.
**SCHOLARLY PROJECTS** Several Anesthesiology faculty mentored medical student scholarly projects in FY10:

<table>
<thead>
<tr>
<th>Mentor</th>
<th>Student</th>
<th>Project</th>
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<tbody>
<tr>
<td>Inna Belfer MD, PhD</td>
<td>Christina Lee</td>
<td>Protein, RNA, and DNA Integrity in Human Dorsal Root</td>
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<td>Ganglia and Trigeminal Nuclei as a Function of Postmortem Time:</td>
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<td>Association of SNPs in KCNS1 and GCH1 with mRNA Expression</td>
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<tr>
<td>Barbara Brandom MD</td>
<td>Min-Shue Chen</td>
<td>An Assessment of the Safety of Dantrolene</td>
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<tr>
<td>Barbara Brandom MD</td>
<td>James Wilde</td>
<td>A Survey of Musculoskeletal Pain in Malignant Hyperthermia Susceptible</td>
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<tr>
<td>Jacques E. Chelly MD, PhD, MBA</td>
<td>Diamond Harris</td>
<td>A Randomized Controlled Study Evaluating Preoperative Etanercept on the</td>
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<td>Severity of Postoperative Pain after Inguinal Hernia Surgery</td>
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<td>Patricia L. Dalby MD</td>
<td>Brian Slater</td>
<td>Measuring Patient and Family Satisfaction Following an Emergency</td>
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<td>Obstetric Crisis: A Pilot on the Validity of the Questionnaire</td>
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<td>Tomas Drabek MD</td>
<td>Caleb Wilson</td>
<td>Effects of Depletion of Microglia on Neurologic Outcome</td>
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<td>using Intraparenchymal Clodronate Injection in Prolonged Cardiac</td>
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<td>Arrest Treated with Moderate and Deep Hypothermia in Rats</td>
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<td>Ibtesam Hilmi MB, CHB, FRCA</td>
<td>Kelly Ross</td>
<td>Reviewing the Incidence of Awareness in the Department of Anesthesiolo</td>
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<td>gy, University of Pittsburgh Medical Center, between January 2000 and</td>
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<td>December 2008</td>
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<tr>
<td>Ibtesam Hilmi MB, CHB, FRCA</td>
<td>Dave Wang</td>
<td>Prevention and Management of Fire in the Operating Room: An</td>
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<td>Educational Simulation</td>
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<td>William McIvor MD</td>
<td>Sarah Faeder</td>
<td>A Patient Simulation Pulmonary Physiology Lab</td>
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<tr>
<td>William McIvor MD</td>
<td>Jennifer Zarit</td>
<td>A Collection of Patient Simulations Illustrating Symptoms Consistent</td>
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<td>with Malignant Hyperthermia</td>
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<tr>
<td>William McIvor MD</td>
<td>Roger Huijon</td>
<td>Assessment of Access and Usage Patterns of Simulation in Graduate</td>
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<td>Surgical Education</td>
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<tr>
<td>William McIvor MD</td>
<td>Eric Wise</td>
<td>A Screen-Based Simulation and Tutorial of Inserting a Pulmonary</td>
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<td>Artery Catheter into a Patient</td>
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<td>Manuel Vallejo Jr MD, DMD</td>
<td>Matthew McConnell</td>
<td>Idiopathic Intracranial Hypertension in Pregnancy</td>
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<td>Brian Williams MD, MBA</td>
<td>Christopher Yang</td>
<td>Use of Perineural Analgesics to Produce Longer-Lasting Analgesia.</td>
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<td>Analysis of Histotoxicology Outcomes</td>
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<td>Yan Xu PhD</td>
<td>Renee Dallasen</td>
<td>Dose and Time Dependence of the Molecular Mechanisms Associated with</td>
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<td>Isoflurane-induced Neurotoxicity and Neurogenesis in the Adult Mouse</td>
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**AWARDS**

Best Student in Anesthesiology Award: Robert Groff  
Department of Anesthesiology Peter M. Winter Award for Excellence in Medical Student Teaching: William McIvor MD

