Division Introduction

The Division of Pediatric Critical Care plays a vital role in providing care to critically ill children at Children’s Health™ and is continuously making improvements and innovations to ensure the patient care provided is of the highest quality.

Under the direction of Jessica Moreland, M.D., Division Chief, the Division provides top quality care with all of the most recent medical advanced technologies in the 44-bed Pediatric Intensive Care Unit. In addition, Critical Care faculty, in collaboration with the Division of Pediatric Cardiology and the Heart Center at Children’s Health™, provide state-of-the-art cardiovascular critical care services for children with congenital heart disease as well as other cardiac diseases in the 30-bed Cardiovascular Intensive Care Unit. The Division also provides intensive care in the Children’s Medical Center in Plano in a 12-bed PICU.

The Division has a long-standing history of clinical, bench, and translational research, with several NIH-funded laboratories and regular participation in multi-center clinical trials to advance the care of critically ill children.

Some of the country's brightest pediatric graduates enroll in the Division’s internationally recognized Critical Care Fellowship Program, one of the oldest and largest of its kind in the United States. Teaching of fellows, residents, and medical students takes place at the bedside and during lectures and interactive sessions.

In addition, there is an array of research training opportunities helping fellows learn to ask and answer scientific questions relating to the genetic, molecular, cellular, and physiologic aspects of pediatric critical care medicine.

Faculty

Four new faculty members joined the Division in 2016, bringing the total to twenty-two faculty and fourteen fellows.

Ivie Esangbedo, M.D., M.P.H.
Assistant Professor

M.B.B.S.
College of Medicine of the University of Lagos, Lagos, Nigeria, 2003

M.P.H.
The George Washington University, School of Public Health and Health Services, Washington, DC, 2004

Postdoctoral Training
Residency, Pediatrics
St. Joseph’s Regional Medical Center, Paterson, NJ (Mount Sinai School of Medicine, New York), 2004-2007
Fellowship, Pediatric Critical Care Medicine
Baylor College of Medicine, Texas Children’s Hospital, Houston, TX, 2008-2010
Fellowship, Pediatric Cardiac Intensive Care

Interests
Cardiac critical care, critical care nutrition, point-of-care ultrasound (POCUS)
Ali McMichael, M.D.
Assistant Professor

*B.A., summa cum laude*
Pepperdine University, Malibu, CA, 2006

*M.D.*
University of New Mexico, Albuquerque, NM, 2010

**Postdoctoral Training**
Residency, Pediatrics
Duke University Medical Center, Durham, NC, 2010-2013
Fellowship, Pediatric Critical Care Medicine
Duke University Medical Center, Durham, NC, 2013-2016

**Interests**
Anticoagulation during extracorporeal membranous oxygenation, emergency response systems, quality improvement and education, simulation

Bao (Robyn) Puente, M.D.
Assistant Professor

*B.S., magna cum laude*
Regis University, Denver, CO, 2004

*M.D.*
Washington University School of Medicine, St. Louis, MO, 2008

**Postdoctoral Training**
Residency, Pediatrics
Washington University/St. Louis Children’s Hospital, St. Louis, MO, 2008-2011
Fellowship, Pediatric Critical Care
UT Southwestern, 2011-2014 (Chief Fellow 2013-2014)
Fellowship, Pediatric Cardiology
UT Southwestern, 2014-2016

**Interests**
Myocardial dysfunction and recovery in pediatric patients with heart failure

Priscilla Yu, M.D.
Assistant Professor

*B.S., magna cum laude*
University of California, Los Angeles, Los Angeles, CA, 2004

*M.D.*
University of California, Irvine School of Medicine, Irvine, CA, 2008

**Postdoctoral Training**
Residency, Pediatrics
Children’s Hospital Los Angeles, CA, 2008-2011
Fellowship, Pediatric Critical Care
Mattel Children’s Hospital UCLA, Los Angeles, CA, 2012-2015
Fellowship, Pediatric Cardiac Critical Care Medicine
Children’s Hospital of Philadelphia, Philadelphia, PA, 2015-2016

