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Critical Care Medicine General Description

Introduction

The Department of Critical Care Medicine at the University of Pittsburgh was founded on December 5, 2001. Upon its founding, it became the first stand-alone department of critical care medicine in the United States. Since 2008, the Department has been led by Derek Angus, MD, MPH, who holds the Mitchell P. Fink Chair of Critical Care Medicine, an endowed chair that was established to honor the founding chairman of the Department. Under Dr. Angus’ leadership, the Department has gained an international reputation as a leader in critical and acute care research.

The Department includes 69 full-time faculty members and two part-time faculty within two divisions: Adult and Pediatric. The Department also has 21 secondary faculty members. During FY20, eight new faculty members were recruited to support the Department’s three core missions: clinical care, education, and research.

Clinical Care

The Department provides high-quality, efficient, and patient-centered care to critically ill patients in UPMC Presbyterian Hospital, UPMC Montefiore Hospital, UPMC Mercy Hospital, UPMC Magee-Womens Hospital, UPMC Children’s Hospital of Pittsburgh (CHP), and the Veterans Affairs Pittsburgh Medical Center. In total, our faculty and fellows provide critical care services in 14 ICUs across six hospitals in Pittsburgh. We manage and provide intensivist coverage for two ICUs at St. Joseph’s Children’s Hospital (SJCH) in Tampa, Florida, and provide SJCH with telemedicine support from CHP, and for one ICU at Florida Children’s Hospital, Orlando as well as provide telemedicine support for child transplant patients at University of Virginia, Charlottesville. The Department also works closely with the UPMC ICU Service Center, which coordinates critical care delivery across the UPMC Health System. In addition, our work within the ICU, we lead the hospital-wide rapid response teams at covered hospitals, providing an essential safety net to hospitalized patients outside the ICU. Our faculty also lead renowned specialty programs in several cutting-edge areas, including critical care after solid organ transplant, extracorporeal membrane support, and obstetric critical care, positioning UPMC as a national leader in subspecialty critical care. Our faculty also actively contribute to various management committees for the UPMC Health System, ensuring seamless integration between UMPC ICUs and other important service lines.

Education

We proudly run the oldest and largest interdisciplinary critical care medicine training program in the country, emphasizing clinical training that is both comprehensive, holistic, and completely integrated into the workflow of acute care medicine. Trainees from our six clinical fellowships graduate with an unparalleled level of expertise and competence obtained from real-world challenges and close mentorship that allows them to confidently assume critical care leadership roles around the world. Many of the present and past chairs of academic critical care medicine and anesthesiology departments are our graduates. These highly visible and influential critical care medicine leaders amplify the impact of our training program beyond our borders. Pitt medical students rotating through our ICUs highly rank our critical care clerkships and once again recognized our faculty with several teaching awards. We also offer several interprofessional education programs for residents, nurse practitioners, and physician’s assistants, strengthening the essential interprofessional nature of modern health care.
Research
Our faculty perform innovative, ground-breaking research in basic, translational, and clinical science, advancing the science of critical care medicine and leading to improved patient outcomes worldwide. Our research activities far exceed national benchmarks, with an annual funding amount of $14.4 million. During FY20, our senior, mid-career and junior investigators allowed us to maintain a diverse portfolio of National Institutes of Health grants. These include Investigator-initiated Research Project awards (R01), Outstanding Investigator Awards (R35) Research Career Program awards (K23); Cooperative Agreements (U01); a Small Research Grant award (R03), an Exploratory/Developmental award (R21), a Clinical Investigator award (K08), a Mid-Career Investigator award (K24), an NIH Director’s New Innovator Award (DP2), and a Phase 1 & 2 Exploratory/Developmental Cooperative agreements (UG3 & UH3); as well as our two long-standing Adult and Pediatric T32 Training Program awards.

Our grant activity is part and parcel with exceptional research productivity: our faculty and trainees combined to publish 290 peer-reviewed original research papers over the past 12 months, many of which appeared in high-impact journals. This, in turn, leads to invitations for our faculty to speak at leading symposia, professional conferences and other invited lectures. Finally, our faculty hold national physician-scientist roles as editors and members on the editorial boards of major acute care journals, including JAMA, American Journal of Respiratory & Critical Care Medicine, Critical Care Medicine, and Pediatric Critical Care Medicine, among others. These impressive statistics speak to the depth of our academic commitment and investigative scope of our faculty members.

Mission Statement

The Mission of the Department of Critical Care Medicine is to provide exemplary care for critically ill patients, conduct cutting edge research related to life-threatening acute medical problems, and to educate tomorrow’s leaders in the field of critical care medicine. We believe that with the strong support of the University, the School of Medicine, and the UPMC Health System, the Department will continue to achieve our mission and contribute to the dramatic growth and prestige of the University.

COVID-19 Pandemic Achievements

The COVID-19 pandemic created an unprecedented challenge to our Department, and we rose to meet the challenge. As ICU physicians and researchers on the front lines, we worked tirelessly to provide both high quality critical care at home and lend our expertise to clinical, research, and education efforts across the globe. These achievements demonstrate our leadership, adaptability, and dedication to the critically ill. Below are several examples of how we led and collaborated.

Clinical COVID-19 Achievements

- TeleICU Support for New York-Presbyterian: The surge in COVID-19 cases during April and May created an unprecedented need for critical care capacity and intensivist skills. Ian Barbash, MD, MS, led the UPMC side of a collaboration with Mayo Clinic to rapidly deploy teleICU services for the NewYork-Presbyterian system. Key logistics included (a) identification and creation of a hybrid rounding/on-demand care model; (b) development of 24/7 staffing workflows for the more than 20 UPMC physicians who volunteered, all of whom required credentialing to obtain disaster privileges for the NYC hospitals and health system; and (c) close collaboration with information technology experts locally and at the New York hospitals to allow for rapid triage of incoming calls and familiarity with multiple new electronic medical records, and to ensure HIPAA-compliant video connections for rounding support.
• **ECMO Team for Western Pennsylvania:** Holt Murray, MD, in collaboration with colleagues at Allegheny Health Network and Pittsburgh VA Healthcare, formed the Western Pennsylvania ECMO Collaboration Team. A group of 14 physicians were available 24/7 to provide immediate guidance and counsel on which COVID-19 patients would benefit from Extracorporeal Membrane Oxygenation support.

• **Spokesperson for the UPMC System:** CMO for the ICU Service Center, Rachel Sackrowitz, MD, acted as the UPMC spokesperson for clinical logistical issues for the more than 30 hospitals in the health system.

**Research COVID-19 Achievements**

• **REMAP-CAP:COVID International Clinical Trial:** David Huang, MD, MPH and Bryan McVerry, MD, from PACCM, coordinated the startup and roll out of the REMAP-CAP:COVID clinical trial as part of a global effort to fast-track testing for COVID-19 therapies. UPMC was the first site in the US to launch, and by July the clinical trial was embedded in the Cerner e-records at 19 hospitals. The first drugs tested were Hydroxychloroquine, convalescent plasma and corticosteroids. The ‘Learning While Doing’ adaptive platform clinical trial model is designed to address the dilemma faced by doctors when deciding between adopting new, often untested, therapies or waiting until longer-duration clinical trials reach a result. CCM’s staff at CRISMA and MACRO were instrumental in managing and facilitating regulatory approvals, expanding academic and industry partnerships, and consenting and recruiting patients.

• **Global Consortium of Neurological Dysfunction:** Two CCM investigators are leading the worldwide study of neurological dysfunction in patients with COVID-19. Sherry Chou, MD, MMSc, heads the adult arm of the Global Consortium Study of Neurological Dysfunction in COVID-19 (GCS NeuroCOVID) and Ericka Fink, MD, MS, is one of three pediatric investigators leading the consortium’s efforts in critically ill children. As of October 15, 2020, the adult arm of the consortium had 121 sites in 23 countries, and the pediatric arm had 95 sites in 25 countries. Plans by GCS NeuroCOVID for these multi-center investigations were outlined in two publications in the journal *Neurocritical Care*.

• **The National Emergency Tele-Critical Care Network:** CCM faculty member Jeremy Kahn, MD, MS, led a team representing UPMC and Pitt to help develop a Department of Defense-funded national network for emergency tele-critical care to support hospitals during the pandemic. This effort involved rapidly creating a mobile phone application to immediately connect overwhelmed clinicians to critical care experts; as well as develop strategies to increase the effectiveness, efficiency, and scalability of emergency telemedicine.

• **Model Hospital Policies for Scarce Resources and Medications:** Douglas White, MD, MAS, led a push to develop two model policies that offered hospitals and health systems a fair and transparent approach for allocating scarce critical care resources and medications. The policies were adopted by multiple states during the pandemic, including Pennsylvania, and made freely available on the Department’s website for download by anyone worldwide.

**Education COVID-19 Achievements**

• **Non-intensivist Training:** In the midst of the surge, skilled intensivists also became a scarce resource. Two second-year fellows adapted our online UPMC Critical Care Curriculum for Residents to create a set of 14 short videos for non-intensivist physicians, who were asked to care for critically ill patients. The videos provide important critical care practices for clinical treatment for respiratory failure, ARDS, shock and mechanical ventilation.
Other Major Achievements

Launch of Children’s Neuroscience Institute
Under the leadership of Hülya Bayır, MD, we launched the Children’s Neuroscience Institute in late 2019. The Institute has become the academic home for Pitt investigators who share a common goal of combating childhood neurological diseases.

UPMC Healthcare Innovation Officer
In late June, chair, Derek Angus, MD, MPH was appointed the first Healthcare Innovation Officer for UPMC. His task is to blend expertise in clinical care delivery with medical research, artificial intelligence, computer science, and social and behavioral sciences to enable UPMC to provide the best care today and learn how to provide better care tomorrow. In early fall 2020, Dean Shekhar appointed Dr. Angus to the complementary role of associate vice chancellor for Health Care Innovation.

Minority Mentoring Program Honored
Patrick Kochanek, MD, director of the Safar Center for Resuscitation Research, was as one of six Pitt faculty to be honored for under-represented minority mentoring at the 40th Anniversary of Pitt’s Diversity Programs—an event that was postponed by the COVID-19 pandemic.

Director of CHP Brain Care Institute
Robert Clark, MD, vice chair for Pediatric Critical Care and associate director of the Safar Center was named director of the UPMC CHP Brain Care Institute.

Two New Leaders Recruited
Rachel Sackrowitz, MD, MBA, was recruited from Advanced ICU Care, a tele-ICU provider based in St. Louis, MO, as the new chief medical officer of the UPMC ICU Service Center. Joining the Department from Wake Forest University School of Medicine, Jonathan Bishop, MD, MBA, was appointed the clinical chief at UPMC Mercy Hospital and medical director of the Medical ICU. Both appointments were effective July 1, 2019.

Medical Student Mentoring Award
Kristina Rudd, MD, MPH, was honored with the Allen Humphrey Excellence in Mentoring Award for her mentorship of a medical student participating in the Dean’s Summer Research Scholarship Program. Dr. Rudd mentored Gabriela Galli, a second-year Pitt medical student, who conducted research on acute kidney injury among adults hospitalized with sepsis in Thailand.

Twelve Faculty Named in Pittsburgh Magazine’s 2020 Best Doctors List
Twelve CCM faculty were listed among the city’s best doctors by Pittsburgh Magazine, including Ali Al-Khafaji, MD, MPH; Rajesh K. Aneja, MD; Derek C. Angus, MD, MPH; Marie Baldisseri, MD, MPH; Hülya Bayır, MD; Joseph Carcillo, MD; Robert S. B. Clark, MD; Scott R. Gunn, MD; Melinda Hamilton, MD, MSc; John A. Kellum, MD; Holt N. Murray, MD; and Lori A. Shutter, MD.
High-Impact Publications

New Adult faculty member, Kristina Rudd, MD, MPH, was first author for a collaborative study with the University of Washington to assess the global burden of sepsis. The results were published in *The Lancet* and announced at the Critical Care Reviews annual meeting in Belfast.


A retrospective cohort study by five CCM pediatric investigators and colleagues examined whether severe hyperoxemia events are associated with mortality among patients admitted to a pediatric ICU. The results were published in *JAMA*.


Sherry Chou, MD, MMSc, was a member of the team formed by the Society of Vascular and Interventional Neurology to draft a national guidance statement about mechanical thrombectomy during the COVID-19 pandemic. The statement was published in *Stroke*.


Douglas White, MD, MAS, who is director for the Program on Ethics and Decision Making in Critical Illness, was instrumental in drafting a model hospital policy for rationing critical care resources, which was published in *JAMA*.


Douglas White, MD, MAS, and two juris colleagues—one from Stanford Law School and Medical School and the other from Denver University College of Law—co-authored an opinion piece in the Perspectives section of the *New England Journal of Medicine* advocating for maintenance of disability rights when making decisions about allocation of scarce medical resources.


Derek Angus and the Adaptive Platform Trials Coalition reviewed the common features and issues that arise with adaptive platform trials and offered recommendations to promote best practices in APT design, conduct, oversight and reporting. It was published in *Nature Reviews Drug Discovery*.

News Media Coverage

Mainstream news media often cover critical care research results and seek the expertise of our faculty to provide insight and opinion on health issues in the news. Our experts are at the forefront of COVID-19 patient care and clinical trials for effective treatments as well as thought leaders on ethical and management issues of critical care resources. Consequently, they were much sought after by journalists seeking expert commentary on pandemic-related topics. This, in turn, made the past year exceptional for the volume of news coverage we generated. During FY20, CCM faculty were cited in nearly 5,000 news media reports. These two examples highlight the caliber of our news coverage: Sherry Chou, MD and Douglas White, MD were interviewed by journalists at The New York Times and Washington Post on neurological complications from COVID-19 and policies for scarcity of resources or medications, respectively.

Our faculty were regularly quoted in international, national and regional outlets as well as a broad cross section of science, healthcare and wellness news media. Sepsis—the research focus of many of our faculty and one of the most highly morbid acute care conditions in the United States—was frequently a topic of interest to news media prior to the pandemic. That was the case with Kristina Rudd’s study in The Lancet on the global burden of sepsis, which resulted in widespread international coverage. Exemplary of other notable high-profile news coverage is Jeremy Kahn’s interview with NPR about the sepsis care mandates in New York.
Summary of Clinical Activities

Clinical activities for the Department of Critical Care Medicine are separated into the Adult Division and the Pediatric Division and supported by the UPMC ICU Service Center.

**Adult Division**

Vice Chair for Clinical Affairs & Quality Improvement: Scott Gunn, MD

Critical care is provided by the Adult Division around-the-clock to the sickest patients at UPMC Presbyterian/Montefiore Hospital, UPMC Magee-Womens Hospital, and UPMC Mercy Hospital as well as at the Veterans Affairs Pittsburgh Healthcare System. We use a multidisciplinary approach that includes intensivists working with surgical and medical colleagues, advanced practice providers (APPs), critical care fellows, nurses, respiratory and physical therapists, pharmacists, nutrition specialists, and social workers.

**Pediatric Division**

Vice Chair for Pediatric Critical Care: Robert Clark, MD

The Pediatric Division provides critical care for cardiac, neurovascular, neurotrauma, medical, and surgical pediatric patients at UPMC Children’s Hospital of Pittsburgh (CHP). The Division also manages and provides on-the-ground intensivist coverage for the Pediatric ICU and the Pediatric Cardiac ICU at St. Joseph’s Children’s Hospital in Tampa, Florida. This critical care capability is complemented by telemedicine support from CHP.

**UPMC ICU Service Center**

Co-Directors: Derek Angus, MD, MPH, and Holly Lorenz, RN, MSN

The UPMC ICU Service Center implements innovative initiatives that standardize and integrate critical care delivery across the UPMC system. In FY20, the focus was on:

- Reducing unnecessary care: The PARTNER program continued roll out across the UPMC system. It improves the emotional and decision support provided to families and surrogates
- Building a smarter ICU: Conducted a needs assessment of the ICU footprint of the UPMC system and developed a regional approach that encourages collaboration in new models of care and also avoids redundancies in bed numbers and staffing
- Leveraging evidence to optimize efficiency: Implemented evidence-based care approach for the ICU formulary by targeting a reduction in use of human albumin, vasopressin, and dexmedetomidine
Summary of Research Activities

The research endeavors of the Department of Critical Care Medicine range from fundamental cell and molecular biological studies and translational research linking basic science advances to bedside care and state-of-the-art clinical epidemiological studies of human critical illness. Research activities are grouped into six primary domains: sepsis, resuscitation science, brain injury, acute organ dysfunction, computational biology, and health services research.

The Department continues to maintain its leadership role in cutting edge research, especially so for sepsis and septic shock, to be prolific in submitting proposals for funding and, even in these economic times with funding at a premium, to fare well in achieving awards. Two research centers and two service centers form the nexus of the Department’s research infrastructure.

- **Safar Center for Resuscitation Research** is one of the leading centers in the world that focuses on investigations of traumatic brain injury and cardiopulmonary arrest. It draws upon a multidisciplinary team of researchers aligned with the clinical departments of Anesthesiology, Critical Care Medicine, Emergency Medicine, Neurological Surgery, Pediatrics, and Physical Medicine and Rehabilitation.

- **Clinical Research, Investigation, and Systems Modeling of Acute Illness Center (CRISMA)** unites clinical, translational, and health services researchers who study the optimal care of the critically ill. CRISMA was integral in launching REMAP-COVID, an international clinical trial to study therapies for the coronavirus. Their work is supported by four research cores: Biostatistics and Data Management Core, Clinical Research Biospecimen Core, Long Term Outcomes Core and the Administrative Core.

- **Multidisciplinary Acute Care Clinical Research Organization (MACRO)** facilitates large-scale prospective patient screening and enrollment in clinical trials and prospective studies, predominantly for acute clinical care. MACRO serves principal investigators from 11 University departments and divisions.

- **Health Services Research Data Center (HSRDC)** provides a shared resource for University investigators to facilitate health services research using large clinical and administrative datasets containing sensitive health information. The HSRDC provides a secure analytic and storage platform in compliance with state and federal security regulations.

**T32 Research Fellowships**

We support the next generation of biomedical researchers with post-doctoral research training supported by two NIH T32 training grants. In its 26th year, the “Multidisciplinary Training in Critical Care Outcomes Research” training program for four Adult fellows provides an intensive experience in basic, clinical or translational research in the science of adult cardiopulmonary organ dysfunction and critical illness. The Pediatric T32 “Training in Pediatric Neurointensive Care and Resuscitation Research” program is in its 19th year. Four fellows target investigations into TBI and cardiopulmonary arrest, which contribute to the greatest morbidity and mortality to children.
Summary of Teaching Activities

The Department provides high-quality clinical education to learners at all levels of training. Two clerkships let Pitt medical students learn the cognitive and technical skills needed to assess and manage unstable patients and, similarly, UPMC residents from seven or more specialties rotate through our ICUs to gain these skills. The unique Advanced Practice Provider Residency immerses up to two Nurse Practitioners or Physician’s Assistants per year in the clinical and didactic education of our critical care fellows, merging interprofessional education with interprofessional clinical care. For up to two months, foreign visitors (medical students to full professors) may participate in educational programming and observe ICU rounds via our International Observership Program. Over 60 CCM faculty contribute to providing core lectures, teaching at the bedside, and coordinating simulation training at the Peter M. Winter Institute for Education Research (WISER) and the Veteran’s Administration Simulation Center.

Multidisciplinary Critical Care Training Program

We are a leader in multidisciplinary critical training. Our Multidisciplinary Critical Care Training Program (MCCTP) is the first critical care fellowship training program in the nation to link training across internal medicine, emergency medicine, pediatrics, surgery, anesthesiology and neurology critical care, enabling trainees to learn in a diverse clinical environment. We attract candidates from around the globe and enable our graduates to attain leadership positions at well-respected institutions throughout the US and abroad. Since graduating our first fellows in 1964, the MCCTP has trained over 700 critical care physician subspecialists.

Accredited Fellowships & Advanced Training Programs

Four fellowship programs—Pediatric Critical Care, Critical Care Medicine-Internal Medicine, Anesthesiology Critical Care, and Surgical Critical Care—have maintained continuous accreditation by the ACGME, while Neurologic Critical Care is accredited by the United Council of Neurological Subspecialties. Two non-ACGME advanced training programs provide critical care graduates with the opportunity for further training in Pediatric Cardiac Critical Care (two-year program) and in Adult Extracorporeal Membrane Oxygenation (one-year program). Pediatric fellows also have the option to extend their clinical training with the Neurologic Critical Care track, which accepted its first fellow in 2018 with an expected graduation date of June 2020.

Curriculum

The training curricula for Adult and Pediatric fellows includes multiple educational conferences, lectures, high-fidelity simulation sessions, interactive problem-solving workshops, (e.g. point-of-care ultrasound training) and a specifically designed Critical Care Communications course (C3). The C3 course prepares fellows for difficult family conversations about goals of care, forgoing life sustaining therapy, delivering bad news and managing conflict. Whenever feasible, we bring the Pediatric and Adult fellows together for education sessions. The Professionalism and Leadership course is exemplary of this unity: fellows learn the administrative, educational and research skills necessary to function as an academic intensivist. The curriculum also includes Adult and Pediatric Journal Clubs and Critical Care Grand Rounds, which features University, national and international critical care experts.
Summary of Faculty Data

Critical Care Medicine fulltime faculty in both divisions remained stable during FY20 with 43 Adult faculty members and 33 Pediatric faculty members. A seasoned group of highly successful physician scientists led our research endeavors. In the Adult Division working under the CRISMA banner, they are Derek Angus, MD, John Kellum, MD, Jeremy Kahn, MD, Michael Pinsky, MD, Chris Seymour, MD, and Doug White, MD. The Safar Center for Resuscitation Research is home to our pediatric physician scientists, including Patrick Kochanek, MD, Robert Clark, MD, Hülya Bayır, MD, and Joseph Carcillo, MD.

The Pediatric Division’s clinical leadership includes Rajesh Aneja, MD and Justin Yeh, MD, head the Pediatric ICU and Pediatric Cardiac ICU respectively. The vice chair for Clinical Affairs and Quality Improvement in the Adult Division, Scott Gunn, MD, heads a team of 13 ICU medical directors and co-directors. Educational activities are led by Lori Shutter, MD, vice chair for Education, and supported by director Melinda Hamilton, MD (Pediatric Division) and associate director Jason Moore, MD (Adult Division).

Last year, we hired 8 new faculty members compared to 11 in FY19, and we promoted four (two to associate professor and two to assistant professor) compared to five in FY19.
Clinical Activities

Introduction

Critical care is a dynamic and evolving field. With recent advances in mechanical ventilation, extracorporeal membrane oxygenation (ECMO), and other forms of life support, modern ICUs are increasingly filled with complex patients in life-and-death situations. The Department of Critical Care Medicine rises to this challenge by providing timely, compassionate, and expert care to hospitalized and critically ill patients in a collaborative, interprofessional environment.

The Department’s Critical Care Adult Division provides care in 10 ICUs in three hospitals across the UPMC Health System: UPMC Presbyterian/Montefiore Hospital, UPMC Magee Womens Hospital and UPMC Mercy Hospital as well as at the Veterans Affairs Pittsburgh Healthcare System. The Critical Care Pediatric Division provides care primarily at UPMC Children’s Hospital of Pittsburgh, which contains a state-of-the-art Pediatric ICU and Pediatric Cardiac ICU. The Pediatric Division also provides intensivist coverage at two locations in Florida: St. Joseph’s Children’s Hospital in Tampa, Florida, for the Pediatric ICU and Pediatric Cardiac ICU, and the Pediatric ICU at Florida Children’s Hospital, Orlando.

The Department functions in close collaboration with the UPMC ICU Service Center, which coordinates critical care delivery across the UPMC Health System. Under the leadership of Derek Angus, MD, MPH, and Holly Lorenz, RN, BSN, the ICU Service Center implements innovative initiatives that standardize and integrate critical care delivery across the UPMC system. In FY20 the ICU Service Center completed its second full year of operation and recruited hired its first chief medical officer.

Adult Critical Care Division

The Adult Division provides high-quality, around-the-clock care to UPMC’s sickest patients in 10 specialized ICUs with 159 beds at UPMC Presbyterian/Montefiore, UPMC Magee-Womens Hospital, UPMC Mercy Hospitals, and at the Veterans Affairs Pittsburgh Healthcare System. ICU beds account for approximately 20 percent of the total beds available at UPMC Presbyterian/Montefiore. Our clinicians also provide emergent care to all patients in the medical center who experience a cardiac, respiratory or other life-threatening medical emergency through the Department’s rapid response team.

Quality of patient care is optimized through a multidisciplinary approach, which includes intensivists working with surgical and medical colleagues, advanced practice providers (APPs), critical care fellows, nurses, respiratory and physical therapists, pharmacists, nutrition specialists, and social workers. This team approach, under the direction of the critical care faculty, provides our patients with the highest level of care based on the latest scientific evidence. The Adult Division of CCM supports specialized clinical programs including solid-organ transplantation, cardiac and non-cardiac thoracic surgery, trauma and acute care surgery, artificial liver perfusion, ventricular assist devices, and neurocritical care. The CCM rounding teams are assigned to specific ICUs and consist of one CCM faculty member, one or more CCM fellows, APPs, medical students, and, in some cases, additional residents from a variety of other departments (Surgery, Anesthesiology, Medicine, Orthopedics, or Obstetrics).
COVID-19 Pandemic Response

Long before western Pennsylvania faced its own surge in coronavirus patients, more than a dozen CCM faculty volunteered as tele-intensivists for the UPMC teleICU service. A focus of their work was to provide much needed critical care expertise to overworked intensivists and physicians at three New York City hospitals where they struggled to cope with the influx of critically ill patients. On April 26 New York-Presbyterian health system ran a full page add in the Pittsburgh Post-Gazette thanking our team for their service. Faculty also volunteered locally for surge staffing, as back up coverage for colleagues required to quarantine, and for in-house night coverage at UPMC Passavant during its peak surge.

At UPMC Presbyterian, the Surgical Trauma ICU and Cardiothoracic ICU (along with the Medical ICU operated by the Department of Medicine) were dedicated as the priority units to care for COVID-19 patients when the surged arrived in spring and early summer. Coronavirus patients were also treated at our ICUs at UPMC Mercy and Magee Womens Hospital.

Cardiothoracic & Surgical ICUs

Medical Director: Holt Murray, MD

The 28-bed Cardiothoracic & Surgical ICUs (CTICU/SICU) deliver care to adult cardiac, heart/lung transplantation, thoracic and vascular patients. These patients have undergone cardiac surgery, thoracic surgery, heart transplants, lung transplants and ventricular assist device placement. These ICUs specialize in the support of patients with invasive cardiac monitoring, cardiac support devices and advanced support of ARDS. The CTICU team also provides all day-to-day ECMO support management. Under the leadership of Dr. Murray, who is Medical Director of the ECMO program, with colleagues in Cardiothoracic Surgery and Perfusion Services, the CTICU team oversees our ECMO Center of Excellence, a recognized Extracorporeal Life Support Organization.

Transplant ICU

Medical Director: Ali Al-Khafaji, MD, MPH
Associate Medical Director: David Huang, MD, MPH

The 12-bed Transplant ICU provides a multidisciplinary approach to caring for critically ill patients with end-stage liver diseases, fulminant hepatic failure, acute alcoholic hepatitis, gastrointestinal bleeding and other complications related to liver disease. Our multidisciplinary team members provide management for liver,
kidney, pancreas, small bowel and multi-visceral transplant patients. In addition, we care for complex head and neck, colorectal, orthopedic spine, surgical oncology and medical patients. Staff also provides rapid response services for UPMC Montefiore. A variety of sophisticated artificial support devices including the Extracorporeal Liver Assist Device and Plasmapheresis are used for patient care and are part of clinical trials.

**Neurotrauma ICU**

Medical Director: Lori Shutter, MD  
Medical Co-Director: Joe Darby, MD

The CCM physicians in the 10-bed Neurotrauma ICU provide advanced care for critically ill patients with a neurological injury in conjunction with the Department of Neurosurgery and Division of General and Trauma Surgery. These patients have sustained traumatic injuries to the brain or spinal cord, as well as other traumatic injuries involving the chest, abdomen, major vessels and long bones. This unique neuro-trauma patient population requires specialized management of hemorrhagic shock, sepsis, renal failure, adrenal suppression, and respiratory failure in order to optimize their potential for neurological recovery.

**Neurovascular ICU**

Medical Director: Lori Shutter, MD  
Co-Director: Brad Molyneaux, MD

Critical Care Medicine faculty and fellows work collaboratively with faculty in the Departments of Neurosurgery and Neurology in the largest neurocritical care program in Western Pennsylvania. The CCM physicians in this 20-bed ICU manage patients with neurovascular diseases including subarachnoid and intracranial hemorrhage, acute ischemic stroke, status epilepticus/seizures, brain tumors, CNS infections, neuromuscular disorders, and post-operative neurosurgical care, as well as provide determination and certification of death by neurological criteria. The unit-based multidisciplinary QI projects for the last year focused on protocols to assist in the transition to comfort care during a terminal extubation, management of shivering during fever control, and hand-offs between the CCM team and neuro-anesthesia. UPMC is a designated Comprehensive Stroke Center with the core of critical care services for stroke patients located in this ICU.
**Surgical Trauma ICU**

Medical Director: Scott Gunn, MD,  
Medical Co-Director: Matthew Rosengart, MD, MPH

UPMC is a level I Trauma Center, as designated by the American College of Surgeons, and is the busiest trauma center in the state of Pennsylvania. To handle the volume of trauma patients, the Surgical Trauma ICU provides state-of-the-art care for 22 critically ill surgical and injured trauma patients. The unit is staffed by a dedicated team of intensivists, who provide and coordinate multidisciplinary, comprehensive critical care including hemodynamic monitoring and support, mechanical ventilation, prevention and management of shock, sepsis and acute respiratory distress syndrome.

**UPMC Mercy Hospital ICUs**

Chief of Services, Critical Care Medicine: Jonathan Bishop, MD  
Co-Directors, Medical ICU: Chenell Donadee, MD and Firas Abdulmajeed, MD  
Co-Director, Medical Surgical ICU: Brad Butcher, MD  
Medical Director, Trauma Burn ICU: Mary Przybysz, MD

Mercy is a full-service referral hospital with three ICUs—Medical/Surgical ICU (MSICU), Medical/Neuro ICU and Trauma/Burn ICU (TBICU)—able to care for 53 patients requiring stroke, neurosurgical, cardiovascular, trauma and/or medical-surgical care. As a level 1 trauma center, UPMC Mercy uniquely provides the region with our only Burn Center. Critical Care is an integral part of the multidisciplinary burn team providing comprehensive adult and pediatric burn services as a busy American Burn Association-verified center. The Adult Division has provided management of UPMC Mercy's ICUs since 2010.

**UPMC Magee-Womens Hospital Adult Medical-Surgical ICU**

Medical Director: Raghavan Murugan, MD, MS

The Magee Adult Medical-Surgical ICU is a 14-bed, state-of-the-art, multidisciplinary unit that admits critically ill patients from Magee Womens Hospital’s Obstetrics, Gynecology and Oncology services as well as General Internal Medicine patients and multiple surgical services, including bariatric surgery, urology, orthopedic surgery, and ENT surgery. Attendings also cover the separate six-bed specialized Obstetric ICU, admitting and managing critically ill obstetric patients with viable pregnancies. In addition to primary critical care services in the Magee ICUs, the CCM team manages the hospital’s rapid response system and, by ensuring that critically ill patients receive the right care in the right place and
at the right time, plays a critical role in ensuring UPMC Magee-Womens Hospital remains a national leader in tertiary women’s health care.

Rapid Response Team at UPMC Presbyterian/Montefiore Hospital

Medical Director: Raj Ramanan, MD

The rapid response team (RRT) is mainly responsible for responding to all rapid response system calls at UPMC Presbyterian/Montefiore Hospital, Eye and Ear Institute, UPMC Western Psychiatric Hospital, and all surrounding UPMC buildings on the Presbyterian campus. The rapid response team is led by Adult Division intensivists and first-year ICU fellows, ICU nurses, and respiratory therapists. A dedicated clinical rotation for first-year fellows provides fellows with an opportunity to gain experience in the evaluation, management, and triage of deteriorating patients outside the ICU environment. Each year, there are over 2,000 RRT calls including approximately 150 activations for cardiopulmonary arrest. Various specialized teams such as the difficult airway team, massive transfusion alert team, stroke team, and cardiac catheterization team are also secondarily activated as required.

Veterans Affairs Pittsburgh Healthcare System (VAPHS) Intensive Care Units

Vice President of Critical Care Service Line: Sachin Yende, MD, MS
Director of Surgical Stepdown Unit and the Medical/Surgical Intensive Care Unit: Deanna Blisard, MD
Director of Surgical Intensive Care Unit 3A-ICU: Christopher Brackney, MD

The Adult Division provides coverage for the nine-bed Surgical ICU and the eight-bed Medical/Surgical ICU, both of which provide state-of-the-art care for surgical and medical veteran patients. A wide variety of patients receive care in the units including general surgery, cardiothoracic, vascular, neurosurgery, ENT, and transplant services. The Veterans Affairs Pittsburgh Healthcare System performed the highest number of liver and kidney transplants among all VA hospitals in the country. It serves as a tertiary referral center for the VA system in the tri-state area and also serves other VA hospitals in Erie, Altoona, Butler and Clarksburg.
Clinical Center

Critical Illness Recovery Center

Co-Directors: Brad Butcher, MD, and Tammy Eaton, MSN, RN, CRNP

The Critical Illness Recovery Center (CIRC) was launched in June 2018 to reduce readmission rates of survivors of prolonged critical illnesses by providing coordinated, multidisciplinary medical care and psycho-social support after hospital discharge. ICU survivors are at an increased risk for developing a constellation of physical, cognitive, psychiatric, and social disabilities, collectively termed Post-Intensive Care Syndrome. Such distressing and resource-consuming impairments can persist far beyond an episode of acute care and may arise in both patients as well as their family members or caregivers. In just over two years, CIRC has become an international model for interprofessional critical illness survivor care.

COVID-19 Pandemic Response

- Created a new telehealth approach for survivor visits to CIRC
- Collaborated with the Wolff Center to develop a weekly peer support program on a virtual platform that is available to survivors and family members system-wide
- Expanded the post-ICU clinic services to all ICU COVID-19 survivors system-wide

Major Accomplishments

- Hired CIRC's first full-time licensed clinical social worker to provide resource management and short-term virtual counseling services for CIRC survivors
- Transitioned the peer support group program to a virtual platform
- Established a CCM fellow elective experience within CIRC
- Discharge instructions for ICU patients now include information on how to access CIRC resources
- Awards for scholarly work include: Star Research Achievement Award (Society of Critical Care Medicine), Choosing Wisely/High Value Care Award (Society of Critical Care Medicine), Nursing Abstract Scholarship (American Thoracic Society), Society of Critical Care Medicine ICU Heroes award

| Critical Illness Recovery Center Achievements in FY20 |
|-----------------|---------------------------------|
| 143             | Unique ICU survivors who attended the CIRC |
| 225             | ICU survivor visits to the CIRC |
| 403             | Total patient visits since inception July 2018 |
| 23              | Telehealth visits (April 23 to June 30, 2020) |
In July 2019, Rachel Sackrowitz, MD, MBA, joined the UPMC ICU Service Center as the first chief medical officer with a mandate to build a critical care model that standardizes and integrates care delivery across the UPMC system. Significant progress was made during FY20. The Service Center focused on mission-driven initiatives that delivered the highest quality critical care with the greatest degree of compassion to critically ill patients and their families. These diverse initiatives were directed at improving communication with families, reducing low-value care, and priming the health system to be operationally smarter and more efficient. At the macro level, two elements were required for success: first, a closely aligned working relationship with multidisciplinary and cross-departmental clinical leaders and, second, a boldness to challenge assumptions which, in turn, empower ICU teams to embrace new models of care. During FY20, we concentrated our efforts on three related themes.