**MATCHING** A total of nine UPSOM students (Class of 2010) matched into anesthesiology residencies:

<table>
<thead>
<tr>
<th>Student</th>
<th>Match</th>
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<tbody>
<tr>
<td>Min-Shue Chen</td>
<td>UCLA Medical Center, Los Angeles, CA</td>
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<tr>
<td>Michael Landau</td>
<td>Cleveland Clinic Foundation, Cleveland, OH</td>
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<tr>
<td>Joseph Kwok</td>
<td>Stanford University, Palo Alto, CA</td>
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<tr>
<td>Alexandra Lewis</td>
<td>Beth Israel Deaconess Medical Center, Boston, MA</td>
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<tr>
<td>Matthew McConnell</td>
<td>Ohio State University, Columbus, OH</td>
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<tr>
<td>Philong Ta</td>
<td>SUNY Health Science Center, Brooklyn, NY</td>
</tr>
<tr>
<td>Tom Talamo</td>
<td>UPMC Mercy, Pittsburgh, PA</td>
</tr>
<tr>
<td>Dave Wang</td>
<td>Western Pennsylvania Hospital, Pittsburgh, PA</td>
</tr>
<tr>
<td>Robert Groff</td>
<td>Stanford University, Palo Alto, CA</td>
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</tbody>
</table>
The Anesthesiology Residency Program at the University of Pittsburgh is fully accredited by the Accreditation Council of Graduate Medical Education (ACGME) to provide training and education in anesthesiology leading to certification by the American Board of Anesthesiology. FY10 was a period of excellence and innovation, as we adapted to the emerging and evolving changes that characterize contemporary graduate medical education. Dr. James Ibinson served as Chief Resident and Dr. Brian Bane served as Associate Chief Resident. Thirteen residents completed the Continuum of Education in Anesthesiology and graduated from the program in June 2010.

FY10 was also notable for the continuation of our excellent didactic program. Core topics for the first, second, and third-year residents are provided in seminar and lecture series formats. CA-1 and CA-2 lectures and pertinent multiple-choice questions are posted to a special web site, allowing residents unlimited access and review. Third-year residents participated in a curriculum consisting of evidence-based medicine, case management, and oral board preparatory sessions. Case management sessions are presented in the ASA Problem-Based Learning Discussion (PBLD) format to facilitate active learning in small groups. The educational program is augmented by biweekly grand rounds, in which local speakers and visiting professors provide up-to-date reviews of relevant topics. A monthly journal club format was also included in the grand rounds curriculum. During these sessions, residents from each class research and present important articles with the goals of increasing their understanding of scientific literature and sharpening their presentation skills. The CA-1 and CA-3 curriculum includes mock oral examination sessions in the fall and spring. Subspecialty rotations during the CA-2 year also include mock oral board examinations as part of the rotation.

In addition to regular attendance at lectures and grand rounds, residents are required to participate in at least one session of the clinical procedures course. This opportunity allows the residents to teach medical students in a traditional classroom setting, in addition to their clinical teaching during the medical student clerkships and electives. Residents are also encouraged to participate in the Western Pennsylvania Society of Anesthesiologists’ monthly lecture series.

The residency program curriculum includes a resident system-based practice project, which is required of every CA-3 resident. This project consists of identifying a system-wide problem/issue and addressing it by conducting appropriate research, writing a paper, and presenting an executive summary to the departmental executive steering committee. Upon completion, these projects represent complete investigations and potential solutions to departmental clinical issues.

Excellent clinical teaching and experience, combined with a high volume and diversity of cases, has always been a prominent feature of the residency program. Residents complete subspecialty rotations in pediatric anesthesia, obstetrical anesthesia, critical care medicine, geriatric anesthesia, and pain medicine. The program provides additional training in the management of advanced medical and surgical cases in subspecialty areas including cardiac anesthesia, neuroanesthesia, thoracic anesthesia, liver-transplantation anesthesia, regional/ambulatory anesthesia, and the post anesthesia care unit (PACU). The residency program at the University of Pittsburgh remains nationally renowned for the quality of education provided, diversity and volume of clinical cases, and the performance of its residents.
GRADUATING RESIDENTS

Graduate

Brian Bane MD
Thomas Borsari MD
Mariam El-Baghdadi MD
John Hache MD
Denise Hall-Burton MD
James Ibinson MD, PhD
Lavinia Kolarczyk MD
J. Ted Ley MD
Koshy Mathai MD
W. Ty Muhly MD
Nicole Scouras MD
Havyn Skorupan DO
Adam Tune MD

Post-Residency

Completing military service obligations (Keesler AFB, Biloxi, MS)
Completing military service obligations (Andrews AFB, Washington, DC)
Pain medicine fellowship at University of Texas MD Anderson Cancer Center
Pain medicine fellowship at UPMC
Pediatric anesthesia fellowship at UPMC
Completing T32 research fellowship and joining faculty at VAPHS
Cardiac anesthesia fellowship at UPMC
Pediatric anesthesia fellowship at Children’s Hospital Los Angeles
Pain medicine fellowship at UPMC
Pediatric anesthesia fellowship at Children’s Hospital of Philadelphia
Private practice group in North Carolina
Completing military service obligations (Wright-Patterson AFB, Dayton, OH)
Pain medicine fellowship at UPMC