**Interests**
Extracorporeal membrane oxygenation (ECMO), medical education, simulation
Honors / Awards

Best Pediatric Specialists, D Magazine

- Joshua Koch
- Joshua Wolovits

Renee Potera

- Promotion to Assistant Professor

Invited Lectures

Michael Green

- Texas Pediatric Palliative Care Consortium Mid-Winter Conference, Cook Children’s Hospital, Fort Worth, TX, February 2016
  - “The One That Changed Us: Doing Good Versus Doing Harm in the Cardiac ICU”

Josh Koch

- NYU Langone Medical Center, Hassenfeld Children’s Hospital of New York, November 2016
  - “Pediatric Resuscitation – State of the Art”
- Children’s Hospitals’ Solutions for Patient Safety, Learning Session, Denver, CO, May 2016
  - “Safety Coaches – Getting Started”
- CNS Professional Development Conference, Children’s Medical Center, Dallas, TX, December 2016
  - “Antimicrobials in 2016”

Jessica Moreland

- Society of Leukocyte Biology, Verona, Italy, September 2016
  - “Toll-like Receptor Trafficking and Cellular Responses are Determined by Common SNPs”

Lakshmi Raman

- Grand Rounds, Hennepin County Medical Center, Minneapolis, MN, March 2016
  - “Randomized Trial of 3% vs. 23% HTS in Management of Pediatric TBI – A Pilot Study”
- Research Conference, University of Minnesota, Division of Neonatology, Minneapolis, MN, March 2016
  - “Neuromonitoring in ECOM – What’s New”
- Moderator, Critical Care Session, Pediatric Academic Society Annual Meeting, Baltimore, MD, May 2016

Conference Presentations

Dhar A, Scott S, Tweed J, Golla S, Raman L.

Annual Children’s National Symposium, Keystone, CO, February 2016, Poster
“Neuro-developmental Outcomes in Patients on ECMO”


Society of Critical Care Medicine Annual Congress, Orlando, FL, February 2016, Poster
“Validation of a Central Venous Line Placement Assessment Tool in Pediatric Critical Care Medicine”
**Education and Training**

The educational emphases of the Division of Pediatric Critical Care reflect the diversity of the trainees who rotate through the different PICUs and conduct research on the delivery of critical care to children. We provide educational opportunities for medical students and pediatric residents in addition to our fully-accredited fellowship program. While the major thrusts of educational activities focus on physicians in various stages of training, Division faculty also participate in the education of pediatric nurse practitioners, staff nurses, and respiratory care practitioners.

**Medical Students**

We offer elective opportunities for fourth-year medical students from UT Southwestern and outside institutions to rotate through our general medical/surgical, trauma/neurosurgical, and cardiac intensive care units. Prerequisites include acceptable academic standing at the student’s current medical institution and successful completion of a third-year pediatric clerkship. Outside rotators are required to provide a letter of recommendation from their residency program director confirming that these prerequisites are satisfied.

Medical students who select the PICU to fulfill their acute care rotation requirements are exposed to the full range of patients seen in the different units and participate as integral members of the multidisciplinary team of residents, fellows, and faculty. The rotation emphasizes patient-based learning, with the student taking primary responsibility for one or two patients, and using their illness as a jumping off point for learning that combines both didactic and self-directed study.
Other elective opportunities are available for students interested in learning about critically injured patients in a trauma/neurosurgical setting or children recovering from cardiovascular surgery to correct congenital or acquired heart disease.

Residents

Pediatric residents rotate through the PICU for one 4 week block during each of their 2nd and 3rd years of residency. This experience exposes residents to a broad spectrum of critically ill children at distinct phases of their training. To enhance this educational experience, our faculty and fellows provide formal didactic teaching on pertinent critical care topics to the pediatric residents during scheduled lectures three days per week.

As they progress from caring for critically ill children for the first time as 2nd year residents to functioning as leaders of the PICU teams as 3rd year providers, the pediatric residents experience both an increasing confidence in their ability to recognize and stabilize a critically ill child and a profound respect for the speed with which illnesses can progress and change the course of a child’s and a family’s life forever.