**Improving family communication**

The PARTNER Program—launched in June 2018 and currently being implemented in all ICUs across the UPMC system—is a communication initiative that improves the emotional and decision support provided to families and surrogates: the very people who must navigate care decisions about complex medical situations faced by critically ill loved ones. The enhanced communication provided by specially trained PARTNER nurses helps families become more knowledgeable and results in more productive family/physician meetings. In consequence, families are better able to articulate patient-centered goals of care, often reducing burdensome and costly care at end-of-life. The PARTNER program emerged from a highly successful NIH-funded clinical trial of the program led by CCM faculty member Douglas White, MD, that was published in the *New England Journal of Medicine* in 2018. Based on these trial results we implemented PARTNER across the UPMC health system, demonstrating our Department’s ability not only to develop and test novel care models supported the NIH but also implement the findings of these studies to directly improve population health.

**Building a Smarter ICU**

The ICU Service Center conducted a comprehensive needs assessment of our ICU footprint—both at the individual hospital and UPMC system levels—with the aim of creating a smarter ICU system structure. We have developed a regional approach that streamlines the ICU footprint, reducing duplication of services, matching capacity to patient need, and reducing unnecessary transfers that can result in health care far from the patient’s home and away from local support networks. This regional system supports greater collaboration and adoption of new models of care as well as avoids redundancies in bed numbers and staffing. At the heart of this approach is a patient-centric focus that prioritizes caring for patients safely close to home and their families while also ensuring timely access to quaternary, highly specialized services when beneficial. We have created multiple system wide dashboards that allow UPMC physicians and leadership to locate and triage critically ill patients in real time, track outcomes at the ICU and business unit level, and monitor drug spend which allows us to optimize and refine our system approach to critical care as UPMC evolves. We have also established an advanced ICU telemedicine system facilitating highly specialized intensive care in all UPMC hospitals.

<table>
<thead>
<tr>
<th>PARTNER Program Achievements in FY20</th>
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<tbody>
<tr>
<td>15 Hospitals offering PARTNER</td>
</tr>
<tr>
<td>36 ICUs implementing PARTNER</td>
</tr>
<tr>
<td>238 PARTNER nurses trained</td>
</tr>
<tr>
<td>2 Social workers PARTNER-trained</td>
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<tr>
<td>6,718 Patients participating in PARTNER</td>
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<table>
<thead>
<tr>
<th>Smart ICU Achievements in FY20</th>
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</thead>
<tbody>
<tr>
<td>4 Quality Dashboards Developed</td>
</tr>
<tr>
<td>12 UPMC Hospitals with TeleICU Coverage</td>
</tr>
<tr>
<td>14 Percentage of Transfers to Pittsburgh averted, keeping more patients in their communities while maintaining quality</td>
</tr>
</tbody>
</table>
hospitals which includes a web-based application to aid and triaging and sharing of patient information between the bedside and teleICU providers.

Leveraging Evidence to Optimize Efficiency

Our goal is always to use the latest scientific evidence as our north star directing us to deliver the most effective care and ensuring that we are responsible stewards the health care system’s limited resources. This approach guides our ICU formulary initiatives. The literature has shown that three costly drugs—human albumin, vasopressin, and dexmedetomidine—do not offer incremental benefit when compared to other less expensive alternatives. We implemented a strategy to be more targeted in the use of these drugs across the system. The ICU Formulary group continues to collaborate with the Pharmacy Therapeutics Committee to review the ICU formulary and identify opportunities for evidence-based cost saving, quality improvement initiatives.

<table>
<thead>
<tr>
<th>ICU Formulary Achievements in FY20</th>
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<tbody>
<tr>
<td>52%</td>
<td>Target reduction for albumin</td>
</tr>
<tr>
<td>31%</td>
<td>Target reduction for vasopressin</td>
</tr>
<tr>
<td>47%</td>
<td>Target reduction for dexmedetomidine</td>
</tr>
<tr>
<td>&gt; $2 million</td>
<td>Projected savings for 2020</td>
</tr>
</tbody>
</table>

COVID-19 Pandemic Impact

The COVID-19 pandemic presented us with many challenges but also has afforded us opportunities to grow and to reinforce the advantages of the ICU Service Center. Dr. Rachel Sackrowitz lead the inpatient response effort for the 31 UPMC hospitals across Pennsylvania, New York and western Maryland, acted as the UPMC spokesperson for clinical logistical issues. Dr. Sackrowitz and the Service Center team formed alliances with other departments—UPMC Enterprises, Clinical Analytics, Workforce Management, Capacity Management, Wolff Center, and Department of Emergency Medicine, amongst others—to develop processes to ensure all COVID-19 patients received the same consistent, world-class care throughout the System. An array of guidelines, protocols and checklists facilitated this consistency, e.g. guidelines for clinical pharmacy, ICU management, ICU analgesia, mechanical ventilation, and prone positioning, as well as intubation procedure checklists and an ECMO crisis management guide. In collaboration with UPMC Clinical Analytics, we created a system capacity management dashboard that allowed us to better understand available beds, staff, and ventilators System-wide.

Based on two model hospital policies developed by Douglas White, MD from the Department of Critical Care Medicine (see page 5 for further details), we developed operational plans in the event it became necessary to determine the allocation of scarce critical care resources or the allocation of medications to treat patients with COVID-19. As a system, we were fortunate not to face scarcity of ICU resources and medications for patients nor shortages of PPE for staff.

We partnered with UPMC Enterprises to rapidly develop and deploy a teleICU platform. Physicians and intensivists had 24/7 access to the quaternary-level critical care expertise of faculty based in Oakland in the Department of Critical Care Medicine and Division of Pulmonary, Allergy and Critical Care. These faculty members also provided teleICU service support to four hospitals in New York City during their surge in COVID-19 patients (see page 4 for further details).
Pediatric Critical Care Division

Based at UPMC Children’s Hospital of Pittsburgh, our pediatric critical care enterprise boasts the only multidisciplinary Medical-Surgical and Cardiac Pediatric Intensive Care Units in western Pennsylvania, in addition to the world’s first primary Pediatric Neurocritical Care service established in 2007. The pediatric critical care complex comprises a 36-bed Pediatric Intensive Care Unit (PICU), a 12-bed Cardiac Intensive Care Unit (CICU) with an additional 21 CICU-capable beds.

The Pediatric Critical Care Medicine Division is responsible for staffing, managing, and directing the PICU, CICU, and pediatric Neurocritical Care service. The Division receives patients from all of western Pennsylvania, as well as much of West Virginia, Ohio, and Maryland, in addition to serving as a referral center for patients from distant regions of the United States and many international sites. Outcomes for our patients continue to far surpass that predicted by national norms. Our Pediatric Division is recognized as one of the leading centers in the world for patient care, education, and research in pediatric critical care.

Vice chair of the Pediatric Critical Care Medicine Division, Robert S. B. Clark, MD, leads a team that includes Rajesh Aneja, MD, clinical chief; Hülya Bayır, MD, academic chief; and Justin Yeh, MD, Cardiac Critical Care chief, 25 faculty members, 14 critical care fellows and three cardiac critical care fellows. Last year, they provided care for over 3,500 critically ill infants and children (ranging in age from newborn to young adulthood). The patient population is divided approximately evenly between medical and surgical subspecialties. Within these major groups, the distribution of patients reflected the activity of Children’s Hospital as a whole.

Pediatric ICU

Medical Director: Rajesh Aneja, MD
Associate Director: Alicia Au, MD, MS

The 36-bed Pediatric ICU (PICU) is a family-centered medical/surgical unit. Our intensivists serve as physicians of record for medical patients while they are in the ICU and share management responsibilities with all surgical services. Children’s Hospital services using the PICU complex included General/Trauma Surgery, ENT, Cardiovascular Surgery, Neurosurgery, Transplantation Surgery, and the full spectrum of pediatric medical subspecialties. The PICU is the primary service for all medical patients, with approximately one-third of the medical patients admitted directly from the emergency department or transport system. Our PICU achieved the lowest adjusted mortality and morbidity figures for all Collaborative Pediatric Critical Care Research Network Pediatric ICUs, with network data published in August 2015 showing a standardized morbidity and mortality approximately 40% lower than predicted. More recently we implemented real time tracking of mortality risk that is refreshed daily—these data demonstrate remarkably low mortality rates that remain consistently 40% lower than expected.
Pediatric Cardiac ICU

Chief of Pediatric Cardiac Critical Care: Justin Yeh, MD

The 12-bed Pediatric CICU and 21-bed CICU expansion specializes in pediatric patients recovering from cardiac surgery or with a primary cardiac disorder as the indication for intensive care. Clinical efforts also include an adult congenital heart disease program. The CICU space is specially designed to care for critically ill heart patients or those recovering from cardiac surgery. Children’s Hospital’s heart specialists are centered in this unit where they are able to focus their efforts to meet the unique needs of pediatric heart patients. All eight CICU attending physicians have dual or additional CICU-focused training. The CICU also provides training to fellows in Pediatric Critical Care Medicine, Cardiology and Cardiothoracic Surgery.

St. Joseph’s Children’s Hospital, Tampa

PICU Director: Jerril Green, MD
CICU Director: Justin Yeh, MD

The Pediatric Division provides coverage and manages the Pediatric ICU and the Pediatric Cardiac ICU at St. Joseph’s Children’s Hospital (SJCH) in Tampa, Florida. Seven board-certified/board-eligible pediatric intensivists stationed in Tampa, along with both on-the-ground and telemedicine support from Pittsburgh-based Children’s Hospital provide high-level critical care services at SJCH.

AdventHealth Children’s Hospital, Orlando

Director: Rajesh Aneja, MD

During FY20, the Division began providing on site critical care coverage for pediatric liver transplant patients at AdventHealth Children’s Hospital in Orlando, Florida. One of the Pediatric Division’s critical care physicians accompanies the transplant surgeon, anesthesiologist, OR and PICU nurses to provide critical care for the crucial first days after transplant.

Rapid Response Team

Director: Christopher Horvat, MD, MHA

The Pediatric Division leads the rapid response team at Children’s Hospital, responding to acute changes in patient status, particularly hemodynamic, respiratory, and neurologic (e.g. Condition “A” and “C”). The team consists of a pediatric critical care fellow, an attending physician, ICU nurses, and a respiratory therapist. We continued our successful mock Condition program for resident and nursing education, revamped the crash cart restocking procedures, and are introducing structured debriefs for every Condition event.

Rapid Response Team Condition Events FY20

UPMC Children’s Hospital

![Graph showing Condition A and Condition C events](image-url)
Pediatric Neurocritical Care/Trauma Service

Director: Dennis Simon, MD

The Pediatric Neurocritical Care/Trauma service was established in 2007 and manages patients with neurological trauma, cerebral hemorrhage, stroke, brain tumors, and complex neurological problems. Evidence-based clinical pathways have been implemented, and a world-renowned clinical research program has been established focusing on children with acute neurological disease.

Pediatric Transport Team

Medical Director: Idris Evans, MD, MSc

Under the day-to-day medical direction of one of the Pediatric Division’s critical care physicians, the CHP transport team includes a pediatric critical care fellow for patients judged to be a particularly high risk for complicated illness or death. The Division provides emergency transport for critically ill children as a major service to Children’s Hospital and the region, with over 1,500 children per year transported to Children’s Hospital. Research from the Pediatric Division has provided critically important, and perhaps startling, data that pediatric specialty transport teams not only minimize adverse events, but also significantly decrease in-hospital mortality.

Pediatric Critical Care Telemedicine

PICU Telemedicine Services Director: Rajesh Aneja, MD
CICU Telemedicine Services Director: Justin Yeh, MD

Our expertise in pediatric cardiac critical care and in liver transplant critical care has led to a growing demand, which we provide using telemedicine support to a number of hospitals across the country. In addition to providing a full spectrum of service coverage to St. Joseph’s Children’s Hospital in Tampa, we also provide PICU liver transplant telemedicine services (as well as on-site coverage) for AdventHealth Children’s Hospital, Orlando, Florida supported by PICU faculty. We will begin to provide a full spectrum of CICU service coverage to Wolfson Children’s Hospital in Orlando, Florida in late 2020.

Pediatric Critical Renal Research Team

Co-Directors: Dana Fuhrman, DO, MS, and Hülya Bayır, MD

The Pediatric Critical Renal Research team is a multidisciplinary team of experts from the Pediatric ICU, Nephrology, Nursing and Pharmacy that provides state-of-the-art renal replacement therapy and support for PICU, NICU, and CICU patients. Holding joint appointments with the Division of Nephrology and the Department of Pediatrics, Dr. Fuhrman is one of the few pediatricians who is dual board certified in critical care medicine and nephrology.
Health Informatics for Clinical Effectiveness Team

Director: Christopher Horvat, MD, MHA

The Health Informatics for Clinical Effectiveness team capitalizes on the electronic health record (EHR) and bioinformatics to improve patient care in real time. Projects underway during FY20 included:

- Leveraging EHR data to track acuity-adjusted outcomes in the PICU and CICU at Children’s Hospital and at St. Joseph’s Children’s Hospital in Tampa.
- Leading the inpatient sepsis performance improvement team—a national, multi-center collaborative through the Children’s Hospitals Association Improving Pediatric Sepsis Outcomes initiative—to design and deploy an automated, electronic sepsis surveillance system in the acute care wards; develop Cerner sepsis screening tools; and introduce order sets with clinical effectiveness guidelines to streamline antibiotic therapy. This program has played a substantial role in reducing inpatient mortality.
- Developing an inpatient, machine learning-based deterioration prediction tool that will be integrated into Cerner.

Critical Illness Recovery for ChiLdrEn (CIRCLE)

Director: Ericka Fink, MD, MS

CIRCLE was established in 2017 to provide the best quality of life beyond the child’s ICU stay, encompassing not only optimizing physical outcome, but psychosocial, emotional, and family-based outcomes as well. Initiatives include:

- PICU Functional Mobility Guidelines. Evidence and consensus-based guidelines to support timely, safe, initiation and progression of physical and occupational therapy supported interventions for mobility and return to activities of daily living.

Activities and initiatives in development include PICU guidelines for speech, language and cognition; PICU journal project for families; personalized outcomes program for children at risk for a new disability; and the CIRCLE Clinic, which is a virtual multidisciplinary follow-up clinic to support recovery after critical illness.
Research Activities

Introduction

The Department of Critical Care Medicine continues to maintain its leadership role in cutting edge research, to be prolific in submitting proposals for funding, and, even in this difficult funding environment, to fare extremely well in obtaining awards. CCM also continues to build partnerships toward diversifying future funding opportunities. Productivity continued in FY20 with 25 new awards totaling $4.7 million. Total grant support in FY20 was up from FY19 to $14.4 million in total costs. Our grant funding success aligns with our exceptional publication record—CCM primary faculty authored 337 peer-reviewed manuscripts during FY20, many of which are both highly cited and in high impact journals. Given our track record over the last decade, we anticipate the success of the past year will continue in terms of rigorous scientific investigation and resultant contributions to the field of critical care.

CCM research faculty work across the translational spectrum, from basic science to clinical trials and outcomes research. Two large centers form the foundation of the Department’s research endeavors: the Safar Center for Resuscitation Research, and the Clinical Research, Investigation, and Systems Modeling of Acute Illness (CRISMA) Center. These two centers are complemented by the five-year-old Center for Critical Care Nephrology (CCCN) as well as several smaller research programs and individual investigators. CCM is also home to two University cost centers which provide critical research support and infrastructure to funded investigators throughout the Schools of the Health Sciences: The Multidisciplinary Acute Care Research Organization (MACRO), which provides clinical trials coordination services including patient screening and enrollment; and the Health Services Research Data Center (HSRDC), which provides secure, HIPAA-compliant data storage and access for highly sensitive public health data sets.

Our direct research activities are grouped into six primary domains: sepsis, resuscitation science, brain injury, computational biology, acute organ dysfunction, and health services research.

Sepsis and Septic Shock

Beginning with some of the earliest and still most widely cited epidemiologic research in sepsis and extending through to updated international definitions of sepsis released in February 2016, our scientists are pursuing the basic mechanisms underlying sepsis-induced organ dysfunction and conducting multicenter clinical trials to test new approaches for improving patient-centered outcomes for patients with sepsis. We are investigating the genetic and inflammatory profiles of thousands of septic patients through novel biobanks, and we are studying different approaches to resuscitation, renal and respiratory support, and novel therapies to modify the immune response using both drugs and devices. We are exploring therapeutic approaches across the acute care spectrum, including the pre-hospital setting, emergency department, and intensive care unit. We are also leading efforts to bring sepsis care into the age of personalized medicine, and to bring to bear computational biology along with the “omics package” to our translational research.

Resuscitation Research

An important theme in our multidisciplinary department is resuscitation in shock states. CCM investigators are studying resuscitation in shock due to sepsis, cardiac arrest, trauma, hemorrhage and organ donation. This work spans the translational spectrum, ranging from basic science approaches to understand the neurobiological response to cardiac arrest in mouse models to multicenter clinical trials evaluating strategies to
resuscitate hemorrhagic shock in trauma patients. Furthermore, we are leading the field in areas such as functional hemodynamic monitoring, medical emergency teams and development of novel suspended animation techniques. Our funding for resuscitation research comes from diverse sourcing including the National Institutes of Health, Health Resources and Services Administration, Defense Advanced Research Projects Agency, Department of Defense, US Army and Navy, American Heart Association, Laerdal Foundation, Robert Wood Johnson Foundation, and numerous industry partners.

Brain Injury

Beginning with the ground-breaking work of the late Peter Safar, brain injury—both ischemic and traumatic—has been a centerpiece of research within our department. Hypoxic-ischemic encephalopathy remains an incurable disease and our researchers are studying both the causes of neuronal injury and life-saving treatments including gender specific approaches. Similar work is underway in traumatic brain injury and includes investigation into the mechanisms of cellular energy failure and the effect of novel therapies such as adenosine and other neuroprotective agents. Our investigators are leading multi-center pre-clinical studies funded by the US Army to define new therapies for traumatic brain injury and are carrying out the first multi-center comparative effective study in pediatric traumatic brain injury in the world. We are also conducting multicenter clinical trials in this space, including a recently funded trial testing novel approaches to tailor care to brain tissue oxygenation measurements in severe TBI.

Computational Biology, Mechanistic Modeling of Disease and Simulation

Our scientists are applying some of the most advanced techniques in systems modeling to problems in the field of critical care. We are using sophisticated computer simulations to unravel the mysteries of critical illness in silico, from sepsis and hemorrhagic shock to mechanical ventilation and acute lung injury. We are using complexity analysis of patient vital-sign monitoring aimed at developing early warning systems to detect clinical deteriorations in hospitalized patients using a machine learning approach. In addition, we are using our world-class WISER Simulation Center to study how best to train the next generation of intensivists and how to keep the current generation at the top of their game.

Organ Dysfunction, Support and Recovery

We have active research programs in brain, lung, heart, kidney, liver and gastro-intestinal dysfunction and injury consequent to critical illness. Moreover, several of our investigators study the interplay between organ systems in health and disease such as heart-lung and kidney-lung interaction. We have some of the world’s leading experts on the use of respiratory, cardiovascular and renal support. Using applied physiology principles developed over the last 20 years by thought leaders from our department, we have spearheaded an international movement to approach assessment and management of acute cardiovascular insufficiency and acute renal injury. These applications have resulted in several published multi-center clinical trials and one US Air Force-funded air evacuation clinical trial. Finally, we are breaking new ground by looking past the acute care episode and studying how patients recover from critical illness. Recovery from acute illness is largely uncharted territory but is critically important for patient long-term well-being. Whether recovering from neurological, respiratory or renal injury or from immune suppression in sepsis, survival is strongly associated with the extent of recovery.
Health Services Research, Health Policy, eResearch and Medical Ethics

Our researchers are leading the field in the study of health care delivery, health policy and decision making in acute illness both in adults and children. We are studying novel approaches to organize, manage and finance the care of acute illness in the United States and abroad using both traditional epidemiological methods and novel methods from sociology, behavioral economics, and the decision sciences. Funded by numerous federal and industry sources, we are leaders in the field of comparative effectiveness research in acute illness, using randomized clinical trials, observational studies using electronic medical record data and large administrative datasets to examine strategies to reduce mortality, lower costs and improve the patient and family experience in the ICU. We are leading the drive for regulatory and other health policy approaches to improve sepsis outcomes, and to determine the effects of these policies on sepsis quality and costs. We are also doing innovative work in the area of quality improvement and patient safety, partnering with health care providers to measure and improve their performance using emerging methods including advanced analytics and “big data.”

Endowed Chair in Critical Care Medicine Research

As is tradition, a Provost’s Inaugural Lecture celebrates the bestowal of an Endowed Chair. Professor John Kellum, MD, vice chair for Research and the first director of the Center for Critical Care Nephrology in the Department of Critical Care Medicine at the University of Pittsburgh, was awarded the UPMC Endowed Chair in Critical Care Medicine Research on May 2016. He delivered his Inaugural Lecture entitled “The Inconvenient Truth About Acute Kidney Injury” on December 9, 2019 and received a ceremonial medal from Chancellor Patrick Gallagher.

Research Centers

Research within the Department is primarily conducted in three research centers—the Clinical Research, Investigation, and Systems Modeling of Acute Illness (CRISMA) Center, the Safar Center for Resuscitation Research, and the Center for Critical Care Nephrology—and the Children’s Neuroscience Institute, which was established in late 2019.

Clinical Research, Investigation, and Systems Modeling of Acute Illness Center

Director: Derek C. Angus, MD, MPH

Founded in 2001, the Clinical Research, Investigation, and Systems Modeling of Acute Illness (CRISMA) Center is at the forefront of clinical, translational, and health services research that focuses on critical illness. The CRISMA Center is the home to five multidisciplinary programs of research: Critical Care Nephrology, Ethics and Decision Making, Health Policy and Management, Systems Medicine, and Translational and Clinical Science. These five programs receive support through four shared CRISMA Cores: Biostatistics and Data Management Core, Clinical Research Biorepository Core Lab, Long Term Outcomes Core, and Administrative Core. During FY20, CRISMA served as the academic home to 22 core faculty, 22 staff, 12 postdoctoral research fellows.
Major Research Initiatives

Research innovation is a hallmark of the CRISMA investigative model for critical and acute care studies. These research initiatives exemplify that innovative approach:

- **REMAP (Randomized Embedded Multifactorial Adaptive Platform)** is a novel clinical trials approach that combines features of EHR-embedded randomized controlled trials with those of adaptive platforms. SPRY (Strategies to Promote ResilienC) was the first clinical trial conducted under the REMAP banner. Funded by the UPMC Immune Transplant and Therapy Center, SPRY enrolls frail patients and those at risk for frailty to examine the pre-habilitative effects of metformin on their outcome after elective surgery. (See page 5 for information about REMAP-CAP:COVID.)

- The METEOR project is developing and testing three strategies to speed implementation of preventive post-extubation noninvasive ventilation based around interprofessional education, leveraging cutting-edge principles for social science and medical education to speed translation into practice. Funded by a U01 from the National Institutes of Health, the project will culminate in a multicenter, hybrid effectiveness-implementation trial to identify the optimal strategy for promoting the use of post-extubation noninvasive ventilation among high-risk patients recovering from acute respiratory failure.

- Research that focuses on increasing the pace of evidence-uptake in ICU setting has long-term programmatic support via Dr. Jeremy Kahn’s an NIH Outstanding Investigator Award (R35). His team is developing novel approaches to translating evidence into practice in the ICU by integrating AI-based clinical decision support with theory-driven approaches to improve the structure and function of interprofessional care team, promoting both effective collaboration within the team and effective integration of the “computer as team member” in the ICUs of tomorrow.

- The Four Supports study, an NIH randomized controlled trial, adds a family support nurse to the clinical team to provide four types of support to the families of patients with advanced critical illness: emotional support, communication support (between the clinical team and the family), decisional support (education about the role of a surrogate decision maker) and anticipatory grief support. The study aims to improve the long-term psychological outcomes for family members, to improve the quality of communication and decision-making between physicians and families, and to improve the patient-centeredness of care.

Research Funding

CRISMA Center investigators have a decades-long record of attaining extramural and intramural funding; FY20 was no different. CRISMA maintained a collective research portfolio of $8 million in total costs during FY20, including $3.4 million in new funding from a variety of sources, including the NIH, other federal agencies, and industry partners. The CRISMA research portfolio includes eight R01 grants; three K23 grants; two R35, U01 and Department of Defense grants; one K08, K24 and UH3 grants as well as foundation and industry grants.

Publications and Productivity

In FY20, CRISMA researchers published 176 papers (183 in FY19), 31 of which were in the most high-impact journals in our field: JAMA, The Lancet, Intensive Care Medicine, and Critical Care. The following publications are representative of the scope, depth and prestige of CRISMA research:

- Kahn JM, Davis BS, Yabes JG, Chang CC, Chong DH, Hershey TB, Martsolf GR, Angus DC. Association between state-mandated protocolized sepsis care and in-hospital mortality among adults with sepsis. JAMA 2019 Jul 16;322(3):240-50. (638 Altmetric Attention Score)


COVID-19 Pandemic Impact
CRISMA, with the assistance of MACRO, launched the first US site for the REMAP-CAP:COVID clinical trial as part of a global effort to fast-track efficacy testing for COVID-19 therapies. From mid-April through June 30, 53 UPMC inpatients were enrolled in the trial; by late October, enrollment was 200. Results for these early enrollments were validated by international REMAP study teams and published in JAMA September 2. University partners for REMAP-CAP:COVID include the Division of Pulmonary, Allergy and Critical Care Medicine, departments of Emergency Medicine and Infectious Diseases, and the School of Pharmacy as well as the UPMC Health Records and Clinical Analytics teams. Notable publications relating to REMAP-CAP:COVID and scarce critical care resources, and neuroscience team preparedness include:

Angus DC. Optimizing the trade-off between learning and doing in a pandemic. JAMA. 2020 May 19;323(19):1895-6. (236 Altmetric Attention Score)


Noteworthy Accomplishments
The weekly CRISMA Research Conference embodies the collaborative spirit of the CRISMA research mission while providing researchers with an opportunity to showcase their work and introduce collaborators from Pitt, UPMC, other research institutions and industry partners. While the conference series was cut short due to the pandemic, in fall 2019 speakers included Anuj Mehta, MD, from the University of Colorado, Deepshikha Ashana, MD, MBA, from the University of Pennsylvania Health System, and Stephanie Parks Taylor, MD, MS, from the University of North Carolina at Chapel Hill, as well CRISMA junior investigators and trainees. Under the CRISMA aegis, the Program for Ethics and Decision Making in Critical Illness (EDM) and the Program on Translational and Clinical Science (TraCS) held monthly seminars to foster shared learning amongst the Pitt ethics and palliative care communities and the translational science, epidemiology and health services communities, respectively.

Safar Center for Resuscitation Research

Director: Patrick M. Kochanek, MD

The Safar Center for Resuscitation Research is one of the leading centers in the world for the investigation of traumatic brain injury (TBI) and cardiopulmonary arrest (CA). Founded by the late Dr. Peter Safar in 1979, the Safar Center’s mission is to identify and promote methods of preventing premature death and to reduce associated disability from trauma and CA. As Dr. Safar wrote, the goal is to save people with “hearts and brains too good to die.”

The Center focuses on bench to bedside investigations for TBI and CA related to mechanisms involved in the evolution of secondary brain injury, translational neuroscience, and the development of novel therapies, diagnostics, and monitoring tools that can be implemented at any point in the chain of survival—from the field through to rehabilitation. This is also reflected in the composition of the home departments of our faculty. During FY20, the Safar Center boasted 16 core faculty from six departments and two schools, more than 20 staff, nine postdoctoral research fellows (four of whom were supported by the Safar Center’s T32), three University of Pittsburgh medical students, and numerous undergraduate and graduate student mentees. The Center also features several special programs that address research training, along with research in both pediatric and adult neurocritical care, and resuscitation in combat casualty care. The multidisciplinary nature of the Center’s research relies on investigators working closely with the clinical departments of Anesthesiology, CCM, Emergency Medicine, Neurological Surgery, Pediatrics, and Physical Medicine and Rehabilitation, at both the UPMC and UPMC Children’s Hospital of Pittsburgh.

Major Research Initiatives

As a world leader in resuscitation research, the Safar Center focuses in three areas of research:

- TBI, including investigations in both pre-clinical models and clinical investigations, spanning both the pediatric and adult areas of research. This also includes programs addressing combat casualty care research, blast injury, and mild repetitive TBI.
- CA, including investigations in both pre-clinical models and clinical investigations, spanning both the pediatric and adult areas of research. This also includes pre-clinical and clinical studies in extracorporeal support and resuscitation.
- Training programs in both pediatric neurointensive care and resuscitation research, supported by a long-standing T32 award from NICHD, and through other individual programs including a Pittsburgh CURE program for underrepresented minority undergraduate training in TBI research funded by the State of Pennsylvania, involvement of multiple Medical Scientist Training Program investigators from the School of Medicine, and multiple K-funded junior faculty.
Research Funding
Safar Center investigators have a longstanding robust record of attaining extramural and intramural funding. In FY20, the Safar Center maintained a collective research portfolio of over $5.7 million in total annual costs including grants from the NIH, DoD, State of Pennsylvania, American Heart Association, Veterans Administration, and the Chuck Noll Foundation, among others. Safar Center investigators were awarded 10 new grants last year including 3 R01s, 4R21s, an I21, both a K23 and K01 award, and grants from both the Society of Clinical Neuropsychology and the American Academy of Clinical Neuropsychology. Among the awards across multiple departments are five new grants to CCM faculty including an R21 to Dennis Simon, MD, A dual PI R01 to Hülya Bayır, MD and Robert Clark, MD, an R21 to Drs. Clark and Gilles Clermont, MD, a K23 award to Dr. Christopher Horvat, and a new subaward for Dr. Kochanek with former CCM faculty member Travis Jackson, PhD., now an Associate Professor at the University of South Florida.

Publications and Productivity
Safar Center investigators continued to advance our status as research-thought leaders in TBI and CA. During FY20, Safar Center investigators—from senior and junior faculty to trainees—had 59 peer-reviewed publications and 13 editorials, commentaries, or forewords, many of which appeared in high-impact journals including *Nature Chemical Biology*, *Cell Chemical Biology*, *Lancet Neurology*, *Proceedings of the National Academy of Sciences*, *the Journal of Pediatrics, Critical Care Medicine, Resuscitation*, *Neurocritical Care, Pediatric Critical Care Medicine, JAMA Network Open*, and *Journal of Neurotrauma*, among others. The following four publications are exemplary of the caliber and scope of research generated at the Safar Center, and for the purpose of this report, represent examples of publications from the laboratories of Safar Center associate directors who are based in the Department of Critical Care Medicine:


COVID-19 Pandemic Impact
Four Safar Center associate directors played important roles on projects related to COVID-19, including its neurological complications. Sherry Chou, MD, spearheaded the development of a Global Consortium to study neurological dysfunction in patients with COVID-19 and outlined the plans for those multi-center investigations in two publications in the journal *Neurocritical Care* (see below). While Ericka Fink, MD, is one of three pediatric investigators leading the consortium’s efforts in critically ill children. As of October 15, 2020, the adult arm of the consortium had 121 sites in 23 countries, and the pediatric arm had 95 sites in 25 countries.

Cameron Dezfulian, MD, was the senior author of a paper in *Pediatric Critical Care Medicine*, “Caring for Critically Ill Adults with Coronavirus Disease 2019 in a PICU: Recommendations by Dual Trained Intensivists”
that provides a roadmap for other pediatric intensivists to rapidly convert their PICUs to enable care for adults with COVID. Sherry Chou also participated in the development of a guidance statement from the Society of Vascular and Interventional Neurology on mechanical thrombectomy for stroke in the era of COVID-19. Finally, Patrick Kochanek, MD, published a foreword on the impact of COVID-19 in the journal *Pediatric Critical Care Medicine*.


**Noteworthy Accomplishments**

Among the many developments in FY20, these are particularly noteworthy:

- University of Pittsburgh Medical Student Elizabeth Kenny received the O’Malley Award for top medical student research. She was mentored at the Safar Center and Center for Free Radical and Antioxidant Health by Dr. Bayır.
- Associate director Corina Bondi, in the Department of PM&R, was awarded her first R01 “Traumatic brain injury and aging: targeting the cholinergic system for deficits in sustained attention and executive function” from the National Institute of Neurological Disorders and Stroke.
- Associate director, Samuel Poloyac, PharmD, PhD, was named the new Dean of the School of Pharmacy at the University of Texas at Austin, beginning his tenure in fall 2020.
- Patrick Kochanek was named a Distinguished Professor of Critical Care Medicine.
Center for Critical Care Nephrology

Director: John Kellum, MD

The Center for Critical Care Nephrology (CCCN) is an interdisciplinary research center that focuses on the development of novel treatments and disruptive innovations to prevent, manage, and cure acute disorders of kidney function, as well as fluid and electrolyte balance in critically ill patients. Founded in 2013, the Center aims to be a globally recognized visionary leader in clinical and translational research. Faculty and staff conduct basic, translational, and clinical research under five themes: acute kidney injury (AKI), sepsis, acute organ failure and organ support, organ donor management, and biomarkers and blood purification. CCCN uses its resources and national and international collaborations to increase awareness, improve early detection, develop novel treatment strategies, and facilitate recovery after all forms of AKI. In FY20, CCCN was the academic home for seven core faculty, five staff, six postdoctoral/visiting research fellows, and seven undergraduate and graduate student employees or mentees.

Major Research Initiatives
These major research initiatives exemplify CCCN’s transformative scientific work to improve the care of critically ill patients with AKI and related conditions.

- CCCN is the Pittsburgh AKI recruitment site for the NIDDK’s Kidney Precision Medicine Project, “Phenotyping Renal Cases in Sepsis and Surgery for Early Acute Kidney Injury (PReCISE AK).” This is a first-of-its-kind study that will determine whether biopsy findings predict patients at high risk for developing new or progressive chronic kidney disease after an episode of AKI. It will relate biopsy findings to recovery status at various time points.

- The “Biomarkers Effectiveness Analysis in Contrast Nephrology (BEACON)” study advances the NIDDK’s mission of early detection, risk-stratification, and prognostication of contrast induced acute kidney injury (CIAKI). It will provide new scientific knowledge on using biomarkers to monitor patients undergoing angiography and will have a high impact on clinical practice, physicians, and policy makers.

Research Funding
CCCN has an extensive portfolio and a strong track record of attaining research support with funding from extramural, intramural, and industry sources. Research funding for CCCN is reported under CRISMA for FY20.

Publications and Productivity
In FY20, researchers in the Center for Critical Care Nephrology published 69 papers in high-impact and specialty journals in our field, including The Lancet, JAMA (13), Kidney International and Oxidative medicine and cellular longevity. The following publications are representative of the Center’s work:


Noteworthy Accomplishments
In its ninth year, the AKI Symposium fostered across-campus collaboration among nephrologists and acute kidney injury investigators and also promoted kidney health education with the inclusion of some of Pittsburgh’s kidney disease advocates. The Bimonthly AKI Meeting maintains the momentum of the AKI Symposium with three speakers updating their research throughout the year.