TEACHING AWARDS

Dr. Leroy Harris Excellence in Teaching Award: Richard McHugh MD

Excellence in Clinical Teaching of Residents: Fenny Anthikad MD, Paul Bigeleisen MD, Gordon Mandell MD, Mario Montoya MD, Steven Orebaugh MD, Kathirvel Subramaniam MD, Cynthia Wells MD, Jeffrey Varga MD
RESIDENT AWARDS

Dr. Mark Backeris: second place in the category of original research at the Western Pennsylvania Society of Anesthesiologists (WPSA) Resident Research Competition for his research project entitled “Financial Implications of Different Interpretations of ACGME Anesthesiology Program Requirements.”

Dr. Benjamin Grable: second place at WPSA for his case report, “Isolated Left-Sided Pulmonary Edema Due to Alemtuzumab (Campath®) During Kidney Transplantation,” also presented at the 2009 Annual Meeting of the ASA.

Dr. James Ibinson: first place in the Clinical Research category at the Pennsylvania Anesthesiology Residency Research Conference (PARRC) for his project, “The Efficacy of Aprepitant in Patients at High Risk of PONV Undergoing Ambulatory Plastic Surgery,” which also received the award of Best Overall Poster at the Safar Symposium Multi-Departmental Trainees’ Research Day.

Dr. Lavinia Kolarczyk: first place in the original research category at WPSA for “Transient Thermal Hyperalgesia After Resolution of Ropivacaine Sciatic Nerve Block in Rat,” which also won second place at the PARRC and Best Poster submitted by the Department of Anesthesiology at the Safar Symposium Multi-Departmental Trainees’ Research Day.

Dr. Scott Muir: first place at WPSA for his case report, “Malignant Hyperthermia Presenting Initially as Acute Respiratory Distress Syndrome After Multiple Self-Induced Exposures to Sevoflurane.”

Dr. Nicole Scouras: Department of Anesthesiology Mark H. Gilliand MD Award for Best Clinical Resident.

Dr. Giorgio Veneziano: first place at PARRC for his case report entitled, “Ultrasound Imaging Reveals Trans-Fascial Stimulation of the Median Nerve with Maldistribution of Local Anesthetic.”

CONFERENCES & SCHOLARLY ACTIVITIES

Faculty, residents, fellows, and medical students participate in numerous scientific meetings. Here are some highlights from the Department’s many scholarly activities:

American Society for Anesthesiology (ASA) Annual Meeting - New Orleans, LA, October 17-21, 2009

- 5 Problem-Based Learning Discussions (PBLDs)
- 8 Workshops
- 22 Medically Challenging Cases
- 7 Faculty serving on ASA committees
- 1 Fourth-year student sponsored as official student delegate to the meeting

Society for Education in Anesthesia (SEA) Annual Meetings - Fall meeting, New Orleans, LA, October 16, 2009, Spring meeting, Pittsburgh, PA, June 4 - 6, 2010

- 2 Presentations
- 1 Workshops
- 1 Panel Discussion
- 10 Curriculum posters
- 1 Scientific posters
- 11 faculty served on SEA committees
- Ryan C. Romeo MD - spring meeting program chair
- Tetsuro Sakai MD, PhD - Best Abstract award, spring meeting
The Department of Anesthesiology offers ten fellowship training programs, including Accreditation Council of Graduate Medical Education (ACGME)-accredited fellowships in pediatric anesthesiology, pain medicine, anesthesiology critical care medicine, and adult cardiothoracic anesthesiology:

**CARDIAC:** Erin A. Sullivan MD  
Fellows receive advanced training in adult and pediatric cardiothoracic anesthesiology inclusive of emergency and elective surgery, TEE, perfusion/ventricular assist device theory and operation, cardiothoracic critical care medicine, and heart/lung transplantation. Fellows are also eligible to take the PTEeXAM administered by the National Board of Echocardiography; **CRITICAL CARE MEDICINE:** A. Murat Kaynar MD  
Fellows in this one-year program may rotate through radiology and general medical-surgical, coronary care, and surgical specialty ICUs such as cardiothoracic, burn, trauma/general surgery, neurosurgical, obstetric, liver and abdominal visceral transplantation, and general pre- and postoperative surgical critical care; **HEPATIC TRANSPLANTATION:** Raymond M. Planinsic MD  
Fellows complete a three to nine month rotation. They perform anesthetic care at a high level of independence and are strongly encouraged to participate in research activities. This rotation is intended to train fellows to become a transplantation consultant and/or a director of a liver transplantation 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; **NIH T32 POSTDOCTORAL RESEARCH:** Yan Xu PhD  
This fellowship is designed to develop clinician-scientists who will be leaders in the field of anesthesiology research. Fellows are paired with established investigators in a variety of disciplines so that they may explore research problems relevant to anesthesiology; **OBSTETRIC:** Manuel C. Vallejo Jr. MD  
This fellowship provides advanced experience in all aspects of obstetric anesthesiology, including research, administration, and clinical management of the complex obstetrical-gynecological patient; **ORTHOPEDIC:** Jacques E. Chelly MD, PhD, MBA  
This one-year program includes clinical training in orthopedic anesthesiology, acute pain and rehabilitation, along with research activities and educational curricula; **PAIN MEDICINE:** Doris K. Cope MD  
The one-year program is fully accredited by ACGME. Fellows rotate through outpatient services at various UPMC locations and collaborate with psychologists, physical therapists, occupational therapists, and pain medicine physicians from other disciplines; **PEDIATRIC:** Franklyn P. Cladis MD  
The ACGME-accredited fellowship is designed to develop clinical expertise in caring for routine and complicated pediatric surgical patients. Based at Children’s Hospital of Pittsburgh of UPMC (a Level 1 Trauma Center), fellows will also understand the complex airway management needs and resuscitation procedures of pediatric trauma patients; **REGIONAL:** Jacques E. Chelly MD, PhD, MBA  
The fellowship develops expertise in the practice and theory of regional anesthesiology and acute pain management techniques and understanding of the related physiology and pharmacology in the provision of patient care.

### 2010 DEPARTING FELLOWS

**PAIN MEDICINE**  
Muhammad Arif MD; E. Mikhail Bishai MD; Heath Fallin MD; Maureen Ginsburg DO; Spring McCann MD; Arik Mizrachi MD; Walid Osta MD; Patrick Watson DO; Barry Wilson MD

**PEDIATRIC ANESTHESIA**  
Neal Campbell MD; Daniela Cean DO; Thomas Chalifoux MD; Bryan Fritz MD; Sobia Mansoor MBBS; Sibi Pappachan DO; Mei Lene Wu MD

**OB ANESTHESIA**  
Joel Pomerantz MD; Gaurav Rajpal MD

**CARDIAC ANESTHESIA**  
Christopher Hodge MD; Richard McAfee MD

**REGIONAL ANESTHESIA**  
David Ruttum MD; Vladislav Shick MD; Jonathan Tlachac MD; Richa Wardhan MBBS; Sylvia Wilson MD
The Peter M. Winter Institute for Simulation, Education and Research (WISER) is dedicated to healthcare education and educational research. WISER applies advanced instructional technology, including the use of various forms of simulation as well as the University of Pittsburgh standards of excellence and professionalism to study the efficacy of educational training programs and their impact on learning and clinical care. The objectives of WISER are as follows: 1) create a safer environment for patients and improve healthcare operational efficiency by using simulation and other state of the art educational technology in the training and assessment of the healthcare system professionals, 2) serve as a laboratory to research the use of simulation and other advanced instructional technology in healthcare education, and to publish the results, 3) create simulation-based education programs for primary education in various domains of the healthcare delivery system, 4) develop and validate simulation-based technology as a competency assessment evaluation tool for healthcare professionals, and 5) contribute to the education and mentorship of future generations of healthcare system educators and education researchers interested in creating or evaluating simulation based teaching methodologies.

WISER offers many anesthesia and non-anesthesia-based courses that continue to improve patient safety throughout the health system. The anesthesia difficult airway management course is offered to residents, SRNAs, CRNAs, and attending physicians. It was created to allow participants the opportunity to obtain working knowledge and proficiency of the ASA Difficult Airway Management Guidelines and its associated airway management techniques and equipment. WISER also offers a fiberoptic bronchoscopy course, which provides the trainee with a firm foundation in the principles and psychomotor skill sets necessary to rapidly become clinically proficient in the basic and advanced uses of the fiberoptic bronchoscope in the anesthesia domain. A central venous cannulation course focuses on proper central line placement, including
the use of ultrasound guidance and manometry for locating and verifying venous access sites.