Children’s Neuroscience Institute
Director: Hülya Bayır, MD

The Children’s Neuroscience Institute (CNI) was established in 2019 with a mission to improve child health and combat childhood neurological diseases by catalyzing multidisciplinary research collaborations across the neuroscience community. Research is aimed at mechanistic understanding of normal neurodevelopment, the identification of aberrant pathogenic pathways of neurological diseases, and the discovery of personalized treatment strategies for neurologically ill and injured children. The five research cores are (a) lipidomics and multi-omics, (b) bioinformatics, (c) iPSC driven precision therapies for neurogenetic diseases, (d) precision-based immunotherapy for CNS tumors, and (e) molecular imaging incorporating secondary ion mass spectrometry, electron paramagnetic resonance spectrometry and high-resolution magnetic resonance imaging. Disease areas include acute brain injury from traumatic, ischemic, inflammatory and infectious causes; neuro-genetic syndromes; pediatric brain tumors; and self-learning clinical research platform.

Noteworthy Accomplishments
- Built an institute membership of 180 investigators
- Received over 40 letters of intent for the Pilot Grant of which three were selected to receive $35,000 each to be used to advance research supporting the CNI mission and vision
- Teamed with the John G. Rangos Sr. Research Seminar series to use their platform to present six CNI speakers
- Executed the next-generation scientist training program by supporting colleagues with grants (i.e. T32 & S10); and completed a candidacy search for a postdoctoral research associate in lipidomics/bioinformatics, a contingent offer was made for 2021
- Administratively, established and/or appointed CNI associate directors, Executive Advisory Board members, theme leads, and institutional partners
- Director Hülya Bayır presented Pediatric Grand Rounds in December 2019

Research Funding
The CNI investigators have a history of extramural support from federal funding agencies such as the National Institutes of Health and Department of Defense. Notable awards during FY20 include: two NIH awards (R01 and R21) to Udai Pandey, PhD; three dual-PI awards to Udai Pandey, PhD and Christopher Donnelly PhD (R21), Robert Clark, MD and Hülya Bayır, MD (R01), and Robert SB Clark, MD and Giles Clermont, MD (R21); and two U01 awards, one each Hülya Bayır, MD and to Valerian E Kagan, PhD.

Publication and Productivity
During FY20, the CNI investigators had 63 publications including in high-impact journals such as Nature, and JAMA, as well as specialty and subspecialty journals including Nature Chemistry Biology, Cell Chemical Biology, Neurocritical Care, Clinical Oncology, and Free Radical Biology Medicine. The following five publications are a representation of the quality of and scope of CNI research.


Service Centers

The Department oversees two service centers—the Multidisciplinary Acute Care Clinical Research Organization and the Health Services Research Data Center—that provide supportive research services to investigators throughout the Schools of the Health Sciences.

Multidisciplinary Acute Care Clinical Research Organization

Director: David T. Huang, MD, MPH

The Multidisciplinary Acute Care Clinical Research Organization (MACRO) serves the University by facilitating large-scale prospective patient screening and enrollment in clinical trials and other prospective research studies. Specializing in 24/7 screening and enrollment for predominantly acute care clinical studies, MACRO has consistently high enrollment of study participants in three UPMC hospitals: Presbyterian/Montefiore, Mercy, and Magee, with the ability to enroll in UPMC Shadyside based on investigator demand.

In FY20, MACRO served 38 principal investigators from 23 departments and divisions for 73 active studies. MACRO is an independent University of Pittsburgh cost center that had an annual budget of $2.03 million in FY20. Administratively housed in the Department of Critical Care Medicine and affiliated with the Clinical and Translational Science Institute, MACRO is a collaboration between four School of Medicine departments: Critical Care Medicine, Emergency Medicine, Surgery, and Internal Medicine. MACRO also provides pro bono consultation for universities seeking to emulate our model (e.g. University of Michigan, University of Pennsylvania, University of Texas Medical Branch at Galveston, Medical College of Wisconsin). As many as 50 Pitt undergraduate students are employed in the Research Assistant program, which provides them a novel experience in biomedical research and helps prepare them for careers in the health sciences.
COVID-19 Pandemic Impact

- **UPMC REMAP-COVID trial.** Provided co-project manager and screening and enrollment service, and developed remote electronic screening and enrollment process, in close collaboration with CRISMA and UPMC personnel. Was only CTSI coordinator core actively enrolling COVID patients at start of pandemic in Pittsburgh.
- **Additional COVID studies.** Enrolled into multiple NIH interventional and observational studies, and a Pitt PI pilot study.
- **Internally.** Executed fundamental reorganization that allowed us to handle COVID impact.

Major Accomplishments

- **LITES clinical coordinating center.** Overseeing 6 task orders for the Department of Defense-funded Linking Investigations in Trauma and Emergency Services (LITES) contract, which has been in place since September 2016.
- **Multiple NIH trial networks.** Continued facilitation of Pitt’s involvement in NIH trial networks, including the Preventive and Early Treatment of Acute Lung Injury Clinical Trials Network (PETAL) and the Strategies to Innovate Emergency Care Clinical Trails Network (SIREN).
- **SPRY sample processing.** Handling all sample processing for the recently launched SPRY project, the UPMC-funded REMAP embedded trial of metformin.
- **Research Assistant program.** Expanding our Pitt undergraduate Research Assistant (RA) program to facilitate the growing study needs, especially those for trauma studies. RAs are paid Pitt undergraduate students who obtain hands-on clinical research experience by screening and enrolling patients.
- **New principal investigators.** Assisted several new PIs to launch their first clinical research studies.

Health Services Research Data Center

Director: Jeremy Kahn, MD, MS

The Health Services Research Data Center (HSRDC) is a shared resource to University investigators designed to facilitate patient-centered outcomes research using large clinical and administrative datasets containing sensitive health information from public and private sources. The center is composed of exclusive servers and hardware, software and human resources that together provide a powerful, secure analytic and storage platform for health services research compliant with state and federal security regulations. Users access HSRDC services via a secure virtual private network, allowing researchers to manage and analyze sensitive data directly in a secure computing environment, maximizing both operability and security.

The HSRDC operates as a University cost center, with a budget of over $600,000. It was founded in 2011 and is tightly affiliated with both the CTSI and the University of Pittsburgh Health Policy Institute. All HSRDC activities are overseen by an advisory committee with representatives from each of the six schools of the health sciences. As the prevalence of research using large administrative and clinical datasets increases, so does the need to dynamically adapt to changing regulations and security needs. An enterprise such as the HSRDC, with an administrative and information technology infrastructure designed explicitly to store, manage, and analyze this type of data, facilitates this task for the University in order to uniquely position Pitt to seek new funding sources as the healthcare landscape evolves.

Major Accomplishments

- Recently partnered with Optum Analytics to provide Pitt researchers with access to 180+ million patients with claims records and 80+ million patients with electronic health records (EHRs) to support new and ongoing research
- Provided secure data storage and management to more than 35 research groups and nearly 150 individual users in the Schools of the Health Sciences.
Facilitated federal funding exceeding $50 million, including serving as the data storage facility for both PCORI and NIH-funded studies.

Served as the primary computing center for the Health Policy Institute’s Medicaid Research Center, a partnership between Pitt and the Commonwealth of Pennsylvania Department of Human Services that exists to support policy-focused health services research of direct relevance to the state.

Scholarly Activities

In line with our mission of education, training and scientific advancement, each year the Department of Critical Care Medicine coordinates and hosts three scholarly conferences that feature national and international academic leaders as the keynote speakers. A key element of each conference is the opportunity for our junior faculty and fellows to gain experience presenting their research. These conferences are supported through funding from the National Institutes of Health, the US Army, and the Laerdal Foundation as well as a number of industry and private sponsors. All conferences offer continuing medical education credit.

Ninth Annual AKI Symposium

October 31, 2019
Program Director: John A. Kellum, MD

Attracting more than 100 physicians, faculty, and researchers as well as numerous patient advocates and patients, the AKI Symposium is known as forum for leading-edge dialogue on acute kidney injury. The symposium features two keynote speakers: the first was Samir Parikh, MD, from the Center for Vascular Biology Research at Harvard Medical School, who spoke about “Metabolic Determinants of AKI Resistance—PGC1a-NAD+”; and the second was Anupam Agarwal, MBBS, the Chair of Nephrology Leadership at the University of Alabama at Birmingham, who spoke about “Heme Oxygenase-1 as a Protective Mechanism in AKI.” Junior investigator prizes were awarded to Carlos Manrique, MD, (1st place) and Samit Ghosh, PhD, (2nd place). The AKI Symposium was co-hosted by the Center for Critical Care Nephrology, Pittsburgh Center for Kidney Research, Renal-Electrolyte Division-O’Brien Center, UPMC Children’s Hospital of Pittsburgh, Division of Nephrology, and the Starzl Transplantation Institute. Symposium organizers appreciate the education grant support of Astute Medical, Inc. and Grifols.
Ninth Annual Mitchell P. Fink Critical Care Scholar Day

June 4, 2020
Program Director: Jeremy Kahn, MD, MS

Fink Scholar Day is a celebration of the legacy of Mitchell P. Fink, the founding Chair of the Department of Critical Care Medicine who excelled as a teacher, clinician and scientist. In keeping with his vision for critical care medicine as a multidisciplinary field, Fink Scholar Day showcases the work of our junior faculty and fellows around the themes of Clinical Research, Quality Improvement, Education, and Translational Research. Due to the coronavirus pandemic, Fink Scholar Day moved to a virtual format with junior faculty, fellows and research staff presenting 19 research abstracts. The presenter with the strongest abstract in each category was awarded a prize: Donald Bourne, MPH (medical student); Timothy Kaselitz, MD, MPH (MCTTP fellow); Abdullah Qureshi, MD (MCTTP fellow); and Carlos Manrique, MD (visiting scholar).

Training Grants

The Department is committed to training the next generation of federally funded researchers. To support this mission, we direct two NIH T32 grants that support post-doctoral trainees in research training and career development. One T32 grant is housed within CRISMA and is primarily dedicated to adult-trained clinician scientists with an interest in clinical and translational research in critical illness, while the other housed within the Safar Center is primarily dedicated to pediatric-trained clinical scientists with an interest in brain injury and resuscitation science.

Adult Research Fellow Training

Director: Jeremy Kahn, MD, MS

The goal of the “Multidisciplinary Training in Critical Care Outcomes Research” training program (5T32HL007820-19) is to train independent investigators in the science of acute organ dysfunction in the setting of critical illness, with a particular focus on sepsis and the acute respiratory distress syndrome. In May 2019, we were awarded our fifth competitive renewal for this T32, which will now be funded through its 25th year making it one of the longest-standing training grants at the University.

Fellows train in one of five interrelated areas: (a) immunobiology and the cellular basis for organ injury; (b) systems modelling and computational biology; (c) clinical epidemiology of critical illness; (d) critical care ethics and decision making; and (e) critical care health policy and management. These areas intersect with the extramural research grants of our training faculty and reflect the essential translational basis of critical care medicine, which requires an integration of cell and molecular biology, organ system interaction, and novel therapies that impact patient-centered and socially relevant outcomes.

Trainees receive a high-quality, mentored critical care research experience in an inter-professional training environment. Our training philosophy is based on four pillars: intensive mentoring, experiential research, didactic education, and participation in a community of learners. During FY20, we trained four post-doctoral fellows in critical care research:
Emily Brant, MD  
Principal Trainer: Christopher Seymour, MD  
Appointment: 7/01/19 – 6/30/21

Dr. Emily Brant attended medical school at Jefferson Medical College in Philadelphia and completed a residency in Emergency Medicine at the University of Pittsburgh and the UPMC Health System. She entered the training program through the Department of Critical Care Medicine’s clinical fellowship in Critical Care Medicine. She is now in her second year of research training. Dr. Brant’s research interests are in the diagnosis and management of critical illness in the pre-hospital setting, with a specific focus on critical illness syndromes such as sepsis and ARDS. Under the mentorship of Dr. Christopher Seymour, she is using novel data mining approaches to determine the relationship between biomarker trajectories and outcomes in early-stage sepsis.

Kimberley DeMerle, MD  
Principal Trainer: Christopher Seymour, MD  
Appointment: 12/10/19 – 12/09/21

Dr. Kimberley DeMerle attended medical school at Wayne State University School of Medicine and completed a residency in Internal Medicine at the University of Michigan. She entered the training program through the Division of Pulmonary & Critical Care Medicine, where she completed a clinical fellowship. She is now in the first year of her research training on our T32. Dr. DeMerle’s research interests are in the diagnosis and management of critical illness syndromes, with a specific focus on using novel biomarkers to understand sepsis phenotypes. Under the mentorship of Dr. Christopher Seymour, she is using existing data from randomized controlled trials and prospective cohort studies to validate sepsis phenotypes by testing their relationship with clinical trajectories in different cohorts.

Kristin Gigli, PhD, RN  
Principal Trainer: Jeremy Kahn, MD, MS  
Appointment: 7/01/18 – 6/30/20

Dr. Kristin Gigli attended nursing school at Purdue University, obtained a Master of Science in Nursing from the University of Pennsylvania, and obtained a PhD in Nursing with a focus on Health Services Research from Vanderbilt University. She moved to Pittsburgh to join our training program, and she recently finished her second year of her post-doctoral fellowship. Dr. Gigli’s research interests are in the organization and management of intensive care with a specific focus on nursing staffing patterns and how they impact the delivery of evidence-based practice. Under the mentorship of Dr. Jeremy Kahn, she is using the principles of organizational science and health economics to identify ways to improve critical care delivery. After completing her post-doctoral training, she accepted a tenure-track position at Texas Christian University where she is currently developing a K-award.

Cindy Teng, MD  
Principal Trainer: Jeremy Kahn, MD, MS  
Appointment: 7/01/19 – 6/30/21

Dr. Cindy Teng attended medical school at the University of Pittsburgh before beginning a residency in General Surgery at the UPMC Health System. She joined our training program as part of the dedicated research time afforded to her as a surgery resident. Dr. Teng’s research interests are in organizational behavior and theory as it relates to acute care delivery, with a specific focus on the psychosocial determinants of effective team-level care. Under the mentorship of Drs. Jeremy Kahn and Mathew Rosengart, as well as co-investigators from
Carnegie Mellon University she is using network analysis to study how the organization of critical care, both at the macro-economic and micro-economic levels, influence patient outcome.

Pediatric Research Fellow Training

Director: Patrick Kochanek, MD
Co-Directors: Robert Clark, MD, Anthony Kline, PhD

Now in its 19th year, the T32 “Training in Pediatric Neurointensive Care and Resuscitation Research” program (5T32HD040686-16) trains pediatric critical care medicine, child neurology, pediatric neurosurgery, PM&R, pediatric emergency medicine, newborn medicine, pediatric radiology fellows, and selected other fellow-level clinician-scientists or scientists. Supported by 21 outstanding and highly experienced NIH-funded senior mentors, the research interests of our T32 fellows target investigations into TBI and cardiopulmonary arrest, which are central to the field of pediatric neurointensive care and resuscitation, and which contribute to the greatest morbidity and mortality to children across the field of pediatric neurocritical care. A competitive renewal application was submitted to NICHD for continued funding of our highly successful program for an additional five years. The renewal was submitted as a dual PI application by Drs. Kochanek and Clark, along with two Co-PIs, Hülya Bayır, MD, director of basic science research and Anthony Kline, PhD, director of diversity recruitment.

The pediatric T32 program has five goals:
1. Education of the fellows is grounded in the sound principles of contemporary neuroscience.
2. Fellows become academic physician-scientists in the field.
3. Fellows go on to successful independent funding.
4. Fellows ultimately become leaders in the field.
5. Fellows are fully equipped to bring the expertise to rigorously and ethically study novel neuroprotective, resuscitative, and regenerative therapies.

Each year, the program funds two new trainees for a two-year minimum duration of training; typically funding four positions each year. In FY20, the T32 supported four outstanding fellows. Our four post-doctoral fellows in critical care research during FY20 were:

Justin Azar, MD
Principal trainer: Robert Clark, MD, with Michael Morowitz, MD, Raj Aneja, MD, Christopher Horvat, MD, MHA, and Patrick Kochanek, MD
Appointment: 7/1/18-6/30/20

Dr. Azar completed his second year of training on our T32. He joined our program after completing his residency in pediatrics at Children’s National Medical Center and his clinical PICU fellowship training in our program. His major area of research interest is in pediatric nutrition and he launched a single center prospective clinical pilot trial on the effect of plant-based high fiber enteral nutrition on the gut microbiome in critically ill children. Given his interest in pediatric ICU nutrition he is also examining anthropometrics as predictors of mortality in critically ill infants and children using the electronic health records, and a 10-year cohort. He presented work titled “Increased mortality risk in underweight critically ill children” at the 2020 Congress of the Society of Critical Care Medicine, and a manuscript on that work is in preparation. Finally, he also took nine courses to enhance his clinical research skills.

Jessica Jarvis, PhD
Principal trainers Ericka Fink, MD and Amy Houtrow, MD, PhD, MPH, with Amery Treble-Barna, PhD, Sheri Robb, PhD, and Patrick Kochanek, MD
Appointment 5/1/19-4/30/21
Dr. Jarvis just began her second year of training on our T32. She is a targeted recruit to our T32 from the University of Texas at Galveston, with the goal of ultimately further expanding our Pediatric PM&R academic faculty. A trained music therapist with a PhD in PM&R having studied a number of pediatric ICU related issue, she is studying the very timely topic of music therapy as a non-pharmacologic intervention to decrease stress and sedation requirements in infants and children who require mechanical ventilation. The inclusion on her committee of Dr. Sheri Robb, an expert in music therapy at the University of Indiana School of Nursing, has further strengthened her training in this very novel area of research. She has designed and launched a randomized controlled pilot trial and submitted a KL2 grant to the University of Pittsburgh Clinical Science Training Program of the CTSI and has published “Electronic participation-focused care planning support for families of young children receiving rehabilitation therapies: A pilot study” in *Developmental Medicine and Child Neurology* along with two editorials and an abstract presentation. Finally, she was funded as PI for a start-up grant from the Lloyd Reback Family Gift to study the impact of music therapy in infants and children after acute hypoxic-ischemic brain injury.

**Neil Munjal, MD**  
Principal trainers Robert Clark, MD with Christopher Horvat, MD, MHA, Dennis Simon, MD, and Patrick Kochanek, MD  
Appointment 10/24/19-10/23/21
Dr. Munjal is beginning his second year of training on our T32. He is the first recruit to our program from Child Neurology. He received his MD from Washington University St. Louis and completed Child Neurology training at UPMC CHP. He is completing dual training in PCCM with the goal of becoming dual board certified. He is our first trainee to formally obtain pediatric NCC training for board eligibility. His strength is mathematics and computer science. He is developing expertise in machine learning and artificial intelligence (AI), which he is leveraging to develop AI models to predict new neuro-morbidity and neuro-outcomes in the PICU. He is an exceptional trainee who has demonstrated that he is a rising star in our field having received a STAR presentation award for his abstract at the 2020 SCCM Congress. He also received a Fellow Travel Award at the Oct. 2019 Pediatric NCC Research Group meeting (a satellite to the National Neurocritical Care Conference), where he gave an invited presentation on machine learning and AI in neurocritical care. It is exceptional for a fellow to be invited to give an invited panel presentation at such a conference.

**Jay Rakkar, MD**  
Principal trainer Gilles Clermont, MD, with Christopher Horvat, MD, MHA, Patrick Kochanek, MD, Dennis Simon, MD, and Robert Clark, MD  
Appointment 4/30/2020-4/29/2022
Dr. Rakkar began his first year of training on our T32 in April of 2020, as this Report is being prepared. He is an outstanding trainee who came to our PICU fellowship program from Phoenix Children’s Hospital. He has a strong research background from Georgia Tech, the Medical College of Georgia, and additional research work at the Dept. of Neurological Surgery at Emory University. Prior to beginning T32 training he has already been involved in two projects, first, developing an electronic Pediatric Intensity Level of Therapy Score (ePILOT) to predict mortality in intracranial pressure monitored patients, which he presented as an abstract at the 2020 SCCM congress. During his T32 training, he plans to focus on the dynamic assessment of intracranial compliance in pediatric TBI. Dr. Rakkar is now working with Dr. Gilles Clermont, a new mentor on our T32 who has a long track record as an expert and mentor in model-based personalized therapies, physiologic signal analysis, and mathematical modeling of disease state.
Individual Faculty Research Summaries

Ali Al-Khafaji, MD, MPH

Dr. Al-Khafaji focuses his research interests on clinical issues related to caring for critically ill patients with acute alcoholic hepatitis, end stage liver disease, acute kidney injury solid organ transplantation and multisystem organ failure.

Major Projects as Site Principal Investigator

- APACHE (ACLF Plasma Exchange): Effects of Plasma Exchange with Human Serum Albumin 5% (PE-A 5%) on Short term Survival in Subjects with "Acute-On-Chronic Liver Failure" (ACLF) at High Risk of Hospital Mortality.
  Funded by: Instituto Grifols, SA
- TIGRIS: A Prospective, Multicenter, Randomized, Open-Label Study to Evaluate the Efficacy and Safety of PMX Cartridge in Addition to Standard Medical Care for Patients with Endotoxemic Septic Shock.
  Funded by: Instituto Grifols, SA

Derek C. Angus, MD, MPH

Dr. Angus' research interests include translational, clinical and health services research in the fields of sepsis, pneumonia, and multisystem organ failure, as well as optimal critical care delivery. He has a particular interest in novel trial designs for precision medicine and the learning health system.

Major Projects as Principal Investigator

- Strategies to Promote Resiliency (SPRY)
  Funded by: ITTC, UPMC, Co-PIs: Neal & Seymour
- Randomized, Embedded, Multi-factorial, Adaptive Platform Trial (REMAP) COVID
  Funded by: Global Coalition for Adaptive Research (GCAR)

Major Projects as Co-Investigator

- Procalcitonin antibiotic consensus trial (ProACT)
  Funded by: NIH/NIGMS R01GM101197, PI: Huang
- A trial to Improve surrogate decision-making for critically Ill older adults
  Funded by: NIH/NHLBI R01AG045176, PI: White
- Preventive and early treatment of acute lung injury clinical trials network (PETAL)
  Funded by: NIH U01HL123020, PI: Yealy
- Organizational Determinants of ICU Telemedicine Effectiveness
  Funded by: NIH/NHLBI R01HL120980 PI: Kahn
- A Stepped Wedge Trial of an Intervention to Support Proxy Decision Makers in ICUs
  Funded by: NIH R01NR014663, PI: White
- A novel intervention to make heuristics a source of power for physicians
  Funded by: NIH DP2LM012339, PI: Mohan
- Re-evaluation of systemic early neuromuscular (ROSE) blockade trial PETAL Network
  Funded by: NIH/NHLBI U01HL123009, PI: Moss
- Sepsis endotyping using clinical and biological data
  Funded by: NIH/NIGMS R35GM119519 PI: Seymour
- The effects of state sepsis mandates on hospital mortality, health care utilization and costs
  Funded by: AHRQ R01HS025146 PI: Kahn
• Educational strategies to promote post-extubation non-invasive ventilation in patients with acute respiratory failure (METEOR)  
  Funded by: NIH U01HL143507 PI: Girard

• Organizational Strategies for Improving Evidence-Uptake in intensive care  
  Funded by: NIH R35HL144804 PI: Kahn

• A Precision Medicine Approach Based on Discrete Time Windows for Predicting Outcomes of Polytrauma Patients  
  Funded by: US Army W81XWH-18-2-0051 PI: Billiar

Tamil Anthonymuthu, PhD
Dr. Anthonymuthu’s research focuses on developing and implementing lipidomics strategies to identify the role of lipids and lipid mediators in the pathogenesis of diseases. He uses the newly developed lipidomics methods to identify potential plasma-based prognostic biomarkers in brain injuries such as cardiac arrest and traumatic brain injury. He is also interested in elucidation of the molecular mechanism of ferroptotic cell death through novel lipidomics and proteolipidomics methodologies.

Major Projects as Co-Investigator
• Oxidative lipidomics in pediatric traumatic brain injury  
  Funded by: NIH/NINDA 5R01NS061817, PI: Bayır

Alicia Au, MD, MS
Dr. Au's research focuses on the study of neurological injuries in children, with an emphasis on the use of biomarkers for prediction of outcome in traumatic brain injury and for early detection of neurologic system failure in diagnostically diverse patients in the Pediatric Intensive Care Unit.

Major Projects as Principal Investigator
• Mixed Graphical Models for the Predication of Neurological Morbidity in the PICU  
  Funded by: NIH/NINDS K23 5K23NS104133-03

Major Projects as Site Co-Principal Investigator
• Epilepsy Bioinformatics Study for Antiepileptogenic Therapy (EpiBioS4Rx)  
  Funded by: NIH/NINDS, PI: Vespa

Hülya Bayır, MD
Dr. Bayır’s research focuses on lipid signaling in cell death and inflammation, mitochondrial injury and targeted therapies. She has organized multidisciplinary teams of investigators to study novel approaches that treat mitochondrial dysfunction by targeting oxidative stress. Her laboratory collaborates with basic, translational, and clinical science researchers.

Major Projects as Principal Investigator
• Oxidative Lipidomics in Pediatric Traumatic Brain Injury  
  Funded by: NIND 2R01NS061817, Co-Is: Kochanek, Stoyanovsky, Kagan

• University of Pittsburgh CMCR Project 3, Radiation Mitigators Targeting Regulated Necrosis Pathways of Necroptosis and Ferroptosis  
  Funded by: NIAID 2U19AI068021, Co-I: Huang

• Lipid Imaging in Traumatic Brain Injury by High Resolution GCIB-Secondary Ion Mass Spectrometry
Major Projects as Co-Investigator
- Development of Serum, Imaging, and Clinical Biomarker Driven Models to Direct Clinical Management after Pediatric Cardiac Arrest
  Funded by: NINDS 1R01NS096714, PI: Fink

Major Projects as Sponsor to SOM MD-PhD and MD students
- Targeting Mitochondrial PARP1 in Neuronal Ischemia-Reperfusion Injury
  Funded by: NHLBI F30HL142130. Mentee: Lamade, Andrew
- Ferroptosis and Acute Kidney Injury after Pediatric Cardiopulmonary Bypass Surgery
  Funded by NIDDK T35DK065521. Mentee: Hier, Zachary

Joseph A. Carcillo, MD
Dr. Carcillo’s research interest is in using improved understanding of host-pathogen interactions to develop individualized or phenotype specific therapies for pediatric sepsis, with a clinical goal to apply this research to bedside development of practice methods that reduce global child mortality and morbidity. His research is directed to understanding the role of systemic inflammation related to host-pathogen interactions in the development of sepsis-induced multiple organ failure. The basic tenet is that just as hemodynamic therapies directed to specific cardiovascular dysfunction phenotypes have reduced mortality from septic shock, so too can therapies directed to specific inflammation pathobiology phenotypes reduce mortality from sepsis induced multiple organ failure.

Major Projects as Principal Investigator
- Collaborative pediatric critical care research network at UPMC Children’s Hospital of Pittsburgh
  Funded by: NICHD UG1HD049983
- Pediatric Acute respiratory Distress Syndrome (PARDS)
  Funded by: NIH/NICHD U01HD049934
- GM-CSF for reversal of immunoparalysis in pediatric sepsis induced MODS (GRACE)
  Funded by: NIH/NICHD U01HD049934
- ICU resuscitation to improve outcomes after pediatric cardiac arrest (ICU-RESUS)
  Funded by: NIH/NHLBI R01HL131544
- Trauma outcomes in children (TOUCH)
  Funded by: NIH/NICHD U01HD049934
- Inflammation phenotypes in pediatric sepsis induced multiple organ failure
  Funded by: NIH R01GM108618

Major project as Co-investigator
- Microvascular thrombosis in systemic inflammation: A novel ADAM TS13 peptide reverses Thrombocytopenia Associated MODS
  Funded by: NIH R01GM112806, PI Cruz, Co-I Nguyen
Sherry H-Y Chou, MD, MMSc
The overarching goal of Dr. Chou’s work is to improve the treatment and outcome of critically ill patients with subarachnoid hemorrhage (SAH). Her research focuses on the role of inflammation on secondary brain injury, on recovery following SAH, and on the discovery of novel biomarkers to predict outcome and guide therapy. Dr. Chou has extensive experience in building a prospective SAH cohort and biospecimen banking and biomarker analysis and discovery and has built prospective biobanks of vascular brain injury cohorts both in Boston and in Pittsburgh. Additionally, she has significant experience in multicenter clinical trials and collaborations in large research networks.

Major Projects as Principal Investigator
- MicroRNA Endotypes of Systemic Inflammation in Sub-Arachnoid hemorrhage (MESSAGE)
  Funded by: NINDS R21NS113037
- MicroRNA Biomarkers of Systemic Inflammation and Outcome in SAH
  Funded by: Neurocritical Care Society
- Systemic inflammation in subarachnoid hemorrhage
  Funded by: Dean’s Faculty Advancement Award, University of Pittsburgh
- Ultra-mild therapeutic hypothermia to reduce early brain injury following subarachnoid hemorrhage
  Funded by: University of Pittsburgh Physicians/UPMC Academic Foundation Award
- COVID 19 Neurologic Manifestations
  Funded by: University of Pittsburgh Clinical and Translational Science Institute

Major Projects as Site Principal Investigator
- Sleep for Stroke Management and Recovery Trial (Sleep SMART)
  Funded by: NIH U01NS099043, MPI: Broderick/Brown/Chervin
- Phase 3, Multicenter, randomized, double-blind, placebo-controlled, parallel group, efficacy and safety study comparing eg-1962 to standard of care oral nimodipine in adults with aneurysmal subarachnoid hemorrhage
  Funded by: Newton 2 Trial (Edge Therapeutics)

Major Project as Consultant
- Sex Steroids and IGF in the CNS following aSAH and their relationship to patient outcomes
  Funded by: NINR R01NR018160, PI: Crago

Robert SB Clark, MD
Major Projects as Principal Investigator
- Mitochondria-targeted Redox Therapy for Cerebral Ischemia in the Developing Brain
  Funded by: NIH/NINDS R01NS084604, MPI: Clark/Bayir
- Innovative Method for Real-time Assessment of Intracranial Compliance
  Funded by: NIH/NINDS R21NS115174
- Druggable Mitochondrial Targets for Treatment of Cerebral Ischemia
  Funded by: R01NS117000, MPI: Clark/Bayir

Major Projects as Co-Principal Investigator
- Training in Pediatric Neurointensive Care and Resuscitation Research
  Funded by: NIH/NICHD T32 HD40686, PI: Kochanek
Major Projects as Co-Investigator
- Development of Serum, Imaging, and Clinical Biomarker Driven Models to Direct Clinical Management after Pediatric Cardiac Arrest
  Funded by: NIH/NINDS R01NS096714, PI: Fink
- Gut Microbial Metabolite-Mediated Neuroprotection in Traumatic Brain Injury
  Funded by: NIH/NINDS R21NS115173, PI: Simon

Gilles Clermont, MD, MSc
Dr. Clermont’s research program seeks to explore the intersection of advanced quantitative methods and bedside care with the ultimate vision of leveraging mathematical, computational and engineering expertise to deliver improved personalized care to the critically ill.

Major Projects as Co-Principal Investigator
- Innovative Method for Real-time Assessment of Intracranial Compliance
  Funded by: NIH/NINDS R21NS115174 MPI: Clark/Clermont

Major Projects as Co-Investigator
- Development and Evaluation of a Learning Electronic Medical Record System
  Funded by NIH/MLM 1R01-LM012095, PI: Visweswaran
- Predicting Patient Instability Noninvasively for Nursing Care-Two
  Funded by: NIH/NINR1R01-NR013912, PI: Hravnak
- Machine Learning of Physiological Variables to Predict Diagnose and Treat Cardiorespiratory Instability
  Funded by: NIH/NIGMS R01GM117622, PI: Pinsky
- Trauma Care in a Rucksack
  Funded by: DOD W81XWH-19-C-0101, PI: Pinsky

David R. Emlet, PhD
Dr. Emlet is a cellular/molecular biologist who has established and maintains in vitro model systems of primary human kidney proximal and distal tubule cells for the study of acute kidney injury (AKI). His primary research interest is to utilize a translational research method (clinically informed and clinical sample-supported application to in vitro studies) to elucidate the molecular mechanisms/potential biological roles of novel urine acute kidney injury (AKI) biomarkers. These model systems also serve as a resource from the Center for Critical Care Nephrology, CRISMA, for all kidney-related research at the University of Pittsburgh that have contributed significantly to multiple collaborations.

Major Projects as Principal Investigator
- Elucidating the molecular mechanisms and biological role of the AKI biomarker IGFBP7 from Cell-free hemoglobin mediated biomarker secretion in human proximal tubule cells.
  Funded by: non-sponsored UPP Critical Care Medicine, CCM Research Development Fund, Endowed Chair in Critical Care Medicine research.
- Elucidating the molecular mechanisms and biological role of the AKI biomarker TIMP2 in human distal tubule cells from various clinically relevant cellular insults.
  Funded by: non-sponsored UPP Critical Care Medicine, CCM Research Development Fund, Endowed Chair in Critical Care Medicine research
  Funded by: Corporate research agreement with Astute Medical Inc.
• Challenging cancer through physical chemistry.
  Funded by: Corporate research agreement with Christopher and Flemming Rasmussen

Ericka L. Fink, MD, MS
Dr. Fink’s research focus is pediatric resuscitation, neurocritical care, and outcomes. She is PI on an NIH R01-funded prospective, multicenter study enrolling 164 children at more than 14 US centers to validate brain and imaging-based biomarkers to prognosticate outcome after pediatric cardiac arrest. Dr. Fink is CHP’s alternate PI in the NICHD’s Collaborative Pediatric Critical Care Research Network. She is PI of the multinational PICU Core Outcome Set research program funded by the network. Dr. Fink is leading and developing the multidisciplinary Critical Illness Recovery for ChilDrEn (CIRCLE) clinical-quality program to support long-term recovery of children and families affected by critical illness.

Major Projects as Principal Investigator
• Development of serum, imaging, and clinical biomarker driven models to direct clinical management after pediatric cardiac arrest (Personalizing Outcomes after Child Cardiac Arrest (POCCA) study
  Funded by: NIH/NINDS R01 NS096714
• Innovative brain connectivity imaging and long-term child outcomes following cardiac arrest
  Funded by: Lloyd Reback Family Gift Committee, Safar Center for Resuscitation Research, UPMC
• PICU Core Outcome Set
  Funded by: NIH/NICHD U10HD049983, NICHD Collaborative Pediatric Critical Care Research Network

Major Projects as Co-Investigator
• Understanding and preventing adverse safety events in pediatric out-of-hospital cardiac arrests
  Funded by: NIH/NHLBI 1R01HL141429, PI: Guise
• Optimizing chest compression during infant and child cardiopulmonary resuscitation
  Funded by: NIH/NHLBI 1R01HD09589, PI: Menegazzi

Dana Fuhrman, DO, MS
Dr. Fuhrman is interested in establishing a method to predict a kidney’s response to stress and decline in glomerular filtration rate (GFR) over time. She is currently focused on studying patient populations that are at risk for numerous kidney insults across a lifetime and the development of chronic kidney disease.

Major Projects as Principal Investigator
• Renal fitness in young adults with congenital heart disease
  Funded by: NIH K23DK116973
• Urinary biomarkers in healthy young adults as compared to young adults with congenital heart disease
  Funded by: Dr. Fuhrman’s Faculty Start-Up Funds
• The epidemiology of acute kidney injury in non-renal solid organ transplant patients
  Funded by: Children’s Hospital of Pittsburgh Scholar’s Grant Program
• Acute kidney injury recovery in young adults with congenital heart disease
  Funded by: Children’s Hospital of Pittsburgh Scholar’s Grant Program
• The use of balanced solutions as compared to normal saline for maintenance fluids in patients with asthma admitted to the PICU
• A propensity analysis of the effect of plasma exchange on thrombocytopenic AKI
Major Projects as Co-Investigator
- The use of urinary biomarkers to predict acute kidney injury in solid organ transplant patients
  Funded by: Hillman Foundation Award, PI: Squires
- Preoperative albumin infusions as a method to quantify renal functional reserve
  Funded by: Children’s Hospital of Pittsburgh Scientific Program, PI: Sanchez De Toledo

Timothy D. Girard, MD, MSCI
Dr. Girard’s research program seeks to understand and enhance recovery from critical illness by improving short- and long-term patient-centered outcomes. His current projects focus on safely hastening liberation from mechanical ventilation and enhancing short- and long-term cognitive outcomes for critically ill patients. Dr. Girard was the first to establish that protocolized management of sedation during critical illness improves long-term survival and that delirium during critical illness is a risk factor for persistent cognitive impairment and disability. These insights fundamentally reshaped our understanding of the cognitive effects of critical illness and led directly to widespread practice change.

Major Projects as Principal Investigator
- Mitochondrial Determinants of Cognitive Outcomes in ARDS and Sepsis
  Funded by: NIH/NHLBI R01 HL135144-02
- Mitochondrial Determinants of Cognitive Outcomes in ARDS and Sepsis – Supplement
  Funded by: NIH/NHLBI R01 HL135144-02S
- Educational Strategies to Promote Post-Extubation Non-invasive Ventilation in Patients with Acute Respiratory Failure
  Funded by: NIH/NHLBI U01 HL143507-01

Hernando Gómez, MD, MPH
Dr. Gómez’s research interests center in the pathophysiology of septic and hemorrhagic shock and the repercussions of these biologic processes on organ function. His primary project is focused on the role of metabolic re-programming of fatty acid oxidation and mitochondrial dysfunction in the origin of sepsis-induced organ dysfunction. In addition, he is investigating the denudation of the glycocalyx in the origin of microvascular dysfunction during sepsis, and how this relates to the metabolic and energy profile of adjacent renal tubular epithelial cells using intravital microscopy. Dr. Gómez is also working to identify distinct phenotypes in septic rodents and link these to specific disease mechanisms. He has selected specific FDA approved compounds proven to reprogram renal metabolism and protect from organ dysfunction in rodent models and has conducted translational retrospective studies looking at the effect of these medications in patients with sepsis. Dr. Gómez is a co-investigator in a Department of Defense grant to develop a close loop, autonomous resuscitation system using a porcine model of hemorrhagic shock. This work is part of a project that can be deployed without human intervention to remote, dangerous conflict areas to provide immediate hemodynamic assessment and fluid/vasopressor resuscitation to wounded soldiers while being transported to field hospitals.

Major Projects Principal Investigator
- Study of the ACM5SD inhibitor TES-1025 in modulation in sepsis induced acute kidney injury
  Funded by: TES Pharma
- Metabolic reprogramming is an adaptive response to organ injury in sepsis
  Funded by: University of Pittsburgh School of Medicine; University of Pittsburgh’s Dean’s Faculty Advancement Award
Christopher Horvat, MD, MHA
Dr. Horvat’s work is in learning health systems. His principal work spans three major, interrelated aspects: first, effectively levering the accumulating, granular data harbored by the EHR will bring a new era of pediatric research by increasing cohort sizes and significantly improving capabilities of covariate adjustment; second, pairing these data with novel biologic information, such as patient genotypes, will lead to new, personalized approaches to care; and third, generating reliable summaries of EHR data offers better characterization of practice patterns that can guide both bedside and institutional decision making.

Major Projects as PI
- “A Learning Healthy System Approach to Precision Sedation and Analgesia in Critically Ill Children”
  PI: Christopher Horvat, MD MHA
  NICHD 1K23HD098328-01A1

David T Huang, MD, MPH
Dr. Huang’s research focuses on the therapeutic and diagnostic aspects of infection, sepsis, ARDS, and clinical trials. As director of the Multidisciplinary Acute Care Research Organization (MACRO), he oversees a clinical research infrastructure that provides 24/7 screening and enrollment capability to approximately 23 principal investigators from 8 departments and divisions for approximately 29 active studies, and he employs and teaches approximately 50 Pitt undergraduate students.

Major Projects as Principal Investigator
- UPMC REMAP- COVID Trial
  Funded by: UPMC, GCAR
- LIPOS-2 trial planning contract
  Funded by: Sepsicure
- Procalcitonin Antibiotic Consensus Trial (ProACT)
  Funded by: NIH/NIGMS 1R01GM101197
- Microbiome and Procalcitonin Long term Outcomes Epidemiology (MAPLE)
  Funded by: Thermo Fisher I#0052116
- Ascorbic Acid, Corticosteroids, and Thiamine in Sepsis Trial (ACTS) Trial
  Funded by: Open Philanthropy Project

Major Projects as Co-Investigator
- Prevention and Early Treatment of Acute Lung Injury (PETAL) – University of Pittsburgh Clinical Center
  Funded by: NIH/NHLBI 1U01HL123009-01, Co-PIs: Angus, Yealy
- Crystalloid Liberal or Vasopressors Early Resuscitation in Sepsis (CLOVERS)
  Funded by: NIH/NHLBI 5U01HL123009-04, Co-PIs: Angus, Yealy
- Linking Investigations in Trauma and Emergency Services (LITES) Network
  Funded by: Department of Defense W81XWH-16-D-0024, PI: Sperry
- NANO trial
  Funded by: NIH, PI: Morowitz
Ruchira Jha, MD
Dr. Jha’s research focus is on cerebral edema using traumatic brain injury as a model. Her specific interest is on a pathway involving sulfonylurea receptor-1 and evaluating the role of this pathway from multiple translational angles in human subjects as well as mouse models. Her work includes genetics, imaging endo-phenotyping, molecular analyses, and evaluating this pathway at varying levels of injury severity.

Major Projects as Principal Investigator
- Translational assessment of Sur-1 as a biomarker and therapeutic target for cerebral edema in TBI. Funded by: NINDS/NIH K23NS101036: University of Pittsburgh, Dean’s Faculty Advancement Award
- Sulfonylurea Receptor-1 and Glyburide: Preventing Brain Swelling and Providing Neuroprotection in Mild Repetitive Traumatic Brain Injury. Funded by: Chuck Noll Foundation for Brain Injury Research Grant #007
- A translational evaluation of Sur1-Trpm4 imaging endophenotypes and genetics to direct precision medicine for cerebral edema after traumatic brain injury. Funded by: NIH/NINDS R01 (pending support)

Jeremy M. Kahn, MD, MS
Dr. Kahn’s research program focuses on the organization, management, and financing of critical care services in the United States. Specific areas of interest include ICU workforce and staffing, quality measurement, telemedicine, and regionalization of critical care. His work integrates approaches from the fields of epidemiology, health services research, health economics and organizational psychology to investigate novel strategies for increasing the quality and efficiency of critical care. He is a dedicated mentor and is the PI of one of the Department’s two T32s.

Major Projects as Principal Investigator
- The effects of state sepsis mandates on hospital mortality, health care utilization, and costs Funded by: AHRQ R01 HS025146
- Organizational strategies for improving evidence-uptake in intensive care Funded by: NIH, NHLBI R35 1R35HL144804
- A robust emergency critical care telemedicine system for military and civilian use. Funded by: Department of Defense RPA-20-10-NETCCN-TATRC-037
- Multidisciplinary training in critical care outcomes research Funded by: NIH, NHLBI T32 HL007820

Major Projects as Co-Investigator
- Educational Strategies to Promote Post-Extubation Non-invasive Ventilation in Patients with Acute Respiratory Failure Funded by: NIH/NHLBI U01 HL143507-01, PI: Girard
- Understanding use of direct-to-consumer telemedicine for pediatric acute respiratory infections Funded by: NIH/NIAID R01AI1448159, PI: Ray
- Impact of rural hospital payment and delivery reform on geographic disparities in cancer surgery Funded by: NIH/NCI R01CA244189, PI: Sabik

Major Projects as Mentor
- Optimizing pediatric subspecialty care through telemedicine e-consultations Funded by NIH NICHD K23HD088642, PI: Ray
- Evaluating national sepsis policy using the electronic health record Funded by AHRQ K08HS025455, PI: Barbash
A Murat Kaynar, MD, MPH
Dr. Kaynar’s overarching research program focuses on the long-term effects of sepsis and acute ARDS. He is studying the role of zinc and zinc-dependent matrix metalloproteinases in sepsis and ARDS. He added a Drosophila model of surviving sepsis to his armamentarium. He was awarded an R01 at the end of FY15 to study zinc in mouse models of pneumonia, and with encouraging progress, he is submitting a renewal of competitive renewal in this academic year. Dr. Kaynar recently developed a prediction model of patient outcomes after surgery using the UPMC intra-operative data.

Major Projects as Principal Investigator
- Combined viral and bacterial infection and zinc homeostasis in distal lung
  Funded by: NIH/NHLBI R01HL126711
- Aerobic glycolysis and long-term outcomes from sepsis
  Funded by: UPP Foundation Grant 2017
- Cardiovascular consequences of infection and sepsis
  Funded by: BaCCoR (CTSI Basic to Clinical Collaborative Research Pilot Program)
- MMP polymorphisms in sepsis
  Funded by: Foundation for Anesthesia Education and Research
- Triple variable index in predicting outcomes in surgery. Now translating to an application development to be implemented in the operating rooms at the PUH operating rooms towards prospective trials.
  Funded by: Coulter Translational Research Partners II Program 2019

John A Kellum, MD
Dr. Kellum’s research focuses on translational research and personalized medicine for critical illness. He has organized a multidisciplinary team of investigators to study novel approaches to the treatment of sepsis, to understand the pathogenesis of acute kidney injury and to explore novel interventions for acute kidney injury. He directs the Center for Critical Care Nephrology, which integrates the work of epidemiology and health service research with studies of basic mechanism of disease and new methods of treatment. The Center’s research has a focus on fluid, electrolyte, acid-base and kidney disorders in the critically ill and injured.

Major Projects as Principal Investigator
- Phenotyping REnal Cases in Sepsis and surgery for Early Acute Kidney Injury (PReCISE AKI)
  Funded by: NIH/NIDDK UH3DK114861
- Discovery and Validation of Biomarker of Acute Kidney Injury and Dialysis Recovery
  Funded by: Astute Medical Inc.
- Adjudication of Acute Kidney Injury and Recovery
  Funded by: AtoxBio
- Relationship between Short-term Recovery and Long-term Clinical Outcomes
  Funded by: AtoxBio
- Alternate Decisions for Dialysis for AKI (ADD-AKI).
  Funded by: Astute Medical Inc.
- Automated urine flow Detection to Reduce errors and Nursing workload (AiDe-RN).
  Funded by: RenalSense
- Effects of Alternate Decision Making for Renal Replacement Therapy.
  Funded by: Baxter
- Natural History of Cardiac Surgery-Associated Acute Kidney Injury (CSI-AKI)
  Funded by: CytoSorbents
- Exploring EHR based big data phenotypes in sepsis associated advanced AKI
  Funded by: bioMérieux
• Cardiac Surgery-Associated Acute Kidney Injury (CSA-AKI Econ) Economic Model
  Funded by: SERFAN Innovation

Major Projects as Co-Investigator
• University of Pittsburgh Clinical and Translational Science Institute
  Funded by: NIH/CTSA UL1TR001857, PI: Reis
• Inflammation Phenotypes in Pediatric Sepsis Induced Multiple Organ Failure Renewal
  Funded by: NIH/NIGMS R01GM108618, PI: Carciello
• Sepsis Endotyping Using Clinical and Biological Data
  Funded by: NIH/NIGMS R35GM119519, PI: Seymour
• Biomarkers Effectiveness Analysis in Contrast Nephrology (BEACON)
  Funded by: NIH/NIDDK R01DK106256, PI: Murugan
• Biochemical and Reno-Protective Effects of Remote Ischemic Preconditioning on Contrast-Induced
  Acute Kidney Injury
  Funded by: NIH/NIDDK R21DK113486, PI: Olafiranye
• Study of the ACMSD inhibitor TES-1025 in modulation in Sepsis induced Acute Kidney Injury
  Funded by: TES Pharma, PI: Gomez
• Identifying Personalized Risk of Acute Kidney Injury with Machine Learning
  Funded by: NIH/NIDDK R01DK116986, PI: Liu
• Endothelial miR-17~92 protects against acute kidney injury
  Funded by: NIH/NIDDK R01DK125015, PI: Ho

Patrick M. Kochanek, MD, MCCM
Dr. Kochanek studies experimental and clinical traumatic brain injury (TBI) and cardiopulmonary arrest (CA) in
pediatric and adult arenas. He focuses on the secondary injury response in TBI and CA and the development of
novel therapies and diagnostics spanning both pre-clinical and clinical investigations. He pioneered the
concept of multi-center, multi-model, pre-clinical therapy and biomarker screening in TBI through his
involvement as PI of Operation Brain Trauma Therapy (OBTT). Currently, he works with DoD investigators on
new approaches to the resuscitation of TBI plus second insults such as hemorrhagic shock, including
resuscitation with whole blood and novel drugs to prevent cerebral edema. He is also Dual PI with Dr. Edwin
Jackson studying the role of 2',3'-cyclic AMP, a key enzyme in oligodendrocytes in TBI, and is also Dual PI from
the Chuck Noll Foundation with Dr. Ruchira Jha to study the second impact syndrome using a novel pre-clinical
model. He has a subcontract as site PI for a collaborative project with Dr. Travis Jackson to study RNA binding
motif proteins after ischemic and traumatic brain injury. His collaborative work in that area is linked to his
longstanding interest in therapeutic hypothermia as a neuroprotectant. Dr. Kochanek oversees support for
research on hypoxic brain injury from the Lloyd Reback family, a gift that is funding multiple projects over the
next 3 years at the Safar Center. He is a Co-investigator on five R01s, three R21s, and grants from the Veterans
Administration, and the State of Pennsylvania. Finally, he is a mentor to multiple K-awardees across several
departments and oversees a T32 from NICHD on research training in the field of pediatric neurocritical care
and resuscitation—a grant that has been funded for 20 years.

Major Projects as Principal Investigator
• Training in Pediatric Neurointensive Care and Resuscitation Research
  Funded by: NIH/NICHD T32 HD 040686
• Evaluation of Neurotherapeutic Resuscitation Strategies in Polytrauma Associated with TBI.
  Funded by: DoD W81XWH-17-C-0064
• Sulfonylurea Receptor-1 and Glyburide: Preventing Brain Swelling and Providing Neuroprotection in Mild Repetitive TBI (dual PI with Ruchira Jha, MD)  
  Funded by: Chuck Noll Foundation grant #007
• 2',3'cAMP in TBI (dual PI with Edwin Jackson, PhD)  
  Funded by: NIH/NINDS 1R01NS087978
• The Role of RNA Binding Motif 5 in Traumatic Brain Injury (Site PI via subcontract with the University of South Florida)  
  Funded by NIH/NICHD 1R01NS105721-01
• PA-CURE TBI-Biomarkers and Drug Discovery Pipeline of TBI-Related Neurodegeneration  
  (P. Kochanek and L. Taylor Project PIs-David Okonkwo overall PI)  
  Funded by: Commonwealth of PA Department of Health PA RFA67-49

Jiuann-Huey Ivy Lin, MD, PhD
Dr. Lin’s research interests include understanding the mechanisms of congenital heart diseases (CHD). Mouse models derived from ENU mutagenesis and CRISPR/cas9 gene editing, are utilized to understand various forms of CHD. Recent endeavors include exploring the mechanisms of endocytic vesicle trafficking proteins, LRP1/LRP2, that have been associated with various CHD phenotypes including malalignment, outflow tract anomalies and septation defects such as double outlet of right ventricle (Project 1) and truncus arteriosus (Project 2). In addition to the ENU mouse models, Dr. Lin is working on solidifying the hypoplastic left heart syndrome mouse model using CRISPR mouse lines (Project 3).

Major Projects as Principal Investigator:
• LRP1, an endocytic vesicle trafficking protein, is associated with congenital heart defects, an unexplored pathway.  
  Funded by: AHA 17SDG33670982
• LRP2, an endocytic vesicle trafficking protein, is associated with Truncus arteriosus  
  Funded by: Scientific grant by the Department of Critical Care Medicine
• HLHS – Generate a mouse model for hypoplastic left syndrome  
  Funded by: Scientific grant by the Department of Critical Care Medicine
• Biomarkers predictive of cardiac and neurodevelopmental outcomes in neonates with congenital heart diseases.  
  Funded by: American Heart Association

Florian B. Mayr, MD, MPH
Dr. Mayr focuses his research on improving long-term outcomes after critical illness. Currently, he is working on designing a precision medicine framework to identify subtypes of sepsis survivors who are at high risk of adverse long-term outcomes and developing personalized interventions to prevent these adverse outcomes. Dr. Mayr is also part of Pitt’s REMAP COVID team where he will focus on testing the efficacy of novel immunomodulatory interventions for patients with COVID-19.

Major Projects as Principal Investigator
• Towards precision medicine for improving long-term outcomes after sepsis  
  Funded by: VA VISN4 Competitive
• A precision medicine framework to improve long-term outcomes in Sepsis Survivors  
  Funded by: NIGMS K23 GM 132688-01
Deepika Mohan, MD MPH
Dr. Mohan is interested in how doctors make decisions for their patients. Most quality improvement efforts assume that doctors weigh information about the patient, knowledge of best practices, external incentives, and system constraints. Her clinical experience suggests that other variables influence decision making, particularly under conditions of time-pressure and uncertainty. She is using behavioral science methods, such as signal detection theory, to identify these variables and to design novel interventions that might reduce variability in care.

Major Projects as Principal Investigator
- Developing a novel intervention to recalibrate physician heuristics in trauma triage
  Funded by: NIH/NLM DP2LM012339

Major Projects as Co-Investigator
- Causes and consequences of healthcare efficiency. Project 5 – physician cognition, inpatient advance care planning, and outcomes for seriously ill adults
  Funded by: NIH/NIA P01AG019783, PI: Skinner/Barnato
- Improving clinicians’ serious illness communication skills for patients with Alzheimer’s disease or related dementias who develop acute life-threatening illness
  Funded by: NIH/NINR R01NR014663-05S1, PI: White

Raghavan Murugan, MD, MS
Dr. Murugan’s research includes various aspects of critical care nephrology including acute kidney injury, kidney replacement therapy, biomarkers and fluid overload. He employs a highly innovative and paradigm-shifting approach from epidemiology and translational methods to develop and examine new hypotheses. He is a recipient of the National Institute of Health’s KL2 career development award, an R01 to study biomarkers in contrast-associated acute kidney injury as well as several other industry grants.

Major Projects as Principal Investigator
- Biomarker Effectiveness Analysis in Contrast Nephropathy (BEACON)
  Funded by: NIH/NIDDK R01DK106256-01A1
- Early Detection of Acute Kidney Injury During High Risk Pregnancy
  Funded by: Magee Women's Research Institute & Voluntary Service Board Grant
- Epidemiology and Outcome of Catecholamine Resistant Hypotension in Critically Ill Patients
  Funded by: La Jolla Pharmaceuticals Company Inc.
- Association of high net ultrafiltration with mortality among critically ill patients with acute kidney injury and treated with kidney replacement therapy.
  Unfunded project.

Major Projects as Co-Investigator
- Phenotyping REnal Cases In Sepsis and surgery for Early Acute Kidney Injury (PReCISE AKI)
  Funded by: RFA-DK-16-026 Kidney Precision Medicine Project—Recruitment Sites (UG3/UH3, PI: Kellum

Michael R. Pinsky, MD
Dr. Pinsky’s research centers on the advanced application of cardiopulmonary physiology-based monitoring and machine learning principles to diagnose and treat critical illness. He has organized multidisciplinary teams of investigators including clinicians, bioengineers and computer scientists to study novel approaches to
diagnose and treat cardiorespiratory insufficiency, and the use this modeling feedback to diagnose and autonomously treat critical illness in both animals and humans. Dr. Pinsky’s Cardiopulmonary Research laboratory uses computation biology to identify the signatures of impending cardiovascular collapse and response to therapies. Recent research foci also included mitochondrial dysfunction and microcirculation imaging in trauma and sepsis.

Major Projects as Principal Investigator
- Machine Learning of Physiological Variables to Predict Diagnose and Treat Cardiorespiratory Instability (MLADI)
  Funded by: NIH/NIGMS 1R01GM117622-03
- Autonomous diagnosis and management of the critically ill during air transport (ADMIT)
  Funded by: NIH/NHLBI R01141916
- Experimental therapeutics in critical illness
  Funded by: NIH/NHLBI 4T32HL007820
- Predicting patient instability noninvasively for nursing care (PPIINC) (Co-PI: Pinsky)
  Funded by: NIH/NRI R01 2NR013912-01, Co-PI: Hravnak

Major Projects as Co-Investigator
- Trauma care in a rucksack (TRACIR)
  Funded by DoD W81XWH19C0101, PI: Poropatich (Scientific PI: Pinsky)
- Machine learning of physiological waveforms and electronic health records data to predict, diagnose and treat hemodynamic instability in surgical patients (MLORD)
  Funded by: NIH/NHLBI R01HL144692, PI: Cannesson
- Autonomous delivery of trauma care in the field
  Funded by: DoD W811XMH18SBA18A1 BA180061, PI: Dubrawski
- Developing goal-directed perfusion therapy for neurocardiac injury in sub-arachnoid hemorrhage
  Funded by: NIH/NHLBI 2-R01 HL074316-06, PI: Hravnak

Major Projects as Mentor
- Comprehensive assessment of right ventricular and pulmonary vascular function via CT imaging in heart failure patients
  Funded by: NIH/NHLBI 1K01HL143113
- The Role of Energy Regulation in the Epithelial Cell Response to Sepsis and the Origin of Multiple Organ Dysfunction
  Funded by: NIH/NIGMS 1K08GM117310-01A1

Kristina E. Rudd, MD, MPH
Dr. Rudd's research focuses on global sepsis epidemiology, with expertise in clinical and administrative methods to identify sepsis patients. Together with colleagues from the Institute for Health Metrics and Evaluation, she is the co-Principal Investigator of a major study of the global burden of sepsis. She is focused on investigating the impact of aging, multimorbidity, and low healthcare access and quality on an individual’s risk for developing or dying from sepsis. She also studies the management of patients with sepsis and other critical illnesses in low resource settings, with active research collaborations in Thailand and Kenya.

Major Projects as Principal Investigator
- The Syndemic of Sepsis, Multimorbidity, Aging, and Low Healthcare Access and Quality in the United States
  Funding: University of Pittsburgh Department of Critical Care Medicine; external funding pending
• Global Incidence and Mortality of Sepsis  
  Funded by: Bill & Melinda Gates Foundation, University of Pittsburgh Department of Critical Care Medicine

Major Projects as Co-Investigator
• Early Management of Sepsis in Rural Thailand  
  Funded by: NIH/NHLBI T32HL007287 and R01HL113382, PI: West
• Pathways for Innovation in Blood Transfusion Systems in Kenya  
  Funded by: NIH/NHLBI 1UG3HL151595, PI: Kumar, Puyana

Joan Sanchez de Toledo, MD, PhD
Dr. Sanchez de Toledo studies the effects of inflammatory responses associated with cardiopulmonary bypass and its relationship with end-organ perfusion, particularly heart-brain interactions and kidney injury. Dr Sanchez de Toledo also studies pulmonary risks in patients with congenital heart disease focused on the underlying mechanisms of altered pulmonary mucociliary clearance. Dr. Sanchez de Toledo also leads a lab in Spain and is funded by the Spanish Health Institute to study the effects of cardiopulmonary bypass surgery in the neurodevelopment of children undergoing heart surgery. His Spanish lab is collaborating with the Safar Center on a new animal model of pediatric cardiopulmonary bypass. He has recently received Funds from the European Commission to continue to pursue his research goals.

Major Projects as Principal Investigator
• H2020_Tiny Brains_Bio-Photonic Imaging of The Infant Brain, The Missing Link Between the Cellular Brain Damage and the Neurovascular Unit During Acute Illness  
  Funded by: Horizon 2020 European Commission
• Pediatric Cardiac Recovery Program; STUDY 19090052.  
  Funded by: Internal Funding
• Antioxidant and neuroprotection in a pediatric animal model of extracorporeal circulation: new therapeutically strategies to reduce the associated brain damage  
  Funded by: PI20_00298_ Instituto Carlos III Spanish Ministry of Health
• Predicting abnormal neurodevelopmental outcome in children undergoing cardiac surgery under cardiopulmonary bypass with a multimodal neuromonitoring strategy: from bench to the bedside  
  Funded by: PI1702198 Instituto Carlos III (Spanish NIH)

Major Projects as Co-Investigator
• H2020_AI for the Smart Hospital of The Future AICCELERATE EU proposal 101016902  
  Funded by: Horizon 2020_European Commission
• Albumin Renal Reserve study.  
  Funded by: K23DK116973, PI: Fuhrman
• NEPHRON study  
  Funded by: Pediatric Cardiac Consortium, Collaborator: University of Arkansas

Christopher K. Schott, MD, MS
Dr. Schott’s themes for research, lectures and educational curriculum are demonstrating competency in learning the use of point of care ultrasonography (POCUS) to create a focused differential diagnosis, using POCUS to guide resuscitation and treatment efforts in acutely ill patients, and teaching physicians the cognitive and psychomotor skills used in POCUS.
Major Projects as Principal Investigator
- Hierarchical observed competency and utilization of skills with point of care ultrasound (HOCUS POCUS)
  Funded by: AAIM Innovation Grants, Alliance for Academic Internal Medicine
- Veterans Affairs critical care intravenous insertion nursing education by point of care ultrasound (VACCINE by POCUS)
  Funded by: Veterans Research Foundation of Pittsburgh Medical Education and Patient Safety Grants

Major Projects as Co-Investigator
- Evaluation of implementation of a national point-of-care ultrasound program training
  Funded by: Veteran’s Affairs Quality Enhancement Research Initiative (QUERI) ClinicalTrials.gov NCT03296280, PI: Sony
- The Integration of Point of Care Ultrasound in Teleoncology
  Funded by: Veterans Research Foundation of Pittsburgh Medical Education and Patient Safety Grants, PI: Passero
- Point of Care Ultrasonography: A Novel Curriculum for Physician Assistant Students
  Funded by: University of Pittsburgh 2020 Innovation in Education Grant, PI: Graff

Christopher W. Seymour, MD, MSc
Dr. Seymour’s research program focuses on early recognition and treatment of those with acute illness, particularly sepsis. He seeks to better understand heterogeneity within sepsis and to characterize patterns of disease through the use of large retrospective EHR and clinical trial cohorts, as well as through light-touch prospective study of patients with sepsis presenting to the ED, in hopes of optimizing classification for enrollment into clinical trials.

Major Projects as Principal Investigator
- Sepsis Endotyping Using Clinical and Biological Data (SENECA)
  Funded by: NIH/NIGMS R35GM119519
- Artificial intelligence-powered emergency of sepsis
  Funded by: Leon Lowenstein Foundation
- Sepsis on FHIR: a shared data infrastructure to improve sepsis care
  Funded by: The Gordon and Betty Moore Foundation

Major Projects as Co-Investigator
- Randomized, Embedded, Multi-factorial, Adaptive Platform Trial (REMAP) COVID
  Funded by: Global Coalition for Adaptive Research (GCAR)
- Strategies to Promote ResiliencY (SPRY), An Adaptive Randomized Clinical Trial of Metformin in High-Risk Surgical Patient
  Funded by: UPMC/Immune Transplant and Therapy Center, PI: Angus, Neal
- A Precision Medicine Approach Based on Discrete Time Windows for Predicting Outcomes of Polytrauma Patients
  Funded by: US Army W81XWH-18-2-0051 PI: Billiar
Lori Shutter, MD  
Dr. Shutter’s research focus is the areas of critical care education, traumatic brain injury and neurocritical care, with a special interest in brain tissue oxygenation, spreading depolarizations and advanced neuro-monitoring.

Major Projects as Co-Principal Investigator  
- Brain Oxygen Optimization in Severe Traumatic Brain Injury—Phase 3 (BOOST-3)-CCC  
  Funded by: NIH/NINDS 1U01NS099046-01A1

Major Projects as Co-Investigator  
- Automated Detection and Suppression of Brain Tsunamis  
  Funded by: Chuck Noll Foundation, PI: Grover
- SDII: Development and Validation of Spreading Depolarization Monitoring for TBI Management  
  Funded by: DoD DMRDP W81XWH-13-PHTBI-TBIRA, PI: Hartings

Major Projects as Mentor  
  Funded by: NIH/NINDS KL2 TR000146, PI: Jha
- Quantitative Electroencephalographic Monitoring after Cardiac Arrest.  
  Funded by NIH/NHLBI 5K12HL109068, PI: Elmer

Major Projects as Medical Monitor  
- Comprehensive Biomarker Panel for Trauma-Related Dementia: Mechanistic Links Among Axonal Injury, Neuroinflammation, and Neurodegeneration  
  Funded by: USAMRAA W81XWH-18-1-0739; PIs: Okonkwo/Mountz
- Biomarkers and Drug Discovery Pipeline of TBI-Related Neurodegeneration  
  Funded by: Commonwealth of PA, DOH 4100077085; PIs: Okonkwo/Taylor/LeDuc

David J. Wallace, MD, MPH  
Dr. Wallace’s research focuses on structure, process and outcome relationships in critical care delivery, with the goal improving regional care for time-sensitive medical emergencies. Dr. Wallace was awarded a University of Pittsburgh SEED grant for the period August 2018 to July 2021 (PI: Wallace). Dr. Wallace is a member of Dr. Coleman Drake’s K mentor team, which resulted in a successfully funded K01 for Dr. Drake in June 2020.

Major Projects as Principal Investigator  
- Causes and Effects of Hospital-Level Changes in Intensive Care Bed Supply  
  Funded by: NIH/NHLBI R03-HL-16-020
- The Effect of the Affordable Care Act Medicaid Expansion on Geographic Access to Safety Net and Acute Care Hospitals  
  Funded by: Robert Wood Johnson Foundation
- Accessing Critical Care and Emergency Service Systems (ACCESS) Maps  
  Funded by: Department of University of Pittsburgh SEED grant

Xiaoyan Wen, MD, MSc  
Dr. Wen is a faculty member in the Center for Critical Care Nephrology. She has a research background in experimental nephrology, with expertise in cellular and molecular biology, flow cytometry, histology analysis, and confocal microscopy. In 2018-2019, her research was focused on data analysis, manuscript drafting, and grant applications based on datasets obtained from zebrafish and mouse sepsis models of sepsis-associated
acute kidney injury (S-AKI). Specific studies include time-dependency effect of HDIs treatment on S-AKI recovery, the role of Treg cells in S-AKI, and cell cycle arrest and the role of TIMP2 in S-AKI.

Major Projects as Co-Investigator
- Study of the alpha-amino-beta-carboxymuconic acid semialdehyde decarboxylase inhibitor
  Funded by: TES Pharmaceuticals, PI: Gómez

Douglas B. White, MD, MAS
Dr. White directs the University of Pittsburgh Program on Ethics and Decision Making in Critical Illness. His main research focus is on developing and testing interventions to improve surrogate decision making for patients with advanced illness. His research program encompasses both empirical research on and normative ethical analysis of decision-making for patients with life threatening illness.

Major Projects as Principal Investigator
- Prediction of Functional Outcomes from Chronic Critical Illness
  Funded by: NIH/NINR R01NR016459
- Improving Clinicians’ Serious Illness Communication Skills for Patients with Advanced Alzheimer’s Disease or Related Dementias (AD/ADRD) Who Develop Acute, Life-threatening Illness
  Funded by: NIH/NINR R01NR014663
- Mentored Patient Oriented Research in Improving Surrogate Decision Making for Patients with Advanced Respiratory Failure
  Funded by: NIH/NHLBI K24HL148314
- Randomized Trial of a Scalable, Interactive Tool to Support Surrogate Decision-makers of Elderly Critically Ill Patients
  Funded by: NIH/NIA R01AG066731
- Randomized Trial of Specialty Palliative Care Integrated with Critical Care for Critically Ill Older Adults at High Risk of Death or Severe Disability
  Funded by: NIH/NIA R01AG068567

Sachin Yende, MD, MS
Dr. Yende’s research focuses on short- and long-term outcomes of sepsis. He is funded by PCORI to launch an adaptive platform trial across 18 UPMC hospitals to use telemedicine to reduce readmissions after pneumonia and sepsis. He is working with UPMC Health Plan to create a learning health system to determine strategies to improve patient outcomes in the post-acute care period. He serves as primary and secondary mentor for several faculty members for career development awards through the NIH and AHA. He is part of a multidisciplinary national group to advance understanding of obstructive lung disease using population-based cohorts. His work is published in high-impact journals, including JAMA.
Teaching Activities

Introduction

The Department of Critical Care Medicine is committed to providing the highest quality educational experience to its trainees, which include medical students, residents, critical care fellows, and advanced practice providers. Over 60 faculty contribute to our educational mission by teaching at the bedside, providing core lectures, and coordinating simulation-based educational sessions at the Peter M. Winter Institute for Simulation, Education, and Research (WISE) and Veteran’s Administration Simulation Center.

We continue to increase integration of educational opportunities between the adult and pediatric fellowships, which allows us to share valuable knowledge and resources. The integration efforts focus on particular lectures, workshops, our electronic learning management system, and special events with the collaboration of faculty, chief fellows, and program directors. This integration has proven to be successful and led to the development of an innovative combined adult critical care/pediatric critical care training curriculum.

COVID-19 Pandemic Impact

In a matter of days as the pandemic unfolded in early 2020, we pivoted from traditional, in-person interviews to a virtual interview process for fellowship recruitment. We used a combination of live virtual presentations and videos for the spring 2020 recruitment season for Neurocritical Care and Anesthesiology Critical Care. This was followed by in-depth planning to develop a robust virtual recruitment process for the fall recruitment season for Pediatrics, Internal Medicine/Emergency Medicine and Surgical Critical Care. Adaptions included a series of videos to showcase our ICUs, each fellowship program, and education tracks; virtual folders for applicants; and virtual ‘social hour’ interactions between fellows and applicants.

The Grand Rounds committee tapped expertise within the Department and across the University to launch the virtual “CCM Grand Rounds: The COVID-19 Series” in early June. From clinical trials and tele-ICUs to ECMO and virology, our fellows, faculty, APPs and staff members were keen to hear and learn from experts at the forefront of COVID-19 treatment and Sars-Cov-2 research. The COVID-19 Series ran throughout summer and into fall 2020 featuring local, national and international experts, including those with perspectives from the COVID-19 hotspots of New York City and Lombardy, Italy.