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

WISER held 1,366 classes in FY10, with 11,542 educational encounters. Over 3,000 individual students, ranging from undergraduate nurses to anesthesiologists with decades of experience, logged over 42,000 hours of class time. WISER was fortunate to have over 260 instructors teach in 106 separate courses during the year. Classes occupied 14,223 room hours throughout the year. With recent expansions in nursing school classes and new courses for professional health care providers, WISER is projected to have an even busier 2011.

WISER opened a new satellite training facility in the emergency department of Children’s Hospital of Pittsburgh of UPMC (CHP), joining existing facilities at UPMC McKeesport and Passavant and the current satellite at CHP. A number of simulation-based training programs have been offered at these facilities.
Department of Anesthesiology faculty generated approximately 125 published peer-reviewed journal papers and numerous book chapters, abstracts, and editorials during 2009-2010. The following are peer-reviewed journal papers that were published in high-impact journals (20,000 or more citations).


Werner DF, Swihart A, Rau V, Jia F, Borghese CM, McCracken ML, Iyer S, Fanselow MS, Oh I, Sonner JM, Eger EI, Harrison NL, Harris RA, Homanics GE. Inhaled anesthetic responses of recombinant receptors and knockin mice harboring {alpha}2(S270H/L277A) GABAA receptor subunits that are resistant to isoflurane. J Pharmacol Exp Ther 2010 Aug 31. [Epub ahead of print]


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

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

- University of Pittsburgh Graduate and Professional Bulletin, www.bulletins.pitt.edu/graduate/about.htm

**Distinctions:**

- Ranked 11th among U.S. public institutions of higher education, 25th among all U.S. universities, and 31st in the world in the new “High Impact Universities 2010”

- Ranked in the very top cluster of the nation’s public research universities in the 2009 edition of “The Top American Research Universities”

- Long-standing rank in the top 10 American universities in grant funding from the National Institutes of Health (NIH)

- Ranked in the top 10 universities in total federal science and engineering research and development support
UPMC is an $8 billion global health enterprise with almost 50,000 employees headquartered in Pittsburgh, PA, and is transforming health care by integrating 20 hospitals, 400 doctors’ offices and outpatient sites, a health insurance services division, and international and commercial services. Redefining health care by using innovative science, technology, and medicine to invent new models of accountable, cost-efficient, and patient-centered care, UPMC is taking medicine from where it is to where it needs to be. UPMC is western Pennsylvania’s largest employer and the second largest employer in the Commonwealth. A recognized innovator in information technology, UPMC has deployed an electronic health record across its hospitals and is developing a semantic interoperability solution to unify information from multiple systems. These capabilities, which are being developed in collaboration with industry leaders like Cerner, GE, and IBM, will result in products that are commercialized nationally and abroad. UPMC is commercializing its expertise, bringing world-class health care, advanced technologies, and management skills to markets throughout the world through: clinical services management, infrastructure consultation, strategic and commercial product development partnerships, translational sciences, and national security and public health. Each component is designed to drive transformation of health care delivery worldwide. Internationally, UPMC operates a hospital specializing in transplant in Italy and two cancer centers and a hospital in Ireland; is implementing information technology solutions in the United Kingdom; will manage a biomedical research center in Italy; and is providing ongoing clinical teaching and training in Family Medicine at a 1,265-bed teaching hospital in Japan. To learn more about UPMC, visit www.upmc.com.

- UPMC Media Relations

In 2010, UPMC once again ranked in the top 14 of US News and World Report’s Honor Roll of the “nation’s best hospitals.” UPMC was also ranked in the top 10 in seven specialties.
Living in Pittsburgh

Pittsburgh, PA is a hidden gem. Located in the southwest corner of Pennsylvania, it offers the best of everything — an urban melting pot, historical landmarks, ethnic neighborhoods, a vibrant nightlife, picturesque countryside, and the famous three rivers. Pittsburgh is home to many “greats”:

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

Distinctions
- “Most Livable City in the US,” Forbes, Yahoo!, and The Economist
- 29th Most Livable City in the World, The Economist
- Best Places to Raise Your Kids, BusinessWeek
- 10th Best Walking Place in America, Prevention
- Second Best Baseball Stadium to Visit, Forbestraveler.com
- 4th Best Zoo in the Country, Parents Magazine
- 7th Most Affordable Place to Retire, Retirement Places Rated and U.S. News

Sports
- Pittsburgh Steelers - 6 time Super Bowl Champions/8 time AFC Champions
- Pittsburgh Penguins - 3 time Stanley Cup Winners

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

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 2010**

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