Two second-year fellows recognized that ICU staffing shortages in parts of the country forced some healthcare providers into an atypical role of caring for critically ill patients and were charged with managing unfamiliar critical care practices. Second-year fellows, Kathy Wunderle, MD, and Joseph Nobile, MD, adapted our virtual fellowship curriculum—for respiratory failure, mechanical ventilation, ARDS and shock—and posted online 14 videos free for download by any provider worldwide.

The hands-on training sessions and in-person didactic lectures—for which our fellowship is known—were modified in order to restrict personal contact between fellows and presenters. All didactics (e.g. Adult Lecture Series, Professionalism & Leadership, Pediatric Professor Rounds) and presentations (Journal Clubs, M&M) were moved to a virtual format via MS Teams. A 30-minute break was added to full-afternoon lectures to diminish screen-time burnout and lectures were recorded for future watching. Hands-on training and simulation sessions were restricted to small groups in order ensure appropriate social distancing.
Critical Care Fellowship

Since graduating its first fellows in 1964, our Multidisciplinary Critical Care Training Program (MCCTP) has trained over 700 critical care physician subspecialists. The MCCTP has maintained continuous accreditation by the ACGME in four distinct but interrelated fellowships: Critical Care Medicine-Internal Medicine (CCM-IM), Anesthesiology Critical Care Medicine, Surgical Critical Care and Pediatric Critical Care. We are also accredited by the United Council of Neurological Subspecialties in Neurologic Critical Care. In addition, the MCCTP offers one- and two-year, non-ACGME advanced training programs in Pediatric Cardiac Critical Care and in extracorporeal membrane oxygenation (ECMO). We have also partnered with Cardiology to develop an integrated Cardiology/Cardiac Critical Care fellowship training program that allows one year of critical care training through the CCM-IM program. These programs position us at the forefront of educators in emerging and life-saving technology and in the growing subspecialty of Adult and Pediatric Cardiac Critical Care. Overall, the MCCTP is one of the world’s leading training programs in both adult and pediatric critical care, attracting candidates from around the globe and enabling graduates to attain leadership positions at well-respected institutions throughout the world.

The MCCTP is directed by Lori Shutter, MD, who also serves as Vice Chair of Education. Jason Moore, MD, MS serves as associate director of the Adult Division, and Melinda Hamilton, MD, MSc, is the director of the Pediatric Division.

Advanced Practice Provider Residency

We administer a highly innovative Advance Practice Provider (APP) Residency for physician assistants and certified registered nurse practitioners to gain advanced training in adult critical care medicine. The program is designed to meet the growing national demand for non-physician providers skilled in critical care medicine in order to address the physician workforce shortage. This program also aligns with national priorities to develop an adaptive, flexible, and scalable health care workforce through interprofessional educational. Our APP critical care residents train at the bedside with their physician counterparts allowing the APPs to learn intensive care medicine across a broad patient population including medical, general/cardiac/specialty surgical, trauma, solid organ transplant, and neurologic care. The APP residents also participate in our fellowship lecture series, simulation sessions, and all training workshops. This highly competitive program accepts only 1-2 residents per year. There was no APP resident during AY20.

Resident Rotations

CCM offers elective rotations in the ICU for residents from the departments of Surgery, Neurosurgery, Neurology, Anesthesiology, Internal medicine, Emergency Medicine, Pediatrics, and others. In the last fiscal year, 168 residents rotated through our ICUs. In addition to internal and local residents, we also accepted visiting fellows and residents from UPMC Hamot and UPMC Horizon to participate in critical care medicine elective rotations.

Medical Student Electives

Critical Care Medicine Component of Adult Inpatient Medicine Clerkship (MS-3)

Medical students must learn to assess unstable patients and initiate appropriate therapies. They may have limited roles or exposures to these crisis situations constraining their participation in the clinical management of patients with respiratory or hemodynamic compromise. Yet it is vital that students acquire these important skills. To address this issue, we expose MS-3 students to critical care via their Internal Medicine clerkship through a state-of-the-art simulation program, taught once a week at WISER. Educational objectives include
assessing and managing simulated patients with respiratory distress, hypotension and arrhythmias. Evaluations of this component of the Internal Medicine clerkship are consistently superior (97% rated as "Outstanding + Good" AY 2019-2020).

Critical Care Medicine Elective Clerkship (MS-4)
The Critical Care Medicine Clerkship is a four-week elective for senior medical students designed to teach the cognitive and technical skills needed to initially evaluate and manage unstable patients. Students participate in an orientation; interactive, problem-solving conferences; bedside teaching rounds; direct patient care with CCM faculty/fellow supervision; and frequent simulation sessions at WISER with a computerized whole-body mannequin. In AY 2019-2020, we continued the Procedures Workshop, providing students dedicated time to learn the indications, contraindications, proper steps to perform a procedure, anticipation of complication, recognizing complications and managing them. These sessions focused on vascular access using simulated models at WISER and were well received by the students.

Medical students are assigned to a specific ICU where they actively participate in patient care. Supplemental didactic sessions are provided during each block. The highlight of the course, as reported in the students’ evaluations, continued to be the simulation sessions, which augment education in cardiac resuscitation, airway management and other topics including hypotension, anaphylaxis, arrhythmias and sepsis through hands-on simulation learning. Overall, our MS-4 clerkship remains one of the school’s most popular electives and continues to be rated as one of the most valuable in the medical student curriculum. There was a total of 54 participants this past year: 43 Pitt students, five visiting students (1 from Taiwan, 1 from Kazakhstan, 1 from Arizona, 2 from Ohio) and six APP trainees. Despite being cut short for in-persons due to COVID-19, we were able to complete the final scheduled block of the year through remote & virtual simulation sessions which were well received by the participating students.

International Observership Program

The international observership program allows foreign visitors—from medical students to full professors—to immerse themselves in departmental activities for a minimum of two weeks up to three months. They participate in daily critical care medicine educational programming including lectures, workshops, Journal Club sessions, Grand Rounds, and simulation training at WISER, and observe rounds in one or more of our ICUs. In recent years, the observers have come from Asia, Africa, Europe, the Middle East and Latin America. During FY20, we had two visitors, one from Ganga Hospital, India and one from The University of the Philippines Manila, both of whom spent their time in the Transplant and ICU.

An agreement between the Department of Critical Care Medicine and the China Society of Critical Care Medicine builds collaboration between China and the US in critical care medicine training and creates a foundation for future research cooperation. Typically, the China Society selects one or two outstanding ICU physicians fluent in English to attend a two-month observership. In addition, we have hosted as many as 15 Chinese physicians for a shorter two- to three-day visit. We hosted nine physicians from the China Society for a one-day visit in October of 2019.
Adult Division Fellowship Program

Within the Adult Division, the Multidisciplinary Critical Care Training Program has four distinct accredited and interrelated fellowship programs: Critical Care Medicine-Internal Medicine, Anesthesiology Critical Care Medicine, Surgical Critical Care and Neurologic Critical Care, as well as a one-year, advanced training program in extracorporeal membrane oxygenation (ECMO).

Critical Care Medicine-Internal Medicine/Emergency Medicine Fellowship

Program Director: Jason Moore, MD, MS

This two-year program is open to trainees from either Internal Medicine (IM) or Emergency Medicine (EM) residencies. Clinical experience includes required rotations through medical, trauma/general surgery, neurovascular, abdominal organ transplantation, cardiothoracic surgery ICUs. Elective rotations in medical toxicology, radiology, and several of the medical subspecialties are also available.

In their second year, fellows select one of three possible pathways: research, education or clinical leadership. Fellows in the research track pursue a mentored research project and didactic research training with a goal of becoming an NIH-funded clinician scientist. Those in the education track pursue mentored curriculum development and didactic training in adult education with a goal of a career in academic medicine as a clinician-educator. In the clinical leadership track, fellows complete a structured quality improvement project and obtain training and health administration experience with a goal of a career as an ICU director or quality improvement specialist. These pathways deliberately approximate directions for advancement in academic medicine with fellows working alongside faculty mentors to acquire leadership skills in their area of interest.

The demand from EM-trained physicians to be board-eligible in Critical Care Medicine has led to very highly qualified EM residents applying to our program. EM residents now make up approximately 40% of the fellows in our Critical Care IM/EM program. The American Board of Internal Medicine (ABIM) and American Board of Emergency Medicine co-sponsor critical care training and the ABIM subspecialty exam for Critical Care Medicine. In addition, there has been increased interest in the development of paths for cardiologists to obtain critical care training. In response, we partnered with the Division of Cardiology to create an integrated approach for cardiologists to obtain critical care training through the CCM-IM program. This year saw the first fellow from Cardiology take advantage of this partnership.

Twelve IM fellows graduated from our program on June 6, 2020. Nine fellows completed their first year of training and advanced to their second year.

Anesthesiology Critical Care Medicine Fellowship

Program Director: Murat Kaynar, MD, MPH

The Anesthesiology Critical Care fellowship is a one-year training program that includes rotations through trauma/general surgery, surgical, neurosurgical/neuro-trauma, abdominal organ transplantation, cardiothoracic surgery, and burn care ICUs. Elective options include infectious disease, nephrology, radiology, cardiology, post-cardiac arrest service, echocardiography, operating room, and additional ICU time including the pediatric and obstetrics/gynecology ICUs.

The Anesthesiology Critical Care fellowship was one of the original UPMC critical care training programs and has existed as a unique program since 1960. It transitioned into the Department of Critical Care Medicine
when the department was first established in 2001. Three fellows completed the Anesthesiology Critical Care fellowship in June 2020. One accepted a position at large academic-based medical center, one continued on to another ACGME-accredited fellowship, and one is staying on at UPMC as Anesthesiology faculty.

**Neurologic Critical Care Fellowship**

Program Director: Lori Shutter, MD

Accredited by the United Council for Neurologic Subspecialties, the Neurologic Critical Care Fellowship recruits one fellow per year. The program offers three training options in neurologic critical care: a traditional two-year training track for physicians from any background residency without prior critical care training; a one-year track providing specialized neurologic critical care training for those who have already completed critical care training through another board (e.g. IM/EM, Surgery, Anesthesia, or Pediatrics); and lastly, a one-year concentrated critical care training track for neurosurgery residents, who can complete the training during their residency.

All neurologic critical care fellows rotate through a variety of clinical rotations including neurovascular, neurotrauma, cardiothoracic, trauma/general surgery, and general medical-surgical ICUs. In addition, they rotate on the stroke service, neuro-interventional radiology, neuro-anesthesia/neurosurgery, and neuro-electrophysiology. Additional electives include post-cardiac arrest service, toxicology, and additional ICU time including the pediatric and obstetrics/gynecology ICUs. The program graduated one fellow in June 2020 who is staying on at UPMC as Neurology and Critical Care Medicine Faculty.

**Surgical Critical Care and Acute Care Surgery Fellowships**

Program Director: Matthew Rosengart, MD, MPH

The Surgical Critical Care fellowship is a one-year program that includes rotations through trauma/general surgery, neurotrauma, neurovascular, surgical, abdominal organ transplantation, cardiothoracic surgery and burn ICUs. Electives in pre-hospital care, infectious disease, pediatric and obstetrics/gynecology ICUs are also available.

In place since 2008, the Acute Care Surgery Fellowship is recognized as a combined GME and OZ program by the UPMC Graduate Medical Education Program. These fellows become clinical instructors in Surgery during their second year with training devoted to trauma, emergency and elective general surgery, and surgical subspecialties (pediatric, thoracic, vascular, and hepatobiliary).

Four fellows completed the one-year surgical critical care fellowship in June 2020, two are continuing their training with the acute care surgery fellowship and one is staying on as surgical faculty in the Department of Surgery.

**Adult Critical Care ECMO Training Program**

Program Director: Holt Murray, MD

The Adult Critical Care Extracorporeal Membrane Oxygenation (ECMO) training program admits one fellow, who is appointed as a Clinical Instructor. By design the program does not accept a fellow every year, and instead the program is reserved for exceptional individuals with a demonstrated interest in becoming national leaders in ECMO provision. ECMO trainees spend the vast majority of their 12 months of clinical time in the
Cardiothoracic ICU (CTICU). This ICU is the primary local site for all ECMO patients and also has a large regional catchment area. Fellows may be asked to see patients on any of the adult ICUs within UPMC Presbyterian/Montefiore Hospital, UPMC Mercy Hospital, or UPMC Magee Womens Hospital.

Adult Fellowship Curriculum

The educational curriculum for fellows was developed to teach the knowledge and skills required to manage all aspects of critically ill patients. Fellows attend lectures, interactive problem-solving workshops and simulation sessions throughout the year.

<table>
<thead>
<tr>
<th>Core Lectures Subject Areas</th>
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<tbody>
<tr>
<td>Airway</td>
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<td>Ethics &amp; Palliative Care</td>
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<td>Neurology</td>
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<td>Pulmonary</td>
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<td>Ultrasound</td>
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Additional conferences include:
Emergency neurological life support, cadaver airway lab, CRRT, ECMO, point of care ultrasound, and critical care communications course, in addition to multiple procedural workshops like our central line, bronchoscopy, and routine and difficult airway workshops.

Professionalism and Leadership Course

Now in its 13th year, the Critical Care Medicine Professionalism and Leadership course is an innovative and highly regarded part of the fellowship curriculum. The objective is to teach fellows the administrative, educational and research skills necessary to function as an academic intensivist. In modern hospitals, intensivists are increasingly expected to not only provide expert critical care services but also develop clinical protocols, design quality improvement programs, coordinate educational activities for the unit, lead multidisciplinary committees and improve overall quality of patient care. Interactive small group sessions provide fellows with these important skills. The course has received excellent evaluations from our graduates, who have found the skills they learn highly valuable in their first years after graduation.

<table>
<thead>
<tr>
<th>Critical Care Medicine Professionalism and Leadership Course Curriculum</th>
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<tbody>
<tr>
<td>Finding the Right Job in a Variable Market – John Hoyt, MD</td>
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<tr>
<td>Advancement in the Professional Environment – Ann Thompson, MD</td>
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<td>Graceful Self Promotion: PARs and Executive Summaries – Lori Shutter, MD</td>
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<td>Contracts – Kelly Gottschalk, JD</td>
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<td>Negotiating Compensation – Derek Angus, MD, MPH</td>
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<td>Manuscript Review – David Huang, MD, MPH</td>
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<td>Principles of Experimental Design and Controlled Observations – Michael Pinsky, MD</td>
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<tr>
<td>The Art of Presentation – Michael Pinsky, MD</td>
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<td>Grant Writing and Review – John Kellum, MD</td>
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Education Workshops

Critical Care Communications course
Focusing on the skills needed to deliver bad news, establish goals of care, talk about forgoing life sustaining therapy, and manage conflict, this year, we brought together both Adult and Pediatric fellows at the same venue. The three-day course was conducted off campus with live actors and learner-directed teaching by the instructors. The course is a collaborative effort between Palliative Care Medicine and Critical Care Medicine.

Point of Care Ultrasound Training
Christopher Schott, MD, directs point of care ultrasound (POCUS) training for both the Adult and Pediatric MCCTP divisions. This program is crucial for modern critical care training. Initially the program was based at the VA Pittsburgh and Children’s Hospital sites, and this year it expanded to include a training site at UPMC Mercy Hospital that is directed by Firas Abdulmajeed, MD.

Flipped Classroom
Initiated four years ago as a pilot program, the flipped classroom model is now accepted as an integral component of our educational strategy. This approach to adult learning improves the educational experience of our fellows in several aspects: it is better suited to the expectations and learning styles of today’s fellows; it enables the MCCTP to leverage its existing online material; and it allows for better assessment of the fellows’ learning experiences. The success of the flipped classroom model is evident by our fellows’ success on the Multidisciplinary Critical Care Knowledge Assessment Program for which our median scores exceeded the national median (see “Excellent Scores in Critical Care Knowledge Assessment Program” below).

Critical Care Knowledge Assessment Program
The MCCTP participates in the Society of Critical Care Medicine’s Multidisciplinary Critical Care Knowledge Assessment Program (MCCKAP), an online examination used to assess critical care fellowships across the country. The results of the MCCKAP also enable our program directors to better prepare fellows for subspecialty board examinations. Our fellowship program’s median score for all fellows was above the national median (76.59% vs 65.73%). In addition, our specialty-specific MCCKAP mean scores all four programs
exceeded their national equivalents. These scores are an objective measure of the effectiveness of our flipped classroom approach to graduate medical education.

Honors and Awards

First-year IM Critical Care fellow Zachary Rhinehart, MD received the Medical Student Teacher of the Year award. Raquel Forsythe, MD, was the recipient of the Ake N. Grenvik Critical Care Medicine Faculty of the Year award. Matthew Leach, MD, first-year neurologic critical care fellow, received the Adult Fellow of the Year award by the CCM faculty. Joseph Nobile, MD, and Alexis Steinberg, MD, were honored for their roles as Chief Fellows for the Adult Division. Incoming chief fellows for FY21 are Veronica Garvia Bianchini, MD and Mark Andreae, MD, both of which are Adult Critical Care-Internal Medicine fellows.

Critical Care Grand Rounds

The Department of Critical Care Medicine Grand Rounds speaker series provides a forum to disseminate innovations in critical care to Department members and the University community, including recent advances in research, education, and clinical care, as well as promote local advances in critical care to a national and international audience. Grand Rounds speakers for the 2018-2019 lecture series were:

<table>
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<tr>
<th>Presenter</th>
<th>Topic</th>
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<tr>
<td>Randall C. Wetzel, MB, BS, FCCM, FAAP, MSB</td>
<td>Overcoming Intelligence Barriers in the ICU</td>
</tr>
<tr>
<td>Peter Weinstock MD PhD</td>
<td>SIM2.0 - Ensuring safe, reliable care and great healthcare experiences through ergonomic simulation platforms and ecosystems</td>
</tr>
<tr>
<td>Jason L. Sperry, MD, MPH</td>
<td>Evolving Trauma Resuscitation: looking forward through the past</td>
</tr>
<tr>
<td>Samir M. Parikh, MD</td>
<td>Vascular Disruption in Sepsis and ARDS—the Angiopoietin-Tie2 Pathway</td>
</tr>
<tr>
<td>Scott Canna, MD</td>
<td>Genetic Guides through the Cytokine Storm</td>
</tr>
<tr>
<td>Justin Yeh, MD</td>
<td>Frontiers in Cardiac Intensive Care: critical illness &amp; neurodevelopment</td>
</tr>
</tbody>
</table>
### Critical Care Medicine

#### Annual Ake Grenvik Lectureship

**Critical Care: a bit of history and some personal hopes for its future**

**Ann E. Thompson, MD**  
Professor of Critical Care Medicine and Pediatrics  
Vice Dean, University of Pittsburgh School of Medicine

#### 5th Annual Ethics & Decision Making Lecture

**Conscientious Objection in Critical Care Medicine: ethical and conceptual challenges**

**Mark R. Wicclair, PhD**  
Adjunct Professor of Medicine, University of Pittsburgh School of Medicine  
Faculty, Center for Bioethics and Health Law, University of Pittsburgh School of Law  
Professor of Philosophy, Emeritus, West Virginia University

#### Exercise and Protein Supplementation in Critically Ill Patients

**Renee Stapleton, MD PhD FCCP ATSF**  
Professor of Medicine, Pulmonary and Critical Care Medicine  
Director of Medical Student Research  
University of Vermont Medical Center

#### Post-arrrest Prognostication: we can be better faster

**Jonathan Elmer, MD, MS**  
Assistant Professor of Emergency Medicine, Critical Care Medicine, and Neurology  
University of Pittsburgh School of Medicine

#### Cell-free Plasma Hemoglobin & AKI After Cardiopulmonary Bypass

**Nahmah Kim-Campbell, MD, MS**  
Assistant Professor of Critical Care Medicine and Pediatrics  
University of Pittsburgh School of Medicine

#### Controversial Aspects of Brain Death Determination

**Ariane Lewis, MD**  
Associate Professor of Neurology and Neurosurgery  
New York University

#### Can Interest in Global Health be Used to Help at Home?

**Mary Jane Reed, MD**  
Associate, Departments of Pulmonary and Critical Care Medicine  
Associate, Department of General Surgery  
The Geisinger Health System

#### The COVID-19 Series

**David Huang, MD, MPH**  
Professor of Critical Care Medicine and Emergency Medicine  
University of Pittsburgh School of Medicine  
and  
**Bryan McVerry, MD**  
Associate Professor of Medicine, Division of Pulmonary, Allergy and Critical Care Medicine, University of Pittsburgh School of Medicine

#### ICU Telemedicine in the COVID-19 Pandemic

**Ian Barbash, MD, MS**  
Assistant Professor of Medicine  
Division of Pulmonary, Allergy and Critical Care Medicine  
University of Pittsburgh School of Medicine

#### Clinical Management of Patients with COVID-19

**Jonathan Bishop, MD, MBA**  
Clinical Chief, UPMC Mercy Hospital  
Department of Critical Care Medicine, UPMC Health System  
and  
**Chenell Donadee, MD**  
Assistant Professor of Critical Care Medicine  
University of Pittsburgh School of Medicine

### Journal Club Series

Clinical fellows are paired with experienced faculty members for our evidence-based medicine Journal Club Series. Each fellow selects a recent article from the medical literature, reviews it in detail with their faculty mentor, and then presents a critical review for the Department. Through this process fellows learn the basics of clinical research and how to interpret the medical literature, while at the same time staying up-to-date with current practice.
<table>
<thead>
<tr>
<th>Fellow</th>
<th>Preceptor</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jack He, MD</td>
<td>Matthew Rosengart, MD</td>
<td>Timing of Endoscopy for Acute Upper Gastrointestinal Bleeding</td>
</tr>
<tr>
<td>Andrea Elliott, MD</td>
<td>Chenell Donadee, MD</td>
<td>Effect of Reduced Exposure to Vasopressors on 90-Day Mortality in Older Critically Ill Patients With Vasodilatory Hypotension: A Randomized Clinical Trial.</td>
</tr>
<tr>
<td>Christine Leeper, MD</td>
<td>Matthew Rosengart, MD</td>
<td>Duty Hour Reform and the Outcomes of Patients Treated by New Surgeons</td>
</tr>
<tr>
<td>Varun Shetty, MBBS</td>
<td>Cameron Dezfulian, MD</td>
<td>The Nursing Activities Score per Nurse Ratio Is Associated With In-Hospital Mortality, Whereas the Patients Per Nurse Ratio Is Not</td>
</tr>
<tr>
<td>Zachary Rhinehart, MD</td>
<td>David Wallace, MD</td>
<td>Prevention of Early Ventilator-Associated Pneumonia after Cardiac Arrest</td>
</tr>
<tr>
<td>Heather Hoops, MD</td>
<td>Matthew Rosengart, MD</td>
<td>Conservative Oxygen Therapy during Mechanical Ventilation in the ICU</td>
</tr>
<tr>
<td>Christina Thorngren, MD</td>
<td>Christopher Seymour, MD</td>
<td>Effect of a Resuscitation Strategy Targeting Peripheral Perfusion Status vs Serum Lactate Levels on 28-Day Mortality Among Patients With Septic Shock: The ANDROMEDA-SHOCK Randomized Clinical Trial</td>
</tr>
<tr>
<td>Adam McIntyre-Smith, MD</td>
<td>Brad Molyneaux, MD</td>
<td>Prevention of Early Ventilator-Associated Pneumonia after Cardiac Arrest</td>
</tr>
<tr>
<td>Alexis Steinberg, MD</td>
<td>Ruchi Jha, MD</td>
<td>Effects of tranexamic acid on death, disability, vascular occlusive events and other morbidities in patients with acute traumatic brain injury (CRASH-3): a randomised, placebo-controlled trial</td>
</tr>
<tr>
<td>Scott Simpson, DO</td>
<td>Jonathan Elmer, MD</td>
<td>Prolonged Targeted Temperature Management Reduces Memory Retrieval Deficits Six Months Post-Cardiac Arrest: A Randomised Controlled Trial</td>
</tr>
<tr>
<td>Tara Zebrer, MD</td>
<td>Holt Murray, MD and Florian Mayr, MD</td>
<td>Effect of Flexible Family Visitation on Delirium Among Patients in the Intensive Care Unit: The ICU Visitis Randomized Clinical Trial</td>
</tr>
<tr>
<td>Stan Alfaras Melainis, MD</td>
<td>Murat Kaynar, MD</td>
<td>Transfusion Requirement in Burn Care Evaluation (TRIBE): A Multicenter Randomized Prospective Trial of Blood Transfusion In Major Burn Injury</td>
</tr>
<tr>
<td>Abdullah Qureshi, MD</td>
<td>David Wallace, MD</td>
<td>A Multicenter Trial of Vena Cava Filters in Severely Injured Patients</td>
</tr>
<tr>
<td>Daniel Rowan, DO</td>
<td>David Wallace, MD</td>
<td>Effect of a Low vs Intermediate Tidal Volume Strategy on Ventilator-Free Days in Intensive Care Unit Patients Without ARDS: A Randomized Clinical Trial</td>
</tr>
<tr>
<td>Amanda Pientka, MD</td>
<td>Jonathan Elmer, MD</td>
<td>Coronary Angiography after Cardiac Arrest without ST-Segment Elevation</td>
</tr>
<tr>
<td>Joseph Nobile, MD</td>
<td>David Wallace, MD</td>
<td>Effect of Pressure Support vs T-Piece Ventilation Strategies During Spontaneous Breathing Trials on Successful Extubation Among Patients Receiving Mechanical Ventilation: A Randomized Clinical Trial</td>
</tr>
<tr>
<td>Kathryn Wunderle, MD</td>
<td>David Wallace, MD and David Huang, MD</td>
<td>Early Neuromuscular Blockade in the Acute Respiratory Distress Syndrome</td>
</tr>
<tr>
<td>Robert Castiglia, MD</td>
<td>Timothy Girard, MD</td>
<td>Early Sedation with Dexmedetomidine in Critically Ill Patients</td>
</tr>
</tbody>
</table>
Research Training

The Department’s Adult T32 training program, “Experimental Therapeutics in Critical Illness,” provides a pathway for fellows to participate in academic research following their final fellowship year. (See page 38 for specifics about the T32 training program.)

Adult Critical Care Medicine Fellows 2019-20

<table>
<thead>
<tr>
<th>Fellow</th>
<th>Current Position</th>
<th>Future Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Konstantinos Alfaras-Melainis, MD</td>
<td>Anesthesiology Critical Care Medicine fellow</td>
<td>Assistant Professor, Department of Anesthesiology &amp; Perioperative Medicine, University of Pittsburgh, PA</td>
</tr>
<tr>
<td>Robert Castiglia, MD</td>
<td>Critical Care Medicine-Internal Medicine fellow</td>
<td>Critical Care Intensivist, Tristar Centennial medical Center, Nashville, TN</td>
</tr>
<tr>
<td>Andrea Elliott, MD</td>
<td>Critical Care Medicine-Internal Medicine fellow</td>
<td>Assistant Professor, University of Minnesota, Minneapolis, MN</td>
</tr>
<tr>
<td>Jack He, MD</td>
<td>Surgical Critical Care Medicine fellow</td>
<td>Trauma &amp; Acute Care Surgery Fellow, UPMC, Pittsburgh, PA</td>
</tr>
<tr>
<td>Heather Hoops, MD</td>
<td>Surgical Critical Care Medicine fellow</td>
<td>Assistant Professor of Trauma, Critical Care and Acute Care Surgery Oregon Health &amp; Sciences University, Portland, OR</td>
</tr>
<tr>
<td>Timothy Kaselitz, MD, MPH</td>
<td>Critical Care Medicine-Internal Medicine fellow</td>
<td>Assistant Professor, Department of Critical Care Medicine, UPMC and UPMC Children’s Hospital of Pittsburgh, Pittsburgh, PA</td>
</tr>
<tr>
<td>Christine Leeper, MD</td>
<td>Surgical Critical Care Medicine fellow</td>
<td>Attending Physician, Department of Surgery, UPMC, Pittsburgh, PA</td>
</tr>
<tr>
<td>Adam McIntyre-Smith, MD</td>
<td>Anesthesiology Critical Care Medicine fellow</td>
<td>Adult Cardiothoracic Anesthesiology Fellow, UPMC, Pittsburgh, PA</td>
</tr>
<tr>
<td>Joseph Nobile, MD</td>
<td>Critical Care Medicine-Internal Medicine fellow</td>
<td>Intensivist, Pulmonary and Critical Care Consultants, Dayton, OH</td>
</tr>
<tr>
<td>Amanda Pientka, MD</td>
<td>Critical Care Medicine-Internal Medicine fellow</td>
<td>Attending Critical Care Physician, John Peter Smith Health Network, Fort Worth, TX</td>
</tr>
<tr>
<td>Abdullah Qureshi, MD</td>
<td>Critical Care Medicine-Internal Medicine fellow</td>
<td>Attending Critical Care Physician, Advocate Health System, Chicago, IL</td>
</tr>
<tr>
<td>Zachary Rhinehart, MD</td>
<td>Critical Care Medicine-Internal Medicine fellow</td>
<td>Assistant Professor, Director of HVI Clinical Program Development, UPMC Presbyterian</td>
</tr>
<tr>
<td>Daniel Rowan, DO</td>
<td>Critical Care Medicine-Internal Medicine fellow</td>
<td>Intensivist, Advocate Health System, Chicago, IL</td>
</tr>
<tr>
<td>Anupamaa Seshadri, MD</td>
<td>Surgical Critical Care Medicine fellow</td>
<td>Trauma &amp; Acute Care Surgery Fellow, UPMC, Pittsburgh, PA</td>
</tr>
<tr>
<td>Varun Shetty, MBBS</td>
<td>Critical Care Medicine-Internal Medicine fellow</td>
<td>Attending Critical Care Physician, UPMC Hamot, Erie, PA</td>
</tr>
<tr>
<td>Margo Short, MD</td>
<td>Anesthesiology Critical Care Medicine fellow</td>
<td>Assistant Professor of Anesthesiology and Critical Care, University of Kansas Medical Center, Kansas City, KS</td>
</tr>
<tr>
<td>Scott Simpson, DO</td>
<td>Critical Care Medicine-Internal Medicine fellow</td>
<td>Emergency Medicine/Critical Care Physician, Hendrick Health System, Abilene, TX</td>
</tr>
<tr>
<td>Alexis Steinberg, MD</td>
<td>Neurologic Critical Care Medicine fellow</td>
<td>Assistant professor of Neurology and Neurocritical Care, UPMC, Pittsburgh, PA</td>
</tr>
<tr>
<td>Christina Thorngren, MD</td>
<td>Critical Care Medicine-Internal Medicine fellow</td>
<td>Clinical Assistant Professor of Critical Care Medicine, UPMC, Pittsburgh, PA</td>
</tr>
</tbody>
</table>
### Second-Year Adult Critical Care Fellows (Beginning July 2020)

<table>
<thead>
<tr>
<th>Name</th>
<th>Specialty</th>
<th>Medical School/Residency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neurologic Critical Care</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matthew Leach, MD</td>
<td>Neurologic Critical Care</td>
<td>Medical School: University of Michigan Medical School, Ann Arbor, MI Residency: University of Rochester, Rochester, NY</td>
</tr>
<tr>
<td>Ravi Doobay, MD</td>
<td>Neurologic Critical Care</td>
<td>Medical School: Saba University School of Medicine, Bonaire, Sint Eustatius and Saba Residency: SUNY Upstate Medical University, Syracuse, NY</td>
</tr>
<tr>
<td>Andrea Elliott, MD</td>
<td>Neurologic Critical Care</td>
<td>Medical School: McGovern Medical School at the University of Texas Health Science Center, Houston, TX Residency: UPMC, Pittsburgh, PA</td>
</tr>
<tr>
<td>Veronica Garvia Bianchini, MD</td>
<td>Neurologic Critical Care</td>
<td>Medical School: Central University of Venezuela, Caracas, Miranda, Venezuela Residency: Einstein Medical Center Philadelphia, Philadelphia, PA</td>
</tr>
<tr>
<td>Zachary Hahn, MD</td>
<td>Neurologic Critical Care</td>
<td>Medical School: Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, Hempstead, NY Residency: UPMC, Pittsburgh, PA</td>
</tr>
<tr>
<td>Gabriel Hoffman, MD</td>
<td>Neurologic Critical Care</td>
<td>Medical School: State University of New York Downstate College of Medicine, Brooklyn, NY Residency: University of Illinois at Chicago, Chicago, IL</td>
</tr>
<tr>
<td>Astrid Pilgrim, MD</td>
<td>Neurologic Critical Care</td>
<td>Medical School: Eastern Virginia Medical School, Norfolk, VA Residency: Stony Brook University Hospital, Stony Brook, NY</td>
</tr>
<tr>
<td>Zachary Rhinehart, MD</td>
<td>Neurologic Critical Care</td>
<td>Medical School: University of Pittsburgh School of Medicine, Pittsburgh, PA Residency: UPMC, Pittsburgh, PA</td>
</tr>
<tr>
<td>Andrew Schoenling, MD</td>
<td>Neurologic Critical Care</td>
<td>Medical School: Medical University of South Carolina College of Medicine, Charleston, SC Residency: Henry Ford Hospital, Plymouth, MI</td>
</tr>
<tr>
<td>Benjamin Smith, MD</td>
<td>Neurologic Critical Care</td>
<td>Medical School: West Virginia University School of Medicine – Charleston, Charleston, WV Residency: UPMC, Pittsburgh, PA</td>
</tr>
</tbody>
</table>
### Adult Critical Care Fellowships Recruitment FY20

<table>
<thead>
<tr>
<th>Fellowship</th>
<th>Positions Available</th>
<th>Number of Applicants</th>
<th>Number Interviewed</th>
<th>Fellowship Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Care Medicine-Internal Medicine</td>
<td>11</td>
<td>289</td>
<td>51</td>
<td>2 years</td>
</tr>
<tr>
<td>Surgical Critical Care</td>
<td>4</td>
<td>122</td>
<td>40</td>
<td>1 year</td>
</tr>
<tr>
<td>Anesthesiology Critical Care Medicine</td>
<td>4</td>
<td>53</td>
<td>33</td>
<td>1 year</td>
</tr>
<tr>
<td>Neurologic Critical Care</td>
<td>1</td>
<td>46</td>
<td>21</td>
<td>2 years</td>
</tr>
<tr>
<td>ECMO Training Program</td>
<td>1*</td>
<td>-</td>
<td>-</td>
<td>1 year</td>
</tr>
<tr>
<td>*Program runs every 2-3 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Neurologic Critical Care

**Enyinna Nwachuku, MD**  
Medical School: University of Pittsburgh School of Medicine  
Residency: UPMC

**Fajun Wang, MD**  
Medical School: Shandong University School of Medicine  
Residency: University Hospitals Cleveland Medical Center/Case Western Reserve University

### Adult Critical Care-Internal Medicine

**Jessica Fozard, DO**  
Medical School: Lake Erie College of Osteopathic Medicine  
Residency: Wellspan York Hospital

**Brian Malley, MD**  
Medical School: Oakland University William Beaumont School of Medicine  
Residency: UPMC

**Ashley Miller, MD**  
Medical School: University of Maryland School of Medicine  
Residency: NYU/Bellevue

**Timothy Montrief, MD, MPH**  
Medical School: University of Miami Leonard M. Miller School of Medicine  
Residency: Jackson Memorial Hospital/University of Miami

**Mark Ramzy, DO**  
Medical School: Philadelphia College of Osteopathic Medicine  
Residency: Drexel University

**Neesha Anand, MBBS**  
Medical School: Kasturba Medical College Manipal  
Residency: University of Illinois at Chicago/Advocate Christ Medical Center  
Fellowship: Emory University School of Medicine (Sleep Medicine)
<table>
<thead>
<tr>
<th>Name</th>
<th>Medical School</th>
<th>Residency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natalia Arizmendez, MD</td>
<td>Medical College of Wisconsin</td>
<td>Aurora Health Care/ University of Wisconsin</td>
</tr>
<tr>
<td>Jason Brotherton, MD</td>
<td>University of Tennessee Health Science Center College of Medicine</td>
<td>University of Wisconsin</td>
</tr>
<tr>
<td>Oveimar De La Cruz, MD</td>
<td>Universidad del Valle Escuela de Medicina</td>
<td>Geisinger Medical Center</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fellowship: UPMC (Infectious Diseases)</td>
</tr>
<tr>
<td>Sushant Kapoor, DO</td>
<td>Kansas City University of Medicine and Biosciences College of Osteopathic Medicine</td>
<td>Christiana Health Care System</td>
</tr>
<tr>
<td>Anesthesiology Critical Care Medicine</td>
<td>Douglas Adams, MD</td>
<td>Sidney Kimmel Medical College</td>
</tr>
<tr>
<td></td>
<td>Residency: UPMC</td>
<td></td>
</tr>
<tr>
<td>Kate Petty, MD</td>
<td>Wayne State School of Medicine</td>
<td>UPMC</td>
</tr>
<tr>
<td>Ahsan, Waqas, MBBS</td>
<td>Liaquat University of Medical and Health Sciences</td>
<td>St. Elizabeth's Medical Center, Brighton MA/ Tuft's Medical School</td>
</tr>
<tr>
<td>Surgical Critical Care Medicine</td>
<td>Zane Ashman, MD</td>
<td>David Geffen School of Medicine at UCLA</td>
</tr>
<tr>
<td></td>
<td>Residency: Harbor-UCLA Medical Center</td>
<td></td>
</tr>
<tr>
<td>S. Ariane Christie, MD</td>
<td>The Johns Hopkins University School of Medicine</td>
<td>University of California San Francisco</td>
</tr>
<tr>
<td>Robert Handzel, MD</td>
<td>SUNY Upstate Medical University</td>
<td>UPMC</td>
</tr>
<tr>
<td>Ashley Williams, MD</td>
<td>University of South Carolina College of Medicine</td>
<td>University of South Alabama</td>
</tr>
</tbody>
</table>
Pediatric Division Fellowship Program

The Pediatric Critical Care Medicine (PCCM) Division has two fellowship training program tracks: a three-year program in pediatric critical care medicine, with a complement of 14 fellows, and a one- to two-year program in pediatric cardiac critical care, with up to three fellows. In addition, we also have a novel Pediatric Neurologic Critical Care track, a two-year program that extends the Pediatric Critical Care fellowship by 12 months. All programs are designed to provide fellows with the knowledge, clinical experience, and training necessary to acquire the competency of a pediatric intensivist and the skills to pursue an academic career. In so doing, the fellows will fulfill the clinical requirements needed for Pediatric Critical Care Board eligibility. In addition, our recruiting program benefits from a strong national reputation, many alumni practicing and holding leadership positions throughout the US, and the prominence of current PCCM faculty in the field pediatric critical care medicine.

**Pediatric Critical Care Fellowship**

Program Director: Melinda Hamilton, MD, MS  
Associate Program Director: Dana Fuhrman, DO, MS

The prominence of our pediatric critical care faculty and the strong national reputation of the Pediatric Critical Care fellowship program allows us to attract continually increasing number of applicants. For start in academic year 2021, we have had 130 applications for our five available fellowship positions. The training program includes 13.5 months clinical experience in the PICU, 4.5 months in the pediatric cardiac ICU and one month of anesthesiology training, as well as nearly 18 months dedicated to research training and scholarly activities. Fellows gain technical skills and in-depth medical knowledge in areas including neurological and neuromuscular diseases, respiratory and cardiac diseases, trauma, multiple organ dysfunction and transplantation as well as the care of children with sepsis, viral and toxin-related infections and other forms of critical illness. Our alumni are practicing as pediatric intensivists at prestigious programs throughout the country and a significant number of alumni are division directors, department chairs, program directors, and leaders in pediatric critical care research.

**Pediatric Cardiac Critical Care Fellowship**

Program Director: Matthew Bochkoris, MD

The Pediatric Cardiac Critical Care fellowship is an OZ training program that provides comprehensive training for fellows interested in leading the field of pediatric cardiac critical care. Fellows train in the Pediatric Cardiac Intensive Care Unit, which is recognized for providing excellent critical care for infants, children, adolescents, as well as adults with congenital heart problems. The program is integrated with other fellowships, including Pediatric Cardiology, Critical Care Medicine, Neonatology, and Anesthesiology thus providing a broad range of interdisciplinary expertise and several research opportunities from the basic sciences to translational and clinical research. In addition to clinical expertise, the fellowship’s educational opportunities are tailored to suit the needs and interests of each fellow. We provide an unmatched environment for clinical and translational research with trainees producing several publications and presenting in national meetings.
Pediatric Neurologic Care Track

Program Directors: Dennis Simon, MD, and Lori Shutter, MD

Neurologic injury is the most common reason for mortality in the pediatric ICU and the field of pediatric neurologic injury care has become increasingly specialized over the past decade. Our Pediatric Neurologic Care fellowship track accepted its first fellow in 2018 and we continue with this novel and outstanding program. Fellows in Pediatric Critical Care Medicine at UPMC Children’s Hospital of Pittsburgh may apply for the program, which provides additional clinical training in adult and pediatric neurologic care. Core faculty for the fellowship have been selected from the departments of Neurology, Neurosurgery, Radiology, Physical Medicine and Rehabilitation, and Critical Care Medicine. Graduates of the program will be eligible for the United Council for Neurological Subspecialties certifying exam in Neurologic Critical Care in addition to Pediatric Critical Care Board eligibility.

Pediatric Fellowship Curriculum

All Pediatric Fellows participate in multiple educational conferences, as described below.

<table>
<thead>
<tr>
<th>Conference</th>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal Club</td>
<td>Weekly</td>
<td>With faculty mentors, fellows select, present, and organize discussions on recent, classic, or otherwise relevant papers from the biomedical literature.</td>
</tr>
<tr>
<td>Professor Rounds</td>
<td>Weekly</td>
<td>Discussion of interesting or controversial cases within the PICU or CICU with faculty, fellows and residents.</td>
</tr>
<tr>
<td>Neurologic Care Safar Rounds</td>
<td>Weekly</td>
<td>Fellow presents interesting or controversial neurologic care cases from the PICU to faculty, usually Dr. Kochanek, who teach and facilitate discussion.</td>
</tr>
<tr>
<td>Safar Journal Club</td>
<td>Weekly</td>
<td>Fellows select, present, and organize discussion regarding research articles and projects to review (single subject, recent review, etc.).</td>
</tr>
<tr>
<td>PICU Morbidity &amp; Mortality Conference/RCA</td>
<td>Monthly</td>
<td>Fellows organize and present cases, participate in discussion, and help identify needed system or policy changes.</td>
</tr>
<tr>
<td>PCCM Ethics Conference</td>
<td>Monthly</td>
<td>Fellows present cases and participate in discussion of ethical, legal, and psychosocial aspects of care with ethicists, faculty, nursing staff, social workers, chaplains, and others. Currently co-facilitated by a PCCM fellow and faculty member</td>
</tr>
<tr>
<td>CICU Conferences</td>
<td>Monthly</td>
<td>Discussion about congenital heart disease diagnosis and management, including current and past cases. Included M&amp;M process for CICU patients.</td>
</tr>
<tr>
<td>CRRT/ECMO</td>
<td>Monthly</td>
<td>Multidisciplinary conference discussing CRRT and ECMO, including educational sessions and review of problems occurring during individual CRRT and ECMO treatment courses. Alternates monthly between the two sessions.</td>
</tr>
<tr>
<td>ECMO Educational Conference</td>
<td>Intermittent</td>
<td>Each time there is a PICU, CICU, or NICU patient on ECMO, we hold a weekly ECMO educational round virtually or at bedside of that patient. Facilitators include CT surgery, CICU and PICU faculty.</td>
</tr>
<tr>
<td>Fellow Core Curriculum</td>
<td>6 hours monthly</td>
<td>Continuing education for PCCM fellows on different topics relevant to pediatric critical care. Specific topics are presented by faculty from PCCM and outside departments. Fellows involved in scheduling this year. Updated to 6 hours per month (previously 4-5 hours)</td>
</tr>
<tr>
<td>Performance, Quality, Research, and Safety (PQRS) Conference</td>
<td>Bi-Monthly</td>
<td>The objective is to teach methods of QI, to generate QI projects, and to determine results of QI efforts, with an overall goal of improving the safe and effective care of patients in pediatric critical care. This is also a forum for review of any QI concerns within the PICU as well as review of quality indicators for our unit.</td>
</tr>
</tbody>
</table>
Introduction to PCCM

Annually

Intensive 3-week educational program every July geared to 1st year PCCM fellows. Didactics and workshops facilitated by PCCM and simulation sessions led by Dr. Hamilton and senior fellows.

Faculty Research Day

Annually

Presentations by PCCM and adult faculty fellow-related research activities. The meeting serves to help fellow focus their scholarly activity direction.

CICU Educational Rounds

Weekly

Continuing education for PCCM fellows on cardiac critical care topics relevant to the CICU. Specific topics are presented by faculty from PCCM and outside departments.

CICU Core Lecture

Bi-Monthly

Discussion of interesting or controversial cases within the CICU with faculty, and fellows

All sessions above were converted to virtual in the latter portion of the year, secondary to COVID-19 pandemic, allowing for continued fellow involvement.

In addition to the above core conferences, we conducted the following additional educational activities in FY20:

High-fidelity Simulation Sessions for Pediatric Residents

Throughout fellowship, PICU fellows facilitate high-fidelity simulation sessions for Pediatric residents with Melinda Hamilton, MD, during the resident PICU rotation. Sessions include recognition and management of respiratory distress, shock, and seizures. PICU fellows take an active role in conducting and debriefing the simulation sessions, affording them unique opportunities to teach cognitive principles and psychomotor skills, and to utilize adult education principles and debriefing techniques. Fellows co-facilitated this course with Dr. Hamilton.

Professionalism and Leadership Course

PCCM fellows attend the professionalism series, coordinated by the Adult Division. Didactics and workshops center on adult education principles, how to negotiate for faculty positions, and academic career advancement among other topics. See page 69 in the Adult Fellowship section for further details. Sessions were converted to virtual in the latter portion of the year, secondary to COVID-19 pandemic.

Pediatric Critical Care Communication Course (PC3)

PCCM fellows attend the PC3 course once during fellowship. This intensive, 3-day course is based on the VitalTalk™ program. Fellows learn communication skills via short didactics and then practice delivering difficult news to actor families. Over the 3 days, the fellows have ample time to practice with families as the cases evolve and they receive real-time feedback from families.

Advanced Ventilator Course

Senior PCCM fellows attend this course in the fall and an advanced session in the spring of each academic year. The course is facilitated by adult and pediatric CCM faculty as well as Pulmonary/CCM faculty. This is a 2-3-day hands-on workshop, including prework and cases studies.

New Programs

- With point-of-care ultrasound (POCUS) now a standard bedside tool, we continue to expand our POCUS education program. Tim Kaselitz, previous fellow now faculty continues to advance the POCUS
curriculum by instituting monthly educational sessions in addition to quality assurance processes. Working with Dr. Christopher Schott, Dr. Kaselitz reviews all saved US images by PCCM fellows, giving them constructive feedback. Feedback focuses on image quality and interpretation.

- Dana Fuhrman, Associate Program Director, designed a simulation curriculum for CRRT. This course, based on a previous adult course, is facilitated by Dr. Fuhrman and PICU Nurse Leadership. The course included hands-on experience with the CRRT pump, appropriate order-writing, and simulation scenarios that will incorporate patient physiological changes, CRRT pump functionality, and troubleshooting emergency situations.

Graduate Medical Education

During FY20, director of the Pediatric fellowship, Melinda Hamilton, MD, MS, continued her institutional GME position as co-chair of the Professional Development Subcommittee of UPMC Graduate Medical Education. Dr. Hamilton has spearheaded the UPMC GME Podcast series, GMEcast. This series provides skills, techniques and education for the entire UPMC community. Dr. Hamilton writes scripts, interviews guests, and assists in the final production of the podcasts. Dr. Hamilton will present a workshop highlighting this work at the Associate for Hospital Medical Education in May 2020. She maintained her facilitator role for VitalTalk, a UPMC educational initiative that helps trainees and faculty develop communication skills including training for faculty in Pediatric Emergency Medicine, Pediatric Nephrology, and the Pediatrics department. Dr. Hamilton is a site investigator for Educators in Pediatric Intensive Care, a national, multicenter research collaborative. She is also a member of the International Network for Simulation-based Pediatric Innovation, Research, & Education, which brings together pediatric investigators across the globe to use simulation as a means of improving the care delivered to all neonates, infants, and children.

Honors and Awards

- Cameron Dezfulian, MD was voted Pediatric Faculty of the Year by the pediatric fellows
- Lauren Alessi, MD, was voted Pediatric Fellow of the Year by the Pediatric residents; she received the Ann E. Thompson Fellow Scholarship for financial support for an advanced degree; and she was recognized as the Antimicrobial Stewardship Program Bug Bowl Champion for the first annual champion of the microbiology competition hosted by Children’s Hospital of Pittsburgh
- Jeremy Herrmann, MD, received the Lloyd Reback Family Gift Young Investigator Grant for establishing the “Rice-Vanucci Model of Neonatal Hypoxic Ischemic Encephalopathy in Post-Natal-Day 10 (PND 10) Mice and Initial Exploration of the Role of RNA Binding Motif (RBM)-3 in Hypothermic Neuroprotection”
- Jay Rakkar, MD, developed two mobile device applications: one for calculation of total parenteral nutrition needs, and the second for ordering necessary elements for CRRT (patents are pending for both); Jay also received an award for the top abstract and poster for “Total Parenteral Nutrition App” at Rita M. Patel Leadership Conference, February 2020
- Neil Munjal, MD received a STAR research award at 49th Annual Society for Critical Care Medicine Congress, February 2020
- Stephanie LaCount, MD, was awarded a mini grant for “PICU Families Food Security Survey” by the Division of Community Health, UPMC Children’s Hospital of Pittsburgh
- Claire Hanson, MD, was awarded Beckwith Institute UPMC grant, “PICU Caregiver Journal: Emotional Support for Parents and Patients”
Pediatric Critical Care Medicine & Pediatric Cardiac Critical Care Fellows 2019–20

### Departing Pediatric Critical Care Fellows (Graduation June 1, 2020)

<table>
<thead>
<tr>
<th>Fellow</th>
<th>Current Position</th>
<th>Future Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neil Munjal, MD</td>
<td>Pediatric Critical Care fellow</td>
<td>T32 research fellow/ UPMC Children’s faculty effective 11/1.</td>
</tr>
<tr>
<td>Madiha Raees, MD</td>
<td>Pediatric Critical Care fellow</td>
<td>Global Health Fellowship, University of Maryland</td>
</tr>
<tr>
<td>Timothy Kaselitz, MD</td>
<td>Pediatric Critical Care fellow</td>
<td>Faculty position at UPMC Children’s/University of Pittsburgh</td>
</tr>
<tr>
<td>Todd Sower, MD</td>
<td>Pediatric Critical Care fellow</td>
<td>Faculty position at C.S. Mott’s Children’s Hospital, Ann Arbor, Michigan</td>
</tr>
<tr>
<td>Taylor Wheaton, MD</td>
<td>Pediatric Cardiac Critical Care fellow</td>
<td>Faculty position at Rochester Children’s Hospital, Rochester, NY</td>
</tr>
<tr>
<td>Salar Badruddin, MD</td>
<td>Pediatric Cardiac Critical Care fellow</td>
<td>Faculty position at St. Joseph’s Children’s Hospital in Tampa</td>
</tr>
</tbody>
</table>

### Third-Year Pediatric Critical Care Fellows (Beginning July 2020)

<table>
<thead>
<tr>
<th>Pediatric Critical Care Fellow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lauren Alessi, MD</td>
</tr>
<tr>
<td>Medical School: Stony Brook University School of Medicine, Stonybrook, NY</td>
</tr>
<tr>
<td>Residency: Pediatrics, UPMC Children’s Hospital, Pittsburgh, PA</td>
</tr>
<tr>
<td>Claire Hanson, MD</td>
</tr>
<tr>
<td>Medical School: Wright State University Boonshoft School of Medicine, Dayton, OH</td>
</tr>
<tr>
<td>Residency: Pediatrics, Wright State University Dayton Children’s Hospital, Dayton, OH</td>
</tr>
<tr>
<td>Stephanie La Count, MD</td>
</tr>
<tr>
<td>Medical School: Ohio State University College of Medicine, Columbus, OH</td>
</tr>
<tr>
<td>Residency: Pediatrics, Nationwide Children’s/Ohio State University, Columbus, OH</td>
</tr>
<tr>
<td>Jonathan Pelletier, MD</td>
</tr>
<tr>
<td>Medical School: Tufts University School of Medicine, Boston, MA</td>
</tr>
<tr>
<td>Residency: Pediatrics, Duke University Hospital, Durham, NC</td>
</tr>
<tr>
<td>Jaskaran Rakkar, MD</td>
</tr>
<tr>
<td>Medical School: Medical College of Georgia at Augusta University, Augusta, GA</td>
</tr>
<tr>
<td>Residency: Pediatrics, Phoenix Children’s Hospital/Maricopa Medical Center, Phoenix, AZ</td>
</tr>
</tbody>
</table>

### Second-Year Pediatric Critical Care Fellows (Beginning July 2020)

<table>
<thead>
<tr>
<th>Pediatric Critical Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael Certo, MD</td>
</tr>
<tr>
<td>Medical School: Columbia University Vagelos College of Physicians and Surgeons</td>
</tr>
<tr>
<td>Residency: Pediatrics, UPMC Children’s Hospital of Pittsburgh</td>
</tr>
<tr>
<td>Jeremy Herrmann, MD</td>
</tr>
<tr>
<td>Medical School: University of Rochester School of Medicine and Dentistry</td>
</tr>
<tr>
<td>Residency: Pediatrics, McGaw Medical Center of Northwestern University Feinberg School of Medicine</td>
</tr>
<tr>
<td>Margaret Lewen, MD</td>
</tr>
<tr>
<td>Medical School: Perelman School of Medicine at the University of Pennsylvania</td>
</tr>
<tr>
<td>Residency: Pediatrics, Boston Children’s Hospital, Boston, MA</td>
</tr>
</tbody>
</table>
Fellowship Recruitment

### Pediatric Critical Care Fellowships Recruitment FY20

<table>
<thead>
<tr>
<th>Fellowship</th>
<th>Positions Available</th>
<th>Number of Applicants</th>
<th>Number Interviewed</th>
<th>Fellowship Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric Critical Care Medicine</td>
<td>4</td>
<td>132</td>
<td>35</td>
<td>3 years</td>
</tr>
<tr>
<td>Pediatric Neurologic Critical Care Track</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2 years</td>
</tr>
<tr>
<td>Pediatric Cardiac Critical Care Medicine</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>1 year</td>
</tr>
</tbody>
</table>

### Incoming Pediatric Critical Care Fellows (Beginning July 2020)

**Pediatric Critical Care**

- **Taylor Huntington, MD**
  - Medical School: University of Virginia School of Medicine
  - Residency: Seattle Children’s Hospital

- **Allan Joseph, MD**
  - Medical School: Brown University Warren Alpert Medical School
  - Residency: UPMC Children’s Hospital of Pittsburgh

- **Caitlin McNamara, MD**
  - Medical School: Pennsylvania State University College of Medicine
  - Residency: UPMC Children’s Hospital of Pittsburgh

- **Nora Sherry, MD**
  - Medical School: Drexel University College of Medicine
  - Residency: UPMC Children’s Hospital of Pittsburgh

**Pediatric Cardiac Critical Care**

- **Raymond Morales, MD**
  - Medical School: University of Illinois
  - Residency: Kaiser Oakland Medical Center
  - Fellowship: Pediatric Cardiology Fellowship, Rush University Medical Center

- **Elizabeth Pace, MD**
  - Medical School: The Commonwealth Medical College (Geisinger)
  - Residency: Rainbow Babies & Children’s Hospital of Cleveland
  - Fellowship: Rainbow Babies & Children’s Hospital of Cleveland
Faculty Data

Adult Critical Care Division

Professor

Derek C. Angus, MD, MPH, FRCP
Distinguished Professor and Mitchell P. Fink Endowed Chair
Professor, Critical Care Medicine
Professor, Medicine, Secondary Appointment
Professor, Health Policy and Management, Secondary Appointment
Professor, Clinical and Translational Science, Secondary Appointment
Director, CRISMA Center, University of Pittsburgh School of Medicine
Co-Director, UPMC ICU Service Center

Professional Affiliations
American College of Chest Physicians
American College of Critical Care Medicine
American Thoracic Society
Association of American Physicians
European Society of Intensive Care Medicine
Royal College of Physicians of the United Kingdom
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
American Thoracic Society - Awards Committee, Member
International Sepsis Forum - ISF Council, Secretary
ISARIC (International Severe Acute Respiratory Infection Consortium) - Executive Committee, Member
Society of Critical Care Medicine - Academic Leaders in Critical Care Medicine (ALCCM) Task Force, Member
Society of Critical Care Medicine - Adult Long-Term Outcomes Call Group, Member
Department of Critical Care Medicine - CRISMA Executive Committee, Director
University of Pittsburgh - Chancellor's Distinguished Investigator Awards Committee, Member
University of Pittsburgh School of Medicine - Distinguished Faculty Committee, Member

Editorships
Senior Editor: JAMA
Section Editor: Caring for the Critically Ill
Editorial Board: Annals of Intensive Care, Critical Care, Critical Care Practice, Current Opinion in Critical Care, Shock

Major Lectureships
Optimized Learning While Doing: The REMAP-CAP Adaptive Platform Trial, presented to Grand Rounds Rethinking Clinical Trials (virtual), Duke University NIH Collaboratory, Invited 2020
Panel Discussion: Where is the greatest impact to be had? Presented to International Sepsis Forum 2020
Extracorporeal Liver Assist Device (ELAD) in Acute Alcoholic Hepatitis, An Update, presented to Starzl Transplant Institute Conference Series Internal Grand Rounds, Invited 2019
2015 Stephen F. Lowry Colloquium on: Targets, trajectories and treatable traits: a roadmap for deep phenotyping in sepsis, Invited 2019
Pitfalls in sepsis clinical trial designs, presented to Sepsis Update 2019, Invited 2019
Ali Al-Khafaji, MD, MPH, FACP, FCCP  
Professor, Critical Care Medicine  
Medical Director, Transplant Intensive Care Unit  
Medical Director, ICU Telemedicine

**Professional Affiliations**  
Allegheny County Medical Society  
American College of Chest Physicians  
American College of Gastroenterology  
American Medical Association  
American Thoracic Society  
British Medical Association  
International Liver Transplantation Society (ILTS)  
Royal College of Anaesthetists  
Society of Critical Care Medicine

**Study Sections & Advisory Committee Memberships**  
SCCM Liver Failure Task Force, Member  
SCCM Graduate and Resident Education Committee, Member

**Editorships**  
Editorial Board: Critical Care Medicine Section, Intensive Care Medicine

**Major Lectureships**  
Renal Complications in Patients with Liver Disease, presented to 7th Annual Update in Liver Disease Conference, Invited 2019  
Extracorporeal Liver Assist Device (ELAD) in Acute Alcoholic Hepatitis, An Update, presented to Starzl Transplant 2019  
Institute Conference Series Internal Grand Rounds, Invited

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Marie Baldisseri, MD, MPH, FCCM  
Professor, Critical Care Medicine  
Associate Professor, Internal Medicine, University of Pittsburgh School of Medicine,  
Secondary Appointment  
Associate Professor, Acute/Tertiary Care, University of Pittsburgh School of Nursing,  
Secondary Appointment  
Associate Director, Neurovascular ICU, Critical Care Medicine, UPMC Health System  
Program Director, Global Health Division, Critical Care Medicine, University of Pittsburgh School of Medicine

**Professional Affiliations**  
American College of Physicians  
Neurocritical Care Society  
Pennsylvania Medical Society  
Society of Critical Care Medicine

**Study Sections & Advisory Committee Memberships**  
American College of Critical Care Medicine - Guidelines Management Committee, Vice Chair  
European Society of Intensive Care Medicine (ESICM) - Global Intensive Care Working Group for Teaching Underserved Populations  
Neurocritical Care Society (NCS) - Membership Committee  
Society of Critical Care Medicine - 3rd World Task Force, Member  
Society of Critical Care Medicine - American College of Critical Care Medicine  
Society of Critical Care Medicine - Counsel, Member  
Society of Critical Care Medicine - FCCS Leadership Task Force, Member  
Society of Critical Care Medicine - FCCS Obstetrics Committee, Chair  
Society of Critical Care Medicine - FCCS Obstetrics Textbook Task Force, Member  
Society of Critical Care Medicine - FCCS Surgical Task Force, Member  
Society of Critical Care Medicine - Fundamental Critical Care Support Steering Committee, Member

**University Committee Memberships**
University of Pittsburgh School of Medicine - CCM Education Committee, Member
University of Pittsburgh School of Medicine - Emergency Management Committee, Member
University of Pittsburgh School of Medicine - Peer Support Group for Physicians, Member
University of Pittsburgh School of Medicine - ACME Internal Medicine CCM Committee, Member
University of Pittsburgh School of Medicine - Ebola Facility Operations Group, Member
University of Pittsburgh School of Medicine - IM/CCM Clinical Competency Committee, Member
University of Pittsburgh School of Medicine - Disaster Medicine and Global Health, Section Leader
University of Pittsburgh School of Medicine - Obstetrical Critical Care, Section Leader
University of Pittsburgh School of Nursing - Acute Care Nurse Practitioner Graduate Program, Director

Honors & Recognitions
Society of Critical Care Medicine 2018 Distinguished Service Award
Safar Global Health Award, Society of Critical Care Medicine

Major Lectureships
Sepsis in Obstetrics, presented to 46th Annual Congress of the Mexican College of Critical Care Medicine, Invited 2019
Peripartum Cardiomyopathy, presented to 46th Annual Congress of the Mexican College of Critical Care Medicine, Invited 2019
Hemodynamic Monitoring in Pregnancy, presented to 46th Annual Congress of the Mexican College of Critical Care Medicine, Invited 2019
Update in Eclampsia Management, presented to 46th Annual Congress of the Mexican College of Critical Care Medicine, Invited 2019
Disaster Medicine Experience, presented to University of Pittsburgh HOSA Chapter, Next Generation of Global Healthcare Conference, Invited 2019
qSOFPA: Is this really a good tool to use, presented to Emergency Neurologic Life Support (ENLS), the International Conference on Emergency Medicine and Critical Care, Invited 2019
Spinal Cord Compression, presented to Emergency Neurologic Life Support (ENLS), the International Conference on Emergency Medicine and Critical Care, Invited 2019
Traumatic Brain Injury, presented to Presented at the Emergency Neurologic Life Support (ENLS), the International Conference on Emergency Medicine and Critical Care, Invited 2019
The Role of Critical Care in Disasters, presented to University of Maryland Shock Trauma Center Grand Rounds, Invited 2019
Physiologic Changes of Pregnancy, presented to 1st University of Maryland Shock Trauma Center Fundamentals of Critical Care Obstetrics, Invited 2019
Mortality and Cardiac Arrest in Pregnancy, presented to 1st University of Maryland Shock Trauma Center Fundamentals of Critical Care Obstetrics, Invited 2019
Endocrine Emergencies, presented to Adult Multiprofessional Critical Care Review Course (MCCRC), Invited 2019
Obstetric Emergencies, presented to Adult Multiprofessional Critical Care Review Course (MCCRC), Invited 2019

Gilles Clermont, MD, MSc
Professor, Critical Care Medicine
Professor, Mathematics, Clinical and Translational Science, and Industrial Engineering,
Secondary Appointments
Director, Program on Systems Medicine, CRISMA Center
Medical Director, Center for Inflammation and Regenerative Modeling,
McGowan Institute for Regenerative Medicine

Professional Affiliations
American Association for the Advancement of Science
American College of Chest Physicians
American Thoracic Society
European Society of Critical Care Medicine
Institute for Operations Research and the Management Sciences
Shock Society
Society for Complexity in Acute Illness
Society for Industrial and Applied Mathematics
Society of Critical Care Medicine
Joseph Darby, MD
Professor, Critical Care Medicine
Professor, Surgery, Secondary Appointment
Chief of Critical Care, UPMC Hamot
Co-Director of Neurotrauma Intensive Care Unit, UPMC Presbyterian Hospital

Professional Affiliations
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
UPMC Hamot - ICU Committee, Chair
University of Pittsburgh School of Medicine - Education Committee, Member
University of Pittsburgh School of Medicine - Promotions and Reappointments Committee, Member
UPMC - Infection Control Committee, Member
UPMC - Organ Donor Guidance Committee, Member

Scott Gunn, MD, FCCM
Professor, Critical Care Medicine
Professor, Emergency Medicine, and Clinical and Translational Science, Secondary appointments
Medical Director, Surgical Trauma Intensive Care Unit
Medical Director, Respiratory Therapy Services, UPMC Presbyterian University Hospital
Medical Director, Advanced Practice Program, Department of Critical Care Medicine
Director, Clinical Leadership Track, Critical Care Medicine Multidisciplinary Critical Care Training Program

Professional Affiliations
American Association for Physician Leadership
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
University of Pittsburgh School of Medicine - UPP Board of Directors, Member
University of Pittsburgh School of Medicine - Critical Care Medicine CORE Executive Committee Meeting, Member
University of Pittsburgh School of Medicine - Critical Care Medicine Executive Operations Committee, Member
University of Pittsburgh School of Medicine - Critical Care Medicine Executive Vice Chair Committee, Member
University of Pittsburgh School of Medicine - Critical Care Medicine Incentive Committee, Chair
University of Pittsburgh School of Medicine - Critical Care Medicine Promotions and Reappointment Committee, Member
UPMC - Collaborative Practice Committee, Member
UPMC - Critical Care Services Committee, Chair
UPMC - Ebola and Pandemic Response Committee, Member
UPMC - Hospital Infection Control, Member
UPMC - ICU Service Center Executive Committee, Member
UPMC - Physician Clinical Quality Leadership Committee, Member
UPMC - System-Wide ICU Performance and Operations Committee, Co-chair
UPMC - Total Quality and Patient Safety Council, Member
UPMC - Trauma Medical Audit Committee, Member
UPMC - UPMC Presbyterian Shadyside Pharmacy & Therapeutics Committee, Member

Major Lectureships
Surgery Grand Rounds, Breaking Bad News, presented to Visiting Professor, UPMC-Horizon & Jameson Hospitals, Invited 2019
Breaking Bad News, presented to Surgery Grand Rounds, Invited 2019
David Huang, MD, MPH
Professor, Critical Care Medicine
Professor, Emergency Medicine, Secondary Appointment
Director, Multidisciplinary Acute Care Research Organization
Medical Director, CRISMA Center Administrative Core
Associate Medical Director, Transplant Intensive Care Unit,
UPMC Presbyterian/Montefiore

Professional Affiliations
American College of Emergency Physicians
American Medical Association
Society for Clinical Trials
Society of Critical Care Medicine

Honors & Recognition
Presidential Citation, Society of Critical Care Medicine 2020

Study Sections & Advisory Committee Memberships
American College of Emergency Physicians - E-Qual Sepsis Committee, Member
American College of Emergency Physicians - Sepsis Expert Panel, Member
Society of Critical Care Medicine - Care of the Critically Ill Patient with Hepatic Failure Guidelines Task Force, Member
Society of Critical Care Medicine - Liver Committee, Member
University of Pittsburgh - CTSI: Pilot Grants Programs, Reviewer
University of Pittsburgh School of Medicine - Critical Care Medicine Scientific Affairs Committee, Member
UPMC - MCCTP Fellowship Applicant Interviewer, Member

Major Lectureships
REMAP-COVID, an adaptive trial of therapeutics for COVID-19, Critical Care Medicine Grand Rounds 2020

Jeremy Kahn, MD, MS
Professor with Tenure, Critical Care Medicine
Professor, Health Policy and Management, Secondary Appointment
Vice Chair for Academic Affairs
UPMC Endowed Chair, Critical Care Organization and Management, UPMC Health System
Director, Program on Critical Care Health Policy and Management, CRISMA Center
Director, CRISMA Research Fellowship
Medical Director, University of Pittsburgh Health Services Research Data Center
Affiliate Faculty, University of Pittsburgh Health Policy Institute

Honors & Recognition
AHRQ-AcademyHealth HCUP Outstanding Article of the Year Award

Professional Affiliations
AcademyHealth
American Thoracic Society
Interdisciplinary Network for Group Research (INGroup)
Society of Critical Care Medicine
The American Society for Clinical Investigation (ASCI)

Study Sections & Advisory Committee Memberships
National Institutes of Health - Health Services, Outcomes and Delivery Study Section, Chair

Editorships
Associate Editor: American Journal of Respiratory and Critical Care Medicine

Major Lectureships
Using Health Policy to Improve Sepsis Outcomes, presented to Institute for Public Health and Medicine Seminar, Invited 2019
Machine learning and decision support: how informatics tools can improve outcomes, presented to 11th Critical Care Medicine Forum of Peking University, Invited 2019
Teamwork in the ICU, presented to 11th Critical Care Medicine Forum of Peking University, Invited 2019
ICU telemedicine: how it can improve outcomes, presented to 11th Critical Care Medicine Forum of Peking University, Invited 2019
Weaning from mechanical ventilation—state of the art, presented to 11th Critical Care Medicine Forum of Peking University, Invited 2019

A. Murat Kaynar, MD, MPH
Professor, Critical Care Medicine
Professor, Anesthesiology, Secondary Appointment
Director, Anesthesiology Critical Care Medicine Fellowship
Director, Anesthesiology Critical Care Medicine Residency Rotation

Professional Affiliations
American Association for the Advancement of Science
American Society of Anesthesiologists
American Society of Critical Care Anesthesiologists
Association of University Anesthesiologists
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
UPMC - Graduate Medical Education Committee, Member
UPMC - Trauma Service Committee, Member
University of Pittsburgh School of Medicine - Educational Policies Committee, Member
University of Pittsburgh School of Medicine - Non-Tenure Promotion Committee, Member
University of Pittsburgh School of Medicine - Resident Education Committee, Member
Department of Critical Care Medicine - Education Committee, Member

Editorship
Chief Editor: Frontiers in Medicine, Anesthesiology and Intensive Care
Reviewer: American Journal of Respiratory and Critical Care Medicine/Cellular and Molecular Biology, American Journal of Physiology, Critical Care Medicine, Thorax, British Journal of Anaesthesia, and Nature

John A. Kellum, MD, FACP, MCCM
Professor with Tenure, Critical Care Medicine
Professor, Medicine, Clinical and Translational Science, and, Bioengineering, Secondary Appointments
Endowed Chair of Critical Care Research
Vice Chair for Research, Critical Care Medicine
Director, Center for Critical Care Nephrology

Professional Affiliations
American College of Chest Physicians
American College of Physicians
International Society of Nephrology

Honors & Recognitions
34th Meneely/George Lecturer LSU Health Center
Pitt Innovator Award, University of Pittsburgh Innovation Institute
Honorable Member, European Society of Intensive Care Medicine
Jeff Gray Memorial Award "Translating to Management in AKI"
Prince Mahidol Award Youth Program Mentor, Bangkok Thailand

Study Sections & Advisory Committee Memberships
Society of Critical Care Medicine - Congress Program Committee, Other
University of Pittsburgh - Internal Advisory Committee, Member
Editorships
Associate Editor: Blood Purification
Editorial Board: Clinical Journal of the American Society of Nephrology
Editorial Board: Critical Care
Editorial Board: Shock
Review Board: Intensive Care Medicine
Subject Editor: AKI/Electrolyte Disturbances: Nephrology Dialysis Transplantation
Theme Editor: Renal Replacement Therapy: International Journal of Artificial Organs
Theme Editor: Translational Research: Critical Care

Major Lectureships
- Why hemoadsorption seems to be a useful treatment option, presented to Webinar- Cytokine adsorption by blood purification in severely ill COVID-19 patients – rationale and clinical experience, Invited
- Can Existing Biomarkers Help? Presented to The International Renal Research Institute of Vicenza (IRRIV)
- Live Webinar: AKI Biomarkers, Results from the ADQI 23 conference, Invited
- Blood purification in Sepsis and Septic AKI, presented to 47th Annual Meeting of the Japanese Society of Intensive Care Medicine, Invited
- Sepsis-Associated Acute Kidney Injury: Pathophysiology and Treatment, presented to 47th Annual Meeting of the Japanese Society of Intensive Care Medicine, Invited
- Grand Rounds, Kidney Attack- Are we doing enough? Presented to WVU Heart and Vascular Institute Grand Rounds, Invited
- Fluid Management in AKI, presented to Ecuadorian Intensive Care Congress 2019, Invited
- Acute Kidney Injury in Sepsis, presented to Ecuadorian Intensive Care Congress 2019, Invited
- Diagnosis and prevention of AKI inside and outside the ICU, presented to Ecuadorian Intensive Care Congress 2019, Invited
- Current state of renal replacement therapies, presented to Ecuadorian Intensive Care Congress 2019, Invited
- New Biomarkers for 'Pre-AKI' and 'Persistent AKI', presented to 9th Annual AKI Symposium, Invited
- Pathophysiology of Septic AKI, presented to 3rd Asia Pacific AKI CRRT, Invited
- Management of Septic AKI, presented to 3rd Asia Pacific AKI CRRT, Invited
- Fluids and Solutions in AKI Management: Crystalloids and Colloids: When and How to Use, presented to 3rd Asia Pacific AKI CRRT, Invited
- How Do I Manage the Fluid Overload Patient? Presented to 3rd Asia Pacific AKI CRRT, Invited
- Why Are Some People Resistant to AKI? Presented to 3rd Asia Pacific AKI CRRT, Invited
- Acute Kidney Injury, presented to European Society of Intensive Care Medicine (ESICM), Invited
- Harmful effects of fluids on the kidney, presented to European Society of Intensive Care Medicine (ESICM), Invited
- When and How Do I Start RRT? Presented to European Society of Intensive Care Medicine (ESICM), Invited
- Long term outcome after AKI, presented to European Society of Intensive Care Medicine (ESICM), Invited
- Sepsis and acute kidney injury: from pathophysiology to treatment, presented to XVI Sao Paulo Critical Care Congress, Invited
- Fluids for the critically ill after SMART and SALT-ED, presented to XVI Sao Paulo Critical Care Congress, Invited
- Use of diuretics in the ICU, presented to XVI Sao Paulo Critical Care Congress, Invited
- Recovery of Renal Function after Septic Shock, presented to XVI Sao Paulo Critical Care Congress, Invited
- Extracorporeal techniques for blood purification: promises and pitfalls, presented to Weimar Sepsis Update 2019, Invited
- Grand Rounds, Integrating Acute Kidney Injury Biomarkers in our clinical management of AKI, presented to University of Rochester Medical Center Grand Rounds, Invited

Michael Pinsky, MD, CM, Dr hc, FCCP, MCCM
Professor, Critical Care Medicine
Vice Chair Emeritus
Professor, Bioengineering, Anesthesiology, Cardiovascular Diseases, and Clinical and Translational Science, Secondary Appointments
Senior Advisor, Center for Military Medicine Research

Professional Affiliations
American College of Chest Physicians
American Physiological Society
American Thoracic Society
European Society of Intensive Medicine
Society of Critical Care Medicine
Study Sections & Advisory Committee Memberships
National Institute of Health – NHLBI K23, K24 and K25 Study Section, Ad Hoc Reviewer
University of Pittsburgh - Internal Advisory Board, Center for Military Medicine Research, Member
University of Pittsburgh - McGowan Institute for Regenerative Medicine, Member
University of Pittsburgh - Scientific Affairs Committee, Member
University of Pittsburgh - Senior Advisor for Clinical Innovation, Center for Military Medical Research, Other
UPMC - Retention Subcommittee of the Physicians Services Inclusion Committee, Member
UPP - Diversity Committee, Physician Services Division, Other

Editorships
Associate Editor: Critical Care
Chief Editor: WebMD Medscape Drug & Diseases: Critical Care Medicine

Major Lectureships
Cardio-pulmonary Interactions, presented to 2nd Asia Pacific CRRT AKI Conference, Taipei, Taiwan 2019
Learning from the past: Evaluating another failed treatment in septic shock, presented to 28th Argentine Congress of Intensive Medicine, Rosario, Argentina 2019

Lori Shutter, MD, FNCS, FCCM
Professor, Critical Care Medicine
Professor, Neurology, Neurosurgery, and Clinical and Translational Science, Secondary Appointments
Vice Chair for Education, Department of Critical Care Medicine
Division Chief, Neurocritical Care, & Neurology
Director, Neurocritical Care Fellowship Training Program
Medical Director, Neurovascular & Neurotrauma Intensive Care Units

Professional Affiliations
American Academy of Neurology
American Association of Neurological Surgeons
American Medical Association
Congress of Neurological Surgeons
Gold Humanism Honor Society
National Neurotrauma Society
Neurocritical Care Society (NCS)
Society of Critical Care Medicine
Women in Neurosurgery

Study Sections & Advisory Committee Memberships
National Institutes of Health - SBIR / STTR: Drug Discovery for Aging, Neuropsychiatric and Neurologic Disorders [ETTN (11)]
National Institutes of Health - PAR: Development of Appropriate Pediatric Formulations and Pediatric Drug Delivery Systems [ETTN (50)]
University of Pittsburgh School of Medicine - Career Mentoring Program Organizing Committee, Member
University of Pittsburgh School of Medicine - Executive Committee, UPMC, Member
University of Pittsburgh School of Medicine - Fink Day Planning Committee, Member
University of Pittsburgh School of Medicine - Non-Tenured Faculty Promotions and Appointments (NTFPA) Committee, Vice chair
University of Pittsburgh School of Medicine - Office of Faculty Affairs Promotion Taskforce, Member
UPMC - Collaborative Practice Committee, Member
UPMC - GME Committee, Member
Critical Care Medicine - Education Committee, Member
Critical Care Medicine - Executive Operations Committee, Member
Critical Care Medicine - Executive Vice Chair Steering Committee, Member
Critical Care Medicine - Fellowship Program Directors Committee, Member
Critical Care Medicine - Grand Rounds Planning Committee, Member
Critical Care Medicine - Promotions and Appointment Committee, Member
Critical Care Medicine - Safar Symposium Annual Program Committee, Member
Neurology - Residency Curriculum Committee, Member
Society of Critical Care Medicine - Neuroscience Section, Chair
Society of Critical Care Medicine - Research Section, Member
Society of Critical Care Medicine - Abstract Reviewer, Annual Conference
Society of Critical Care Medicine - Post Graduate & Fellowship Education Committee, Member
National Trauma Research Action Plan Coalition of Trauma Research Neurotrauma Panel, Member

Editorships
Editorial Board: Neurocritical Care

Major Lectureships
Management of Severe TBI: Should Brain Hypoxia Guide Clinical Care? Presented to Stanford University. 2020
Department of Neurology Grand Rounds, Invited
Crossroads Between Neurocritical Care & Oncology: CAR T-Cell Neurotoxicity, presented to UPMC Department of Medicine, 2020
Division of Pulmonary, Allergy and Critical Care Grand Rounds, Invited
The Injured Brain & Oxygen: Should Brain Hypoxia Guide Clinical Care? 2019
Presented to The Injured Brain & Oxygen: Should Brain Hypoxia Guide Clinical Care? Invited
Management of Brain Hypoxia after TBI: Should Brain Hypoxia Guide Clinical Care? 2019
Presented to Brain Connects 2019 Conference, Invited
CTE – Linking Trauma and Neurodegeneration: Basic Pathophysiology, Clinical features, Neuropathology & Imaging, presented to Brain Connects 2019 Conference, Invited
Re-emergence of Brain Networks During Recovery of Consciousness after Acute TBI, presented to Brain Connects 2019 Conference, Invited
Building Respect in a World of Microaggressions, presented to Neurocritical Care Society 17th Annual Conference, Invited
Integration of Neurocritical Care: Sharing the Sandbox, presented to Congress of Neurological Surgeons 2019
Annual Meeting, Invited
Patient Specific Goal-directed Therapy in TBI: PbtO2, Ventilators and Antiseizure Medications, presented to Congress of Neurological Surgeons Annual Meeting, Invited
The Injured Brain & Oxygen: Should Brain Hypoxia Guide Clinical Care? 2019
Presented to St Vincent Neuroscience Institute, Invited
Blood Pressure Management in Traumatic Brain Injury, presented to 2019 World Federation of Neurological Surgeons Special World Congress, Invited
Management of Brain Hypoxia after Traumatic Brain Injury, presented to 2019 World Federation of Neurological Surgeons Special World Congress, Invited
The Injured Brain & Oxygen: Should Brain Hypoxia Guide Clinical Care? Presented to University of New Mexico, Department of Neurology Grand Rounds, Invited 2019

Douglas White, MD, MAS
Professor with Tenure, Critical Care Medicine
Professor, Medicine, and Clinical and Translational Medicine Secondary Appointments
Vice Chair for Faculty Development
UPMC Endowed Chair for Ethics in Critical Care Medicine
Director, Program on Ethics and Decision Making, CRISMA Center, Department of Critical Care Medicine

Professional Affiliations
American Society of Bioethics and Humanities
American Thoracic Society
Society for Critical Care Medicine
Society for Medical Decision-Making

Study Sections & Advisory Committee Memberships
National Institutes of Health - Social and Ethical Issues in Research (SEIR) Study Section, Chair
National Institutes of Health - Special Emphasis Panel ZNR1 REV-T (34) NINR Clinical Trial Planning Grant, Member
National Institutes of Health, NHLBI - Elafin Therapy in Pulmonary Arterial Hypertension DSMB, Member
Ireland Health Research Board - Grant Review Panel, Member
Swiss National Science Foundation - Grant Review Panel, Member
University of Pittsburgh School of Medicine - Tenured Faculty Promotions and Appointments (TFPA) Committee, Chair
Editorships
Reviewer: Journal of the American Geriatrics Society, Journal American Medical Association, American Journal of Respiratory and Critical Care Medicine, Annals of Internal Medicine, and Critical Care Medicine

Major Lectureships
"Fair Allocation of Scarce COVID-19 Medications During the Pandemic", presented to Research Seminar, Invited 2020
“Ethical Responses To Medical Scarcity during the COVID-19 Pandemic”, presented to Greenwall Foundation Board of Directors Annual Meeting, Invited 2020
“Fairly Allocating Scarce Ventilators and Anti-viral Medications During the COVID-19 Pandemic.”, presented to COVID-19 Half Marathon, Invited 2020
"When the Family Just Doesn't Get it: Navigating Disagreements About Prognosis", presented to Critical Care Canada Forum 2019
“The Present and Future of the Doctor-Patient Relationship”, presented to 38th Annual Lecture Series, Invited 2019
“Not a Candidate”: Exploring Non-Candidacy as a Form of Unilateral Decision-Making in Medical Practice”, presented to 21st Annual meeting of the American Society for Bioethics & Humanities, Invited 2019
Responding to requests for futile or potentially inappropriate treatment, presented to Critical Care Canada Forum 2019
Results and reflections from the PARTNER trial, presented to Critical Care Canada Forum 2019
Results and reflections from the PARTNER trial, presented to Critical Care Canada Forum 2019
When the family doesn’t get it: a differential diagnosis, presented to Critical Care Canada Forum 2019

Sachin Yende, MD, MS
Professor, Critical Care Medicine
Professor, Clinical and Translational Science, Secondary Appointment
Vice President, VA Pittsburgh Healthcare System
Deputy Chief of Staff, VA Pittsburgh Healthcare System

Professional Affiliations
American Thoracic Society
Society of Critical Care Medicine

Study Sections and Advisory Committee Memberships
American Thoracic Society - Critical Care Assembly Planning Committee, Member 2019
VA Pittsburgh Healthcare System - Executive Leadership Board, Member 2019
VA Pittsburgh Healthcare System - External Peer Review Program, Member 2019
VA Pittsburgh Healthcare System - Leadership Development Committee, Member 2019
VA Pittsburgh Healthcare System - Medical Executive Board, Member 2019
VA Pittsburgh Healthcare System - Patient Safety Indicators Task Force, Member 2019
VA Pittsburgh Healthcare System - Task Force for Ebola Preparedness Team, Member 2019

Associate Professor

Jonathan Bishop, MD, MBA, FCCP
Associate Professor, Critical Care Medicine
Clinical Chief, UPMC Mercy

Professional Affiliations
American Association of Physician Leadership
American College of Chest Physicians
Society of Critical Care Medicine

Study Section and Advisory Committee Memberships
UPMC - COVID-19 UPMC System Capacity Management Committee, Member 2019
UPMC - COVID-19 UPMC System ICU Management Committee, Member 2019
UPMC - Medicine Quality Improvement Committee, Co-chair 2019
UPMC - ICU Service Center Steering Committee, Member 2019
Sherry Chou, MD, MMSc, FNCS
Associate Professor, Critical Care Medicine
Associate Professor, Neurology, and Neurosurgery Secondary Appointments
Associate Director, Stroke & Subarachnoid Hemorrhage, Safar Center for Resuscitation Research

Professional Affiliations
American Heart Association
Neurocritical Care Society
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
Global Consortium to Study Neurological Dysfunction in COVID-19, Founding Principal Investigator
World Health Organization Brain Initiative COVID 19 Forum, Member
Neurocritical Care Society - Board of Directors, Member
Neurocritical Care Society - NCS COVID-19 Taskforce, Member
Neurocritical Care Society - Joint NCS and The German Society for Neurocritical Care And Emergency Medicine (DGNI) Neuroprognostication Writing Group, Member
Neurocritical Care Society - Translational Science Committee, Member
Neurocritical Care Society - Grants Review Committee, Member
Neurocritical Care Society - Educational Products Committee, Member
Neurocritical Care Society - Research Committee, Member

Editorships
Editorial Board: Stroke, Translational Stroke Research, Journal of Neurology and Experimental Neuroscience, CNS Neuroscience & Therapeutics, Neurocritical Care ON CALL
University of Pittsburgh School of Medicine - Anesthesia Critical Care Medicine Fellowship Selection Committee, Member
University of Pittsburgh School of Medicine - Neurocritical Care Fellowship Selection Committee, Member
University of Pittsburgh School of Medicine - Vascular Neurology Fellowship Selection Committee, Member
UPMC - Neurocritical Care Clinical Translational Research Program, Program Director, Other

Major Lectureships
Inflammation and Immune Dysregulation in Stroke – The Brain-Body Interaction, presented to Neurology Grand Rounds, University of Pittsburgh, Pittsburgh, PA, Invited 2019
Aneurysmal Subarachnoid Hemorrhage, presented to Neurocritical Care Society Practice Update, Vancouver, Canada, Invited 2019
Subarachnoid Hemorrhage – 2020 Beholds! presented to Neurocritical Care Society, Vancouver, Canada, Invited 2019

Timothy Girard, MD, MSCI
Associate Professor, Critical Care Medicine
Medical Director, CRISMA Long-Term Outcomes Core

Professional Affiliations
American Delirium Society
American Thoracic Society
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
ACTTION Initiative (with the FDA) SCEPTER-III: Clinical Trials to Evaluate Patient-Centered
Outcomes of Sedation in Mechanically Ventilated Patients in the Adult ICU - Acute, Subacute and Chronic Outcomes after ICU Sedation, Advisory Committee and Moderator
American Thoracic Society - Critical Care Assembly Planning Committee, Member
Department of Critical Care Medicine - Grand Rounds Committee, Member
UPMC - ICU Service Line Delirium Working Group, Chair
UPMC - ICU Continuous Sedation Workgroup, Member
UPMC - ICU Performance and Operations Committee, Member

Major Lectureships
Management of Delirium During Critical Illness, presented to 58th Annual Chest Disease Conference, Sunriver, Oregon, Invited 2020
Life after Critical Illness: Progress and Challenges, presented to 58th Annual Chest Disease Conference Sunriver, Oregon, Invited 2020
Cognitive Decline due to Critical Illness, presented to Pulmonary Research Conference, Section of Pulmonary, Critical Care & Sleep Medicine, Yale University School of Medicine, Invited 2019
Management of Delirium in the ICU in 2019, presented to State Chest Lecture, Section of Pulmonary, Critical Care & Sleep Medicine, Yale University School of Medicine, Invited 2019
Management of Delirium during Sepsis, presented to Sepsis State of the Art: 1st Annual Interprofessional Management of the Critically Ill, University of Iowa Hospitals & Clinics, Invited 2019
Long-Term Outcomes After Sepsis, presented to Sepsis State of the Art: 1st Annual Interprofessional Management of the Critically Ill, University of Iowa Hospitals & Clinics, Invited 2019
Sepsis and Cognition: At the Bedside, presented to Medical Grand Rounds, Department of Medicine, University of South Alabama School of Medicine, Invited 2019
Sepsis and Cognition: At the Bench, presented to Distinguished Scientist Lecture, Department of Cell Biology, University of South Alabama School of Medicine, Invited 2019

Deepika Mohan, MD, MPH
Associate Professor, Critical Care Medicine
Associate Professor, Surgery, Secondary Appointment

Professional Affiliations
Society of Critical Care Medicine
American College of Surgeons

Study Sections & Advisory Committee Memberships
Mail reviewer for the NIH’s Office of the Director Early Independence Award Program PSI Foundation - Grant Reviewer
Allegheny General Hospital - Department of Surgery Research Education Day, Member
University of Pittsburgh - Research Seminar on Ethics & Decision Making, Co-chair
UPMC Presbyterian - UPMC Presbyterian Hospital Ethics Committee, Member

Editorships
Ad hoc reviewer: Critical Care Medicine, Journal of Critical Care, Health Affairs, American Journal of Respiratory and Critical Care Medicine, PLoS One, Health Services Research, JAMA, Journal of Perinatology

Major Lectureships

Jason Moore, MD, MS
Associate Professor, Critical Care Medicine
Director, Critical Care-Internal Medicine Fellowship Program

Professional Affiliations
American College of Physicians
American Medical Association
Association of Pulmonary and Critical Care Program Directors
Society of Critical Care Medicine

**Study Sections & Advisory Committee Memberships**
- Association of Pulmonary and Critical Care Medicine Program Directors (APCCMPD) - Uniform MATCH Policy Task Force, Member
- Society of Critical Care Medicine - Academic Leaders in Critical Care Medicine (ALCCM) Work Group, Member
- Society of Critical Care Medicine - Post Graduate Education Committee, Vice chair
- UPMC - Education Committee for the Department of Critical Care Medicine, Member
- University of Pittsburgh School of Medicine - Common Fellowship Curriculum Committee, Member
- University of Pittsburgh School of Medicine - Fink Scholars Day Committee, Member
- UPMC - GME Program Director Development Sub-committee, Member
- UPMC - Graduate Medical Education Committee, Member

**Honors & Recognitions**
- SCCM Presidential Citation 2020
- Fellow of the College of Critical Care Medicine 2019

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**Rachel Sackrowitz, MD, MBA**
Associate Professor, Critical Care Medicine
Associate Professor, Medicine, Secondary appointment
Executive Vice Chair, Critical Care Medicine
Chief Medical Officer, ICU Service Center, UPMC

**Professional Affiliations**
- American Telemedicine Association
- American Association for Physician Leadership
- American College of Chest Physicians
- Society of Critical Care Medicine

**Study Section and Advisory Committee Memberships**
- Executive Operations Committee, Critical Care Medicine
- Vice Chair Committee, Critical Care Medicine
- UPMC - Medical Quality cabinet
- UPMC - Quality and Safety Leadership Committee, Member
- UPMC - Surgical Quality Cabinet, Member
- UPMC - Telehealth Operations Committee, Member

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**Penny Sappington, MD**
Associate Professor, Critical Care Medicine
Medical Co-Director, Cardiothoracic/Surgical Intensive Care Unit, UPMC Presbyterian Hospital
Medical Director, Extracorporeal Membrane Oxygenation (ECMO) Division, Procirca Perfusion Services
Medical Director, Procirca ECMO Simulation Committee
Program Director, ECMO Critical Care Medicine Fellowship

**Professional Affiliations**
- Extracorporeal Life Support Organization
- Society of Critical Care Medicine

**Committee Memberships**
- UPMC - Critical Care Services Committee, Member
- UPMC - CT Transplant Service Line Committee, Member
- UPMC - ECMO Program, Director
- UPMC - Procirca Perfusion Services for ECMO at UPMC, Director
Christopher Seymour, MD, MSc
Associate Professor, Critical Care Medicine
Associate Professor, Emergency Medicine, and Clinical and Translational Science Secondary Appointments
Director, Translational and Clinical Science (TraCS) Program, CRISMA Center
Director, Clinical Informatics, Biostatistics and Data Management Core, CRISMA Center

Professional Affiliations
American Thoracic Society
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
National Institutes of Health - Early Career Reviewer Program
Surviving Sepsis Campaign - Guideline Committee, ATS Representative
UPMC - Sepsis in the Electronic Health Record Working Group, Physician Lead
UPMC - Sepsis Steering Committee, Member
UPMC - ICU Service Line Steering Committee, adjunct member

Editorships
Editorial Board: Critical Care Medicine

Major Lectureships
Sepsis: diagnosis and treatment in the era of precision medicine, presented to Grand Rounds, New York University, Department of Medicine, New York, NY, Invited 2020
The system for sepsis: starts at home, presented to Oregon Thoracic Society, Bend, OR, Invited 2020
Early sepsis: are patients and treatments the same, presented to Oregon Thoracic Society, Bend, OR, Invited 2020
Sepsis phenotypes, presented to Grand Rounds, Department of Medicine, University of Pittsburgh, Pittsburgh, PA, Invited 2019
Phenotype anarchy, presented to International Sepsis Forum, Stephen F. Lowry Colloquium, Boston, MA, Invited 2019
Electronic health record and machine learning at UPMC, presented to CRISMA Research Conference, Invited 2019
Sepsis is not all the same, should we treat it that way?”, presented to Icahn School of Medicine, Medicine Grand Rounds, New York, NY, Invited 2019
Is mandatory sepsis care too simple? The US experience, presented to German Sepsis Society, Invited 2019

Assistant Professor

Firas Abdulmajeed, MD
Assistant Professor, Critical Care Medicine
Assistant Professor, Department of Neurology, Secondary Appointment

Professional Affiliations
American Medical Association
Iraqi Doctors Organization
Iraqi Medical Association
Jordanian Medical Association
Neurocritical Care Society
Society of Critical Care Medicine
Stark County Medical Society

Study Sections & Advisory Committee Memberships
UPMC - Clinical Competency Committee, Member
UPMC - Critical Care Service Committee, Member
UPMC - Independent Neuro ICU Building Committee, Member
UPMC - NICU Team Coordination Team
UPMC - POCUS Fellows “Undertraining Trainer"
Christopher Brackney, DO, FACOI
Assistant Professor, Critical Care Medicine
Faculty Advisor, Critical Care Medicine Student Interest Group
Director, Critical Care Fellowship, Veterans Affairs Medical Center
Director, Surgical Intensive Care Unit, VA Pittsburgh Healthcare System
Co-Director, University of Pittsburgh Medical Student Critical Care Elective Site

Professional Affiliations
American College of Emergency Physicians
American College of Osteopathic Emergency Physicians
American College of Osteopathic Internists
American Osteopathic Association
American Thoracic Society
Emergency Medicine Residents Association
International Society for Simulation in Healthcare
Society of Critical Care Medicine

Study Section and Advisory Committee Memberships
American College of Emergency Physicians, Surviving Sepsis Campaign Task Force, Member
VA Pittsburgh Healthcare System - Cardiogenic Shock Team, Co-chair

Brad Butcher, MD
Assistant Professor, Critical Care Medicine
Co-Director, Medical Surgical Intensive Care Unit, UPMC Mercy
Director, Critical Illness Recovery Center, UPMC Mercy

Professional Affiliations
Society of Critical Care Medicine
American Academy of Physician Leaders

Study Sections & Advisory Committee Memberships
Society of Critical Care Medicine – THRIVE task force, member
UPMC - Co-Director of the ICU Rotations for Internal Medicine and Emergency Medicine Residency Programs
UPMC - Ethics Committee, Member
UPMC - ICU Committee, Member
UPMC - Resuscitation Committee, Member
UPMC Mercy - Co-Director of Critical Care Education

Chenell Donadee, MD
Assistant Professor, Critical Care Medicine
Medical Director, UPMC ICU Service Center
Co-Director, Medical ICU, UPMC Mercy Hospital

Professional Affiliations
American College of Chest Physicians
American Thoracic Society
Society of Critical Care Medicine
Study Sections & Advisory Committee Memberships
University of Pittsburgh School of Medicine - ACGME Clinical Competency Committee, IM/CCM Program, Member
University of Pittsburgh School of Medicine - Critical Care Medicine Fellowship Selection Committee, Member
UPMC - UPMC ICU Service Center System Operations and Performance Committee, Chair
UPMC - UPMC ICU Service Center Executive Committee, Member
UPMC - UPMC ICU Service Center Working Group, Member
UPMC - Critical Care Representative, System Leadership Team, Member
UPMC Mercy - Critical Care Committee, Co-chair
UPMC Mercy - Comprehensive Stroke Center Committee, Member
UPMC Mercy - Infection Control Committee, Member
UPMC Mercy - Quality Committee, Member

Major Lectureships
Implementing Guidelines and Protocols – Experience and Evidence, presented to Doctor of Nursing Program, Invited 2019

Hernando Gómez, MD, MPH
Assistant Professor, Critical Care Medicine
Director, Quality Improvement Initiatives, Anesthesiology Critical Care Fellowship
Co-Director, Cadaver Simulation Laboratory, Multidisciplinary Critical Care Training Program

Professional Affiliations
American College of Chest Physicians
American Society of Critical Care Anesthesiologists
Colegio Medico Colombiano
European Society of Intensive Care Medicine
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
National Institutes of Health - Surgery, Anesthesia and Trauma (SAT) Study Section, Member
Academia Colombiana de Medicina Critica (ACOMEC), Founding Member

Editorships
Reviewer: Anesthesiology, British Medical Journal, Critical Care, Critical Care Medicine, Annals of Intensive Care, PLoS Medicine, Shock

Major Lectureships
Activation of AMP-activated protein Kinase (AMPK) During Sepsis/Inflammation Improves Survival by Preserving Cellular Metabolic Fitness, presented to 9th Annual Acute Kidney Injury Symposium, Invited 2019

Ruchira Jha, MD
Assistant Professor, Critical Care Medicine
Assistant Professor, Neurology, and Neurosurgery Secondary Appointments

Professional Affiliations
American Academy of Neurology
European Stroke Organization
Massachusetts Medical Society
National Neurotrauma Society
Neurocritical Care Society (NCS)
Society for Neuroscience
Society of Critical Care Medicine
Society of Neurocritical Care-India
World Stroke Organization

Study Sections & Advisory Committee Memberships
University of Pittsburgh School of Medicine - UPMC Neurocritical Care Division Faculty Recruitment and Interview Committee
University of Pittsburgh School of Medicine - UPMC Neurocritical Care Fellowship Recruitment/Interview Committee
University of Pittsburgh School of Medicine - UPMC Neurology Vascular/Stroke Fellowship Recruitment and Interview Committee
UPMC - Neurocritical Care Team Coordination Committee, Member
UPMC - Subarachnoid Hemorrhage Group, Member

Editorships
Editorial Board: JAMA Neurology

Major Lectureships
Getting to your NIH career development award, presented to the Neurocritical Care Society Annual meeting 2019
State of the Art Science in SUR1-TRPM4, presented to Biogen 2019
Cerebral edema in TBI – a translational focus on SUR1-TRPM4, presented to University of Pittsburgh 2019
Department of Neurology Grand Rounds

Florian Mayr, MD, MPH
Assistant Professor, Critical Care Medicine

Professional Affiliations
American Thoracic Society
American Medical Association
Society of Critical Care Medicine
European Resuscitation Council

Study Sections & Advisory Committee Memberships
University of Pittsburgh - Fellow Interview and Selection Committee, Member
University of Pittsburgh School of Medicine - Clinical Competency Committee, Member
VA Pittsburgh Healthcare System - CPR Committee, Chair
VA Pittsburgh Healthcare System - Cardiogenic Shock Committee, Member
VA Pittsburgh Healthcare System - Stroke Committee, Member

Editorships
Academic Editor: PLoS ONE

Holt Murray, MD
Assistant Professor, Critical Care Medicine
Medical Director, Cardiothoracic Intensive Care Unit and Surgical Intensive Care Unit

Professional Affiliations
Allegheny County Medical Society
American Medical Association
European Society of Intensive Care Medicine

Study Sections & Advisory Committee Memberships
UPMC Mercy - Treasurer, Medical Education Committee
UPMC Mercy - Credentials Committee, Member
UPMC Mercy - ICU Committee, Member
UPMC Mercy - Patient Safety Review Committee, Member
UPMC Mercy - Physician Advisory Council, Member
UPMC Mercy - Resuscitation Committee, Member
UPMC Mercy - Utilization & Management Committee, Member
Mary Przybysz, MD
Assistant Professor, Critical Care Medicine
Medical Director, Trauma Burn Intensive Care Unit

Professional Affiliations
American Medical Association
American Society of Anesthesiologists
Society of Critical Care Anesthesiologists
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
UPMC - ICU Formulary Group, Member
UPMC Mercy - Difficult Airway Cart Working Group, Member
UPMC Mercy - ICU Formulary Working Group, Member

Raj Ramanan, MD
Assistant Professor, Critical Care Medicine
Medical Director, Rapid Response Team, UPMC Presbyterian

Professional Affiliations
American Thoracic Society
European Society of Intensive Medicine
Extracorporeal Life Support Organization
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
UPMC - Clinical Competency Committee, Member
UPMC - Patient Safety Peer Review Committee
UPMC - Rapid Response Team (RRT), MERIT and Morbidity and Mortality

Kristina Rudd, MD, MPH
Assistant Professor, Critical Care Medicine

Professional Affiliations
American College of Chest Physicians
American Thoracic Society
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
American Thoracic Society Global Health Interest Group

Honors & Recognitions
International Symposium on Intensive Care and Emergency Medicine pre-conference Round Table Discussion, “Before the ICU” 2019
Allen Humphrey Excellence in Mentoring Award 2019

Editorships
Christopher Schott, MD, MS, RDMS, FACEP
Assistant Professor, Critical Care Medicine
Assistant Professor, Emergency Medicine, Secondary Appointment
Director, Critical Care Elective Medical Student Rotation
Director, Point of Care Ultrasound Elective Medical Student Rotation
Co-Director, Adult Internal Medicine Clerkship, University of Pittsburgh School of Medicine
Director of Ultrasonography, Department of Critical Care Medicine, Veterans Affairs Pittsburgh Healthcare System

Professional Affiliations
Alliance for Academic Internal Medicine (AAIM, APDIM subgroup)
American College of Emergency Physicians (ACEP)
American Institute of Ultrasound in Medicine
American Medical Association
Emergency Medicine Residents’ Association (EMRA)
Phi Beta Kappa Society
Society for Academic Emergency Medicine (SAEM)
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
American College of Emergency Physicians - Critical Care Ultrasonography Guidelines Task Force, Member
American College of Emergency Physicians - Critical Care Ultrasound Curriculum Task Force, Member
University of Pittsburgh School of Medicine - Department of Critical Care Medicine, Education Committee, Member
University of Pittsburgh School of Medicine - Curriculum Committee Imaging Task Force, Member
UPMC - MCCTP IM/EM Clinical Competency Committee, Other
UPMC - Clinical Curriculum Reform Taskforce
Society of Critical Care Medicine – Critical Care Ultrasound Adult Committee
Society of Critical Care Medicine – Faculty development subcommittee
Society of Critical Care Medicine - Education Research Committee

Honors & Recognitions
Professional Accolade, University of Pittsburgh School of Medicine

Editorships
Editorial Board: Emergency Medicine
Reviewer: Critical Care Medicine, Journal of General Internal Medicine (JGIM), and Journal of Ultrasound in Medicine (JUM)

Matthew Siedsma, MD
Assistant Professor, Critical Care Medicine

Professional Affiliations
American College of Emergency Physicians
American Thoracic Society
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
University of Pittsburgh School of Medicine - Director of Residency Education, Department of Critical Care Medicine
University of Pittsburgh - Clinical Competency Committee, Member
UPMC - Faculty Interviewer for Critical Care Medicine Fellow Recruitment, Member
UPMC - UPMC ICU Service Center Formulary Committee - Working Group, Member
UPMC Mercy - Mortality Support Committee, Member
David Wallace, MD, MPH
Assistant Professor, Critical Care Medicine
Assistant Professor, Emergency Medicine, Secondary Appointment

Professional Affiliations
Alpha Omega Alpha Medical Honor Society
American Medical Association
American Thoracic Society

Study Sections & Advisory Committee Memberships
Agency for Healthcare Research and Quality Healthcare Safety and Quality Improvement Research (HSQIR) Study Section, Reviewer
University of Pittsburgh - CRISMA Conference, Director
University of Pittsburgh – Critical Care Medicine Journal Club, Director
University of Pittsburgh - Anesthesiology Critical Care Fellowship Interview Committee, Member
University of Pittsburgh - Internal Medicine Clinical Competency Committee, Member
University of Pittsburgh - Internal Medicine Fellowship Interview Committee, Member

Research Assistant Professor

David Emlet, PhD
Research Assistant Professor, Critical Care Medicine

Professional Affiliations
American Physiological Society
American Society of Nephrology
American Association for Cancer Research

Editorships
Ad Hoc Reviewer: Journal of Enzyme Inhibition and Medicinal Chemistry

Xiaoyan Wen, MD, MSc
Research Assistant Professor, Critical Care Medicine

Professional Affiliations
American Society of Cell Biology
American Society of Nephrology

Other Faculty

Emily Brant, MD
Clinical Instructor, Critical Care Medicine

Lillian Emlet, MD, MS, FACEP, FCMM
Clinical Associate Professor, Critical Care Medicine
Associate Program Director, Internal Medicine-Critical Care Fellowship
Howard Ferimer, MD  
Clinical Assistant Professor, Critical Care Medicine  
Attending Staff Intensivist, Critical Care Medicine, UPMC Mercy

Bachar Hamade, MD, MSc  
Adjunct Assistant Professor

John Hotchkiss, MD  
Clinical Associate Professor, Critical Care Medicine

Tim Kaselitz, MD, MPH  
Clinical Assistant Professor of Critical Care Medicine

Hyung Kook Kim, MD  
Clinical Assistant Professor, Critical Care Medicine

Linas Mockus, MD  
Clinical Assistant Professor, Critical Care Medicine

Alexander Preus, MD  
Clinical Assistant Professor, Critical Care Medicine

Nakul Raykar MD, MPH  
Clinical Assistant Professor

Alan Rosenbloom, MD  
Adjunct Assistant Professor, Critical Care Medicine
Pediatric Critical Care Division

Professor

Rajesh Aneja, MD
Professor, Critical Care Medicine
Professor, Pediatrics, Secondary Appointment
Clinical Chief, Pediatric Critical Care, UPMC Children’s Hospital of Pittsburgh
Medical Director, Pediatric Intensive Care Unit, UPMC Children’s Hospital of Pittsburgh

Professional Affiliations
American Academy of Pediatrics
Shock Society
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
NIH/NICHD SEP CHHD-A, Member
UPMC Children’s Hospital of Pittsburgh - ER Division Chief search committee, Member
UPMC Children’s Hospital of Pittsburgh - Telehealth Steering Committee meeting, Member
UPMC Children’s Hospital of Pittsburgh - Central Line Committee, Member
UPMC Children’s Hospital of Pittsburgh - ICU Antibiotic Stewardship Committee, Member
UPMC Children’s Hospital of Pittsburgh - Pharmacy and Therapeutics Committee, Member
UPMC - PSD Physician Clinical Quality Leadership Committee, Member
Society of Critical Care Medicine - Scientific Organizing Committee, Member
Society of Critical Care Medicine - COVID-19 Virus Registry Ancillary Proposals Review
Ad Hoc Reviewer Special Emphasis Panel ZHD1 DSR-T (50)/Pediatric Critical Care Conferences

Editorships

Hülya Bayır, MD
Professor with Tenure, Critical Care Medicine
Professor, Environmental and Occupational Health, Graduate School of Public Health, Secondary Appointment
UPMC Endowed Chair in Critical Care Pediatric Research
Director, Children’s Neuroscience Institute
Academic Chief, Pediatric Critical Care Medicine
Research Director, Pediatric Critical Care Medicine
Associate Director, Safar Center for Resuscitation Research
Associate Director, Center for Free Radical and Antioxidant Health

Professional Affiliations
The American Society for Clinical Investigation
The Association of American Physicians
Neurotrauma Society
Society For Neuroscience

Study Sections & Advisory Committee Memberships
National Institutes of Health, DNDA - Acute Neuronal Injury and Epilepsy Study Section, Member
Nestle Health Science - ICU Acquired Weakness Advisory Board, Member
Pediatric Neurocritical Care Research Group (PNCRG) - Translational Biology Subcommittee, Co-chair
UPMC Children’s Hospital of Pittsburgh - Ann Thompson Scholarship Review Committee, Member
Department of Critical Care Medicine - Promotions and Tenure Committee, Member

**Major Lectureships**

- Oxidative Lipid Signaling in Neuronal Death Programs in Brain Trauma, presented to Puerto Rico Physiological Society Annual Meeting, Invited 2020
- Redox biology of lipids and its impact on neuronal diseases, presented to 5th Lipidomics Forum, Invited 2019
- Order to Chaos Transition: Lipid Signals of Death in Acute Brain Injury, presented to Ankara University Department of Pediatrics research Grand Rounds, Invited 2019
- Ferroptosis in the Pathogenesis of Acute Kidney Injury, presented to The Acute Kidney Injury Conference: From Bench to Bedside, the Federation of American Societies for Experimental Biology, Invited 2019

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**Joseph Carcillo, MD**

Professor, Critical Care Medicine  
Professor, Pediatrics, Secondary Appointment

**Professional Affiliations**

- American Academy of Pediatrics
- Society for Pediatric Research
- Society of Critical Care Medicine
- Society of Thrombosis and Hemostasis

**Study Sections & Advisory Committee Memberships**

- National Institutes of Health - NICHD Pediatrics Study Section, Member
- UPMC Children’s Hospital of Pittsburgh - General Clinical Research Center IRB, Member
- University of Pittsburgh School of Medicine - Anesthesia Department Scientific Affairs Committee Grant Review Subcommittee, Member
- UPMC - Center for Clinical Pharmacology, Member

**Editorships**

- Editorial Board: Critical Care Medicine  
- Associate Editor: Pediatric Critical Care Medicine

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**Robert Clark, MD**

Professor, Critical Care Medicine  
Professor, Pediatrics, Secondary Appointment  
Vice Chair of Pediatric Critical Care  
Endowed Chair in Pediatric Critical Care Medicine  
Medical Director, UPMC Children’s Hospital of Pittsburgh, Brain Care Institute  
Associate Director, Safar Center for Resuscitation Research

**Professional Affiliations**

- American Academy of Pediatrics
- Neurotrauma Society  
- Society for Neuroscience  
- Society for Pediatric Research  
- Society of Critical Care Medicine

**Study Sections & Advisory Committee Memberships**

- National Institutes of Health - BD CN-W (04) M Member Conflict: Traumatic Brain Injury, Cerebrovascular Disorders, and Epilepsy, Reviewer
- National Institutes of Health - Brain Injury and Neurovascular Pathologies Study Section, Reviewer
- National Institutes of Health - ZRG1 F01A-F (21) F Brain Disorders and Related Neuroscience Special Emphasis Panel, Reviewer
- National Institutes of Health - NINDS Developmental Brain Disorders Study Section, Reviewer
- University of Pittsburgh School of Medicine - Critical Care Medicine Executive Clinical Committee, Member
- University of Pittsburgh School of Medicine - Critical Care Medicine Executive Council Committee, Member
University of Pittsburgh School of Medicine - Critical Care Medicine Executive Steering Committee, Member
University of Pittsburgh School of Medicine - Critical Care Medicine Core Operations Committee, Member
University of Pittsburgh School of Medicine - Critical Care Medicine Promotions and Reappointments Committee, Member
University of Pittsburgh School of Medicine - Critical Care Medicine Scientific Affairs Committee, Member

**Major Lectureships**

A Novel Approach to Drug Development and Therapeutic Monitoring for Severe TBI in Children 37th Annual National Neurotrauma Society Symposium, Pittsburgh

Pediatric TBI: From ABC to ICP Pediatric Critical Care Fellow Lecture, Children’s Hospital of Pittsburgh 2019

Preventing Neuropathological Consequences of Critical Illness Using BRAIN A-I Pediatric Neurocritical Care Research Group, Vancouver, British Columbia

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**Patrick Kochanek, MD, MCCM**

Distinguished Professor, Critical Care Medicine
Professor, Pediatrics, Anesthesiology, Bioengineering, Clinical and Translational Science, Secondary Appointments
Vice Chair, Critical Care Medicine
Director, Safar Center for Resuscitation Research

**Professional Affiliation**

American Association for The Advancement of Science
Council on Cardiopulmonary and Critical Care, American Heart Association Fellow, American Academy of Pediatrics
International Neurotrauma Society
International Society of Cerebral Blood Flow and Metabolism
National Neurotrauma Society
New York Academy of Sciences
Pennsylvania Society of Critical Care Medicine
Society for Neuroscience in Anesthesiology and Critical Care
Society for Pediatric Research
Society of Critical Care Medicine
Society of Neurosurgical Anesthesia and Critical Care
Stroke Council, American Heart Association
The American Association of Neurological Surgeons, Associate Member
World Association of Medical Editors

**Study Sections & Advisory Committee Memberships**

Grant reviewer: NIH/NINDS/NSDA Study Section, NIH/NICHD T32 Special Emphasis Panel

**Honors & Recognitions**

Distinguished Professor of Critical Care Medicine
Pitt Innovator Award
Inaugural Linsalata Chair Visiting Professor of Critical Care Medicine, Rainbow Babies and Children’s Hospital, Cleveland, Ohio

**Editorships**

Editor-in-Chief: Pediatric Critical Care Medicine
Editorial Board: Critical Care Medicine, Critical Care Explorations, Journal of Neurotrauma, Neurocritical Care, Neurotrauma Reports, Therapeutic Hypothermia and Temperature Management

**Major Lectureships**

There is no Problem; You Just Have to Understand the Challenges and How to Interpret the Data, presented to 49th SCCM Critical Care Congress, Orlando, FL, Invited

Intensive Treatment Following New Guidelines, presented to International Symposium on Traumatic Brain Injury, Bergamo, Italy, Invited

Biomarkers in Pediatric TBI as Outcome Predictors, presented to International Symposium on Traumatic Brain Injury, Bergamo, Italy, Invited

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ADAPT Study: Methods and Preliminary Results, presented to International Symposium on Traumatic Brain Injury, Bergamo, Italy, Invited
New Therapies and Diagnostics for Cardiac Arrest in Traumatic Brain Injury: Studies from the Safar Center for Resuscitation Research, presented to Grand Rounds, Department of Pediatrics, Stanford University Medical Center, Palo Alto, CA
From Hypothermia to Rehabilitation: Targeting New Therapies for Traumatic Brain Injury and Cerebral Resuscitation, presented to Center for Shock Trauma and Anesthesiology Research (STAR), University of Maryland, Invited
From Hypothermia to Rehabilitation: Targeting New Therapies for Traumatic Brain Injury and Cardiac Arrest in Children, presented to The Inaugural Linsalata Chair visiting Professor Lectureship, Rainbow Babies and Children’s Hospital, Cleveland, Ohio, Invited
Lessons Learned from 19 Years as Editor-in-Chief of Pediatric Critical Care Medicine, presented to Visiting Professor, Rainbow Babies and Children’s Hospital, Cleveland, Ohio, Invited
Lessons from the OBTT: Do’s and Don’t’s in Planning / Executing a pRCT, presented to Wiggers Bernard Conference, Chania Crete, Invited
From Hypothermia to Rehabilitation: Targeting New Therapies for Traumatic Brain Injury and Cardiac Arrest, presented to Ludwig Boltzman Institute for Experimental and Clinical Traumatology, Vienna, Austria, Invited
From Hypothermia to Rehabilitation: Targeting New Therapies for Traumatic Brain Injury and Cardiac Arrest in Children, presented to Grand Rounds, Department of Pediatrics, Children’s Hospital of Atlanta, Emory University, Invited
From the Pediatric ICU to the Battlefield: Targeting new therapies and diagnostics for traumatic brain injury and cardiac arrest, presented to Symposium in Honor of John Hallenbeck, MD, NIH Natcher Auditorium, Invited

Ann Thompson, MD, MHCPN
Professor, Critical Care Medicine
Vice Dean, University of Pittsburgh School of Medicine
Professor, Pediatrics, Secondary Appointment

Professional Affiliation
American Academy of Pediatrics
American Academy of Pediatrics, Section on Critical Care
Association of University Anesthesiologists
Pediatric Acute Lung Injury and Sepsis Investigators Network
Society of Critical Care Medicine

Study Section & Advisory Committee Memberships
Society of Critical Care Medicine – Diversity and Inclusion Committee, Member
University of Pittsburgh School of Medicine - Forum on Women in Medicine and Science Program Committee, Chair

Editorships
Editorial Board: Pediatric Critical Care Medicine, Jornal de Pediatria
Reviewer: Critical Care Medicine, Annals of Otolaryngology, Pediatric Emergency Care, Pediatric Pulmonology, Archives of Pediatrics & Adolescent Medicine, Pediatric Critical Care Medicine, Pediatrics, Journal of Pediatrics

Major Lectureship
A History of PCCM as I’ve Known It and Some Personal Hopes for Its Future, 2019
Lecture to Division of Critical Care Medicine World Shared Practice Forum – OPENPedics, Visiting Professor in Critical Care Medicine, Boston Children’s Hospital, Harvard Medical School Critical Care: A bit of history and some personal hopes for its future, 2019
25th Annual Ake and Inger Greinvik Lecture UPSOM Critical Care Grand Rounds, invited
Shekhar Venkataraman, MBBS
Professor, Critical Care Medicine
Professor, Pediatrics, Secondary Appointment

Professional Affiliations
American Academy of Pediatrics
American Heart Association
American Medical Association
American Thoracic Society
Society of Critical Care Medicine

Study Section & Advisory Committee Memberships
UPMC Children’s Hospital of Pittsburgh - VAP Committee, Member
JIPMER Medical School - JIPMER Alumni Association of North America, President

Major Lectureship
- Ergotrauma, presented to Advanced International Pediatric Intensive Care Conference (AIPIC - 2019), Invited, 2019
- Ethics, presented to Advanced International Pediatric Intensive Care Conference (AIPIC - 2019), Invited, 2019
- How to get a paper published, presented to Advanced International Pediatric Intensive Care Conference (AIPIC - 2019), Invited, 2019
- Ventilatory strategy for post-operative left-to-right shunts, presented to Advanced International Pediatric Intensive Care Conference (AIPIC - 2019), Invited, 2019
- Expiratory flow limitation, presented to Advanced International Pediatric Intensive Care Conference (AIPIC - 2019), Invited, 2019
- VAP-diagnostic methods, presented to Advanced International Pediatric Intensive Care Conference (AIPIC - 2019), Invited, 2019
- Intraarterial balloon pump, presented to Advanced International Pediatric Intensive Care Conference (AIPIC - 2019), Invited, 2019
- Microcirculatory Management, presented to Advanced International Pediatric Intensive Care Conference (AIPIC - 2019), Invited, 2019

Associate Professor

Cameron Dezfulian, MD, FAHA
Associate Professor, Critical Care Medicine
Associate Professor, Clinical and Translational Sciences, Secondary Appointment

Professional Affiliations
American Fisheries Society
American Heart Association
American Medical Association
American Thoracic Society
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
- American Heart Association - SFRN Study Section (Sudden Cardiac Death and Arrhythmias), Basic Projects, Member, 2019
- American Heart Association - SFRN Study Section (Sudden Cardiac Death and Arrhythmias), Center Awards, Member, 2019
- American Heart Association - 3CPR Early Career Committee, Chair, 2019
- American Heart Association - 3CPR Leadership Committee, Member, 2019
- American Heart Association - 3CPR SCIL (programming) Committee, Member, 2019
- American Heart Association - Fellow Research Day Task Force, Member, 2019
- American Heart Association - Science Subcommittee, Emergency Cardiovascular Care Committee, Member, 2019
- University of Pittsburgh School of Medicine - Cardiovascular Education, Pediatric Critical Care Medicine Training Program, Chair, 2019
- University of Pittsburgh School of Medicine - Education Committee, Critical Care Department, Member, 2019
- University of Pittsburgh School of Medicine - Internal Medicine/Critical Care Medicine Clinical Competency Committee, Member, 2019
- University of Pittsburgh School of Medicine - Resuscitation Area of Concentration, Co-chair, 2019
- UPMC Mercy - Resuscitation Committee, Member, 2019
Major Lectureship
What we know and don’t know about opioid associated OHCA, presented to Neurology Grand Rounds, University of Miami, Miami, FL 2019
Opioid Associated OHCA, presented to Resuscitation Sciences Symposium, Philadelphia, PA 2019
Moderator, 3CPR early career Shark Tank, AHA Scientific Sessions, Philadelphia, PA 2019
Opioid Associated OHCA, presented to Citizen’s Cardiac Arrest Survivor’s Conference, Seattle, WA Moderator, 3CPR early career Shark Tank, AHA Scientific Sessions, Philadelphia, PA 2019
Opioid Associated OHCA, presented to Citizen’s Cardiac Arrest Survivor’s Conference, Seattle, WA 2019

Ericka Fink, MD, MS
Associate Professor, Critical Care Medicine
Associate Professor, Pediatrics, Secondary Appointment
Associate Professor, Clinical and Transnational Science, Secondary Appointment
Associate Director, Safar Center for Resuscitation Research, University of Pittsburgh School of Medicine
Director, Critical Illness Recovery for Children

Professional Affiliations
American Heart Association
Pediatric Acute Lung Injury and Sepsis Investigators Network (PALISI)
Pediatric Neurocritical Care Research Group (PNCRG)
Society of Critical Care Medicine
World Health Organization

Study Sections & Advisory Committee Memberships
National Institutes of Health, NINDS Special Emphasis Panel, Clinical Trial Network NeuroNEXT centers, Reviewer
National Institutes of Health - Early Career Reviewer Program, Center for Scientific Review, Reviewer
American Board of Pediatrics - Subboard of Pediatric Critical Care Medicine, Appointed Member
UPMC Children’s Hospital of Pittsburgh - CHP Emergency Preparedness Leadership Committee, Member
UPMC Children’s Hospital of Pittsburgh - Global Health Focus, Co-Director, Other
Pediatric Acute Lung Injury and Sepsis Investigators Network (PALISI) - Global Health Subcommittee, Co-chair

Editorships
Editorial Advisory Panel: Scientific Reports (Critical Care Medicine member)

COVID-19, presented to Division of Pediatric Critical Care Medicine Journal Club, Invited 2020
One Academic Career in Pediatric Critical Care, presented to Clinical and Translational Science Institute, 2020
CLRES 2820 Special Topics in Clinical Trials course, Invited

Melinda Hamilton, MD, MS
Associate Professor, Critical Care Medicine
Director, Pediatric Critical Care Medicine Fellowship Program
Director, Pediatric Simulation, UPMC Children’s Hospital of Pittsburgh Simulation Center and Peter M. Winter Institute for Simulation, Education, and Research

Professional Affiliations
American Academy of Pediatrics
International Pediatric Simulation Society
Society for Simulation in Healthcare
Society of Critical Care Medicine

Study Section & Advisory Committee Memberships
UPMC Children’s Hospital of Pittsburgh - Pediatric Residency Clinical Pathways Program, CCM Advisor
UPMC Children’s Hospital of Pittsburgh - Residency Review Committee, Member
UPMC Children’s Hospital of Pittsburgh - Telemedicine Program and Steering Committee, Education Director
UPMC - 18th Annual UPMC GME Leadership Conference, Abstract Team Leader and Meeting Committee, Co-chair
UPMC - Graduate Medical Education Research Collaborative (GMERC), Co-chair
UPMC - Professional Development Subcommittee, UPMC Graduate Medical Education Committee, Co-chair

Editorships
Reviewer: Pediatric Critical Care Medicine, Simulation in Healthcare, American Heart Association Educational Products

Justin Yeh, MD
Associate Professor, Critical Care Medicine and Pediatrics
Division Chief, Pediatric Cardiac Critical Care Medicine, UPMC Children’s Hospital of Pittsburgh
Co-Director, Children’s Health Institute, UPMC Children’s Hospital of Pittsburgh

Professional Affiliations
International Society for Heart and Lung Transplantation
Pediatric Cardiac Critical Care Consortium
Pediatric Cardiac Intensive Care Society
Society of Critical Care Medicine
Western Academy of Pediatrics

Study Sections and Advisory Committee Memberships
University of Pittsburgh School of Medicine - Critical Care Medicine Executive Operations Committee, Member
University of Pittsburgh School of Medicine - Critical Care Medicine Executive Vice Chair Committee, Member
University of Pittsburgh School of Medicine - Critical Care Medicine Promotions and Reappointment Committee, Member

Editorships
Reviewer: The American Journal of Cardiology, British Medical Journal, Clinical Cardiology, Congenital Heart Disease, Journal of Critical Care, Pediatric Anesthesia, Pediatric Cardiology, and Pediatrics

Major Lectureships
Frontiers in Cardiac Intensive Care: Critical Illness and Neurodevelopment, 2019
presented to Critical Care Medicine Grand Rounds, Invited

Assistant Professor

Alicia Au, MD, MS
Assistant Professor, Critical Care Medicine
Associate Medical Director, Pediatric Intensive Care Unit, UPMC Children’s Hospital of Pittsburgh

Professional Affiliations
American Academy of Pediatrics
Pediatric Neurocritical Care Research Group (PNCRG)
Society of Critical Care Medicine

Study Sections & Advisory Committee Memberships
UPMC Pediatric Critical Care Fellowship Program - Morbidity and Mortality Conference, Director
UPMC Pediatric Critical Care Fellowship Program - Clinical Competency Committee, Member
UPMC Pediatric Critical Care Fellowship Program - Program Evaluation Committee, Member
UPMC Pediatric Critical Care Fellowship Program - Wellness Taskforce, Member
Yolande Bell-Cheddar, MD/MBBS, MSc
Assistant Professor, Critical Care Medicine

Professional Affiliations
American Academy of Pediatrics
American Board of Pediatrics
American College of Cardiology
Pediatric Cardiac Intensive Care Society

Matthew Bochkoris, MD
Assistant Professor, Critical Care Medicine
Assistant Professor, Pediatrics, Secondary Appointment
Program Director, Pediatric Cardiac Critical Care Medicine Fellowship Training Program
Co-Director, Pediatric Medical Transport Team

Professional Affiliations
American Academy of Pediatrics
Society of Critical Care Medicine

Yuliya Domnina, MD
Assistant Professor, Critical Care Medicine
Director of Quality, Pediatric Cardiac ICU
Program Director, Pediatric Cardiac Recovery

Professional Affiliations
Pediatric Cardiac Intensive Care Society
Society of Critical Care Medicine
World Society of Pediatric and Congenital Heart Surgery

Study Sections & Advisory Committee Memberships
Pediatric Cardiac Critical Care Consortium (PC4) - Database Committee, Member
UPMC Children’s Hospital of Pittsburgh - CICU ID Committee, Co-chair
UPMC Children’s Hospital of Pittsburgh - CICU Morbidity and Mortality Conference Committee, Chair
UPMC Children’s Hospital of Pittsburgh - CICU QI Database “Retrospective Review and Evaluation of Complications in the CICU,” Chair
UPMC Children’s Hospital of Pittsburgh - CICU Quality Database and Telemedicine Database, Director
UPMC Children’s Hospital of Pittsburgh - Early Mobility Protocol Development Committee, Member

Idris Evans, MD, MSc
Assistant Professor, Critical Care Medicine
Medical Co-Director, Pediatric Transport Team, Children’s Hospital of Pittsburgh

Professional Affiliations
American Medical Association
Alpha Omega Alpha Medical Honor Society

Study Sections and Advisory Committee Memberships
UPMC Children’s Hospital of Pittsburgh - PICU Advanced Practice Provider Fellowship Curriculum Committee, Director
UPMC Children’s Hospital of Pittsburgh - PICU/Residency Council, Member
Editorships
Reviewer for Critical Care Medicine

Major Lectureships
Latent class analysis of pediatric patients with sepsis at community hospitals, presented to Canadian Critical Care Forum, Invited 2019

Dana Fuhrman, DO, MS
Assistant Professor, Critical Care Medicine
Assistant Professor, Pediatrics, Secondary appointment
Associate Program Director, Pediatric Critical Care Medicine Fellowship
Co-Director, Continuous Renal Replacement Therapy Program, UPMC Children’s Hospital of Pittsburgh

Professional Affiliations
American Society of Nephrology
American Society of Pediatric Nephrology
National Kidney Foundation
Society of Critical Care Medicine

Editorships
Reviewer for Journal of the American Society of Nephrology, Frontiers in Pediatrics, Nephrology Dialysis Transplantation, Physiological Reports, and Pediatric Critical Care Medicine

Study Section & Advisory Committee Memberships
UPMC Children’s Hospital of Pittsburgh - Ethics Committee, Physician representative

Major Lectureships
Urinary Biomarkers for the Prediction of AKI in Pediatric Liver Transplant Patients, presented to University of Pittsburgh Nephrology and Urology Research Affinity Group, Invited 2020

Elizabeth A. Herrup, MD
Assistant Professor, Critical Care Medicine

Professional Affiliations
Cardiac Neurodevelopmental Outcome Collaborative
Pediatric Cardiac Intensive Care Society
Society of Critical Care Medicine
American Academy of Pediatrics

Christopher Horvat, MD, MHA
Assistant Professor, Critical Care Medicine
Assistant Professor, Pediatrics, Secondary appointment
Director, Condition A/C (Medical Emergency Response Teams), UPMC Children's Hospital of Pittsburgh
Director, Health Informatics for Clinical Effectiveness, UPMC Children's Hospital of Pittsburgh
UPMC Consulting Intensivist for Solid Organ Transplant Recipients, Florida Hospital for Children
UPMC Visiting Pediatric Cardiac Intensive Care Attending Physician, St. Joseph’s Children’s Hospital of BayCare Health
UPMC Visiting Pediatric Intensive Care Attending Physician, St. Joseph’s Children’s Hospital of BayCare Health
Professional Affiliations
American Academy of Pediatrics
American Medical Association
Society of Critical Care Medicine

Honors & Recognition
Senior author, SCCM Annual Congress Abstract Star Research Award 2020

Study Section & Advisory Committee Memberships
American Medical Informatics Association - Annual Symposium, Reviewer
Society of Critical Care Medicine - Pediatric Critical Care Ultrasound Committee, Member
UPMC Children’s Hospital of Pittsburgh - EHR-Integration of Randomized Embedded Multifactorial Adaptive Platform clinical trials, Lead
UPMC Children’s Hospital of Pittsburgh - Acuity Index Development Group, Lead, Other
UPMC Children’s Hospital of Pittsburgh - Co-lead, Inpatient Sepsis Performance Improvement Team, Other
UPMC Children’s Hospital of Pittsburgh - Health Information Management Committee, Member
UPMC Children’s Hospital of Pittsburgh - ICU Service Line Steering Committee, Member
UPMC Children’s Hospital of Pittsburgh - Lead, Improving Pediatric Sepsis Outcomes (IPSO) Committee, Other
UPMC Children’s Hospital of Pittsburgh - Point-of-Care Ultrasound Committee, Member

Editorships
Reviewer: British Medical Journal Open, Critical Care Nurse, International Journal of Environmental Research and Public Health, JAMA Pediatrics, Medical Decision Making, Multimodal Technologies and Interaction, Neurocritical Care, Pediatric Critical Care Medicine, Pediatric Diabetes, Pediatrics, and Scientific Reports

Kathryn Kernan, MD, MFA
Assistant Professor, Critical Care Medicine

Professional Affiliations
Society of Critical Care Medicine
American Medical Association

Study Section & Advisory Committee Memberships
UPMC Children’s Hospital of Pittsburgh - Code medication ordering in-service teaching video for critical care staff, Other
UPMC Children’s Hospital of Pittsburgh - Departmental teaching of sodium disorders in critical illness, Other
UPMC Children’s Hospital of Pittsburgh - ECMO Cannulation Checklist for multidisciplinary care team, Other
UPMC Children’s Hospital of Pittsburgh - National Emergency Airway Registry for Children (NEAR4KIDS) Committee, Member

Editorships
Review Editor: Frontiers in Pediatric Critical Care

Nahmah Kim-Campbell, MD, MS
Assistant Professor, Critical Care Medicine
Assistant Professor, Pediatrics, Secondary Appointment

Professional Affiliations
American Heart Association
Society of Critical Care Medicine
Jiuann Huey (Ivy) Lin, MD, PhD
Assistant Professor, Critical Care Medicine

Professional Affiliations
American College of Cardiology
American Heart Association
Society of Critical Care Medicine

Sarah Rubin, MD
Assistant Professor, Critical Care Medicine
Assistant Professor, Pediatrics, Secondary Appointment

Professional Affiliations
American Medical Informatics Association
American Thoracic Society
Society of Critical Care Medicine

Study Section & Advisory Committee Memberships
UPMC Children’s Hospital of Pittsburgh - Fellowship Advisory Committee, Member
Department of Critical Care Medicine - Core Operations Team, Member

Joan Sanchez de Toledo, MD, PhD
Assistant Professor, Critical Care Medicine

Professional Affiliations
Asociación Española de Pediatría y Societat Catalana de Pediatría
European Society of Pediatric and Neonatal Intensive Care (ESPNIC)
Sociedad Española de Cuidados Intensivos Cardiacos

Study Sections & Advisory Committee Memberships
Society of Critical Care Medicine - Point of Care Ultrasonography Working Group, Member

Dennis Simon, MD
Assistant Professor, Critical Care Medicine
Director, Pediatric Neurocritical Care
Associate Director, Safar Center for Resuscitation Research, Critical Care Medicine

Professional Affiliations
American Academy of Pediatrics
National Neurotrauma Society
Neurocritical Care Society
Society of Critical Care Medicine

Major Lectureships
Pediatric Critical Care and Trauma, presented to Health Ministry Regulatory Authority, Invited 2020
Visiting Associate Professor

Robert Bart, MD
Visiting Associate Professor, Critical Care Medicine
Chief Medical Information Officer, UPMC Health Services Division

Professional Affiliations
Society for Neuroscience
Society of Critical Care Medicine

Major Lectureships
No, I’m Not Trying to Make You Miserable: Trying to Make the EHR Work for You, UPMC Physician Well-Being Symposium 2020
Panelist: “Precision Medicine: Science, Startups and Safeguards.”, UPMC Top of the Mind Summit, Invited 2019
Panelist: “Shaping the Future: Models of Integrated Care at UPMC”, UPMC Top of the Mind Summit, Invited 2019
Panelist: “Intelligence Power Session.”, presented to Cerner Healthcare Conference, Invited 2019

Research Assistant Professor

Tamil Anthonymuthu, PhD
Research Assistant Professor, Critical Care Medicine

Study Sections & Advisory Committee Memberships
Academic Editor: Plos ONE
Ad-hoc reviewer for Nature protocols, Nature communications, Communication Biology, Bioinformatics, Plos ONE, Chemistry and Biology of Lipids, Archives of Biochemistry and Biophysics, Brain research

Professional Affiliations
American Society for Mass Spectrometry
American Chemical Society
Society for Neurosciences

Other Faculty

Zachary Aldewerelde, MD
Assistant Professor of Critical Care Medicine and Pediatrics

Rod Ghassemzadeh, MD
Assistant Professor of Critical Care Medicine and Pediatrics

Shashikanth Gangu, MD
Clinical Assistant Professor, Critical Care Medicine
Medical Director of Pediatric Cardiac Critical Care Unit, Saint Joseph’s Children’s Hospital, Tampa, Florida

Jerril W. Green, MD
Clinical Assistant Professor, Critical Care Medicine
Medical Director, Pediatric Intensive Care Unit St. Joseph Children’s Hospital Tampa

LaTasha M. Lewis, MD
Medical Director of Inpatient Pediatrics
Pediatric Cardiac Intensivist, University of Pittsburgh
Pediatric Intensivist, Weatherby Healthcare, Fort Lauderdale
Michelle Ruiz, MD  
Clinical Instructor

Taylor Wheaton, MD  
Clinical Instructor

Qin Yang, MD, MS  
Research Instructor, Critical Care Medicine

Summary of Employees

<table>
<thead>
<tr>
<th>Employee Status</th>
<th>FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty – full-time</td>
<td>54</td>
</tr>
<tr>
<td>Faculty – part-time</td>
<td>2</td>
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<tr>
<td>Faculty – volunteer</td>
<td>5</td>
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<tr>
<td>Staff</td>
<td>103</td>
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</tbody>
</table>

Faculty Promotions

<table>
<thead>
<tr>
<th>Name</th>
<th>Promotion Effective Date</th>
<th>Academic Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rod Ghassemzadeh M.D.</td>
<td>July 1, 2019</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Elizabeth Herrup MD</td>
<td>July 15, 2019</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Rachel Sackrowitz MD, MBA</td>
<td>July 1, 2019</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Penny Sappington MD</td>
<td>August 1, 2019</td>
<td>Associate Professor</td>
</tr>
</tbody>
</table>
## Faculty New Hires

<table>
<thead>
<tr>
<th>Name</th>
<th>Previous Location</th>
<th>Previous Rank</th>
<th>Current Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jonathan Bishop, MD, MBA</td>
<td>Wake Forest University School of Medicine</td>
<td>Associate Professor</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Michelle Elias Ruiz, MD, FAAP</td>
<td>Cleveland Clinic Children's</td>
<td>Neonatology Staff</td>
<td>Clinical Instructor</td>
</tr>
<tr>
<td>Rod Ghassemzadeh, MD</td>
<td>Stanford University Medical Center</td>
<td>PCCM Fellow</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Bachar Hamade, MD, MSc</td>
<td>UPMC</td>
<td>Adult Critical Care Medicine Fellow</td>
<td>Adjunct Assistant Professor</td>
</tr>
<tr>
<td>Elizabeth Herrup, MD</td>
<td>The Children's Hospital of Philadelphia</td>
<td>Pediatric Cardiac Critical Care Fellow</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Nakul Raykar MD, MPH</td>
<td>UPMC</td>
<td>Adult Critical Care Medicine Fellow</td>
<td>Clinical Assistant Professor</td>
</tr>
<tr>
<td>Rachel Sackrowitz, MD, MBA</td>
<td>Advanced ICU Care</td>
<td>Chief Medical Officer</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Taylor Wheaton, MD</td>
<td>St. Christopher's Hospital for Children</td>
<td>Pediatric Critical Care Fellow</td>
<td>Clinical Instructor</td>
</tr>
</tbody>
</table>
Bibliography
(July 1, 2019 – September 30, 2020)

Adult Critical Care Division

Ali Al-Khafaji, MD, MPH


Derek Angus, MD, MPH


Marie Baldisseri, MD, MPH

Jonathan Bishop, MD, MBA

Brad Butcher, MD

Sherry Chou, MD, MMSc


Gilles Clermont, MD, MSc


Joseph Darby, MD


David Emlet, PhD


Timothy Girard, MD, MSCI


Hernando Gómez

Scott Gunn, MD

David Huang, MD, MPH


Ruchira Jha, MD


Jeremy Kahn, MD, MS


Ata Murat Kaynar, MD, MPH


John Kellum, MD


Kullmar, M., Massoth, C., Ostermann, M., Campos, S., Grau Novellas, N., Thomson, G., . . . Zarbock, A. (2020). Biomarker-guided implementation of the KDIGO guidelines to reduce the occurrence of acute kidney injury in patients after cardiac surgery (PrevAKI-


Florian Mayr, MD, MPH


Deepika Mohan, MD, MPH


Holt Murray, MD


Raghavan Murugan, MD, MS


Michael Pinsky, MD


Raj Ramanan, MD


Kristina Rudd, MD, MPH


Rachel Sackrowitz, MD, MBA

Penny Sappington, MD


Christopher Schott, MD, MS


Christopher Seymour, MD, MSc


Lori Shutter, MD


David Wallace, MD, MPH


Xiaoyan Wen, MD, MS


Douglas White, MD, MAS


Sachin Yende, MD, MS


Pediatric Critical Care Division

Rajesh Aneja, MD


Tamil Selvan Anthonymuthu, PhD

Alicia Au, MD, MS


Hülya Bayır, MD


Matthew Bochkoris, MD

Joseph Carcillo, MD


Robert Clark, MD


Cameron Dezfulian, MD


Ericka Fink, MD, MS


Dana Fuhrman, DO, MS


Elizabeth Herrup, MD


Christopher Horvat, MD, MHA


Kathryn Kernan, MD, MFA


Nahmah Kim-Campbell, MD, MS


Patrick Kochanek, MD

Lafrenaye, A. D., Mondello, S., Wang, K. K., Yang, Z., Povlishock, J. T., Gorsc, K., . . . Kochanek, P. M. (2020). Circulating GFAP and Iba-1 levels are associated with pathophysiological sequelae in the thalamus in a pig model of mild TBI. Scientific Reports, 10(1). doi:10.1038/s41598-020-70266-w


Jiann Huey Lin, MD, PhD


Joan Sanchez de Toledo, MD, PhD


Dennis Simon, MD


Ann Thompson, MD

Shekhar Venkataraman, MBBS


Qin Yang, MD, MS