Residents from other specialty training programs also rotate through the PICU at varying stages in their training. These include trainees from Anesthesia and Pain Management, Emergency Medicine, and Family Medicine, where critical care experience is a valuable adjunct to their education. Their experience is tailored to their educational needs to some degree, but their presence on the PICU teams is enriching for everyone because of the unique perspective they bring from the world of adult medicine.

Fellows

With the objective of providing excellent training in pediatric critical care medicine and preparing individuals to become future leaders in their field, we have trained more than 100 physicians in the art and science of intensive care for critically ill infants and children. Many graduates have become academic leaders within the field, both in the United States and abroad.

Now one of the largest in the United States, the Fellowship Program currently has 14 fellows. It emphasizes intense periods of clinical rotations during the early part of the Fellowship, and later shifts to periods of protected time to carry out a research program developed with the help of faculty both within the Division of Pediatric Critical Care Medicine and in the larger UT Southwestern community. In addition to the clinical and research opportunities, the Fellowship Program has a robust didactic curriculum designed to give fellows a foundational knowledge of the pathophysiology of critical illness. Other highlights include a simulation curriculum and journal club. Our fellows have an excellent success rate on the American Board of Pediatric Critical Care sub-board examination.
Research Activities

Division research activities are numerous and diverse, with faculty members engaged in bench, translational, and clinical research projects. There are multiple areas of investigation that we are proud to highlight:

- Cindy Darnell focuses her time on quality initiatives and improving daily care for critically ill children.
- Peter Luckett’s current research interests include clinical trials in pediatric critical care. In 2002, he was an initial organizing member of the Pediatric Acute Lung Injury and Sepsis Investigators (PALISI) clinical trials group, which recently completed a collaboration with members of the Acute Respiratory Distress Syndrome Network (ARDSnet) as part of the NIH Roadmap contract mechanism entitled “Reengineering Clinical Research in Critical Care.”
- Darryl Miles’ focus is to advance the care of neurocritical illness in children and learn how the brain responds to injury to better understand what we can do to improve neurologic outcomes. He is the UTSW principal investigator for multi-center studies investigating the Approaches and Decisions after Pediatric Traumatic Brain Injury (ADAPT) and MRI Biomarkers of Long-term Recovery after Childhood TBI. Dr. Miles is currently leading projects using ultrasonic and transcranial doppler technology to noninvasively measure intracranial pathology in brain related injured children, and has an ongoing long-term database describing the genetic and prognostic influencers of recovery after TBI. He is a member of the Center for Cerebrovascular Disorders at Children’s Medical Center and the Pediatric Neurocritical Care Research Group.
- Jessica Moreland focuses her research on better understanding the cell biology of inflammation with a specific interest in neutrophil biology. Her laboratory studies neutrophil priming by infectious and inflammatory stimuli and the role of the NADPH oxidase in pro- and anti-inflammatory signaling. In addition, the laboratory utilizes a murine model of SIRS and multi-organ dysfunction syndrome (MODS).
- Renee Potera’s current research focuses on the role of alveolar macrophage signaling during acute inflammatory lung injury using a murine model of the systemic inflammatory response syndrome.
- Lakshmi Raman’s interest is in brain injury and the care of ECMO (extracorporeal membrane oxygenation) patients. She has concentrated her research on the effect of chronic hypoxia on the brain, and has been involved in doing some prospective studies in patients on ECMO and a study comparing different concentrations of hypertonic saline in the management of intracranial hypertension in traumatic brain injury.
- Lakshmi Raman and Darryl Miles, in collaboration with Dr. Ann Stowe, have received a grant from the Texas Institute of Brain Injury and Repair (TIBIR) studying the effects of cerebral perfusion pressure in severe traumatic brain injury on central nervous system inflammation after pediatric TBI.

Clinical Activities

Pediatric Critical Care faculty deliver the highest standard of care for critically ill children. The pediatric intensive care units at Children’s Medical Center Dallas are primary referral centers for North Central and Northeast Texas. Patients with special needs are also referred from throughout Texas, as well as Oklahoma, Arkansas, Louisiana, Mexico, and Latin America.

Depending on their diagnoses, critically ill children are assigned to one of four pediatric intensive care units at Children’s. Specialized medical teams assume primary responsibility for their care in one of these units:

- General medical-surgical pediatric intensive care unit (PICU)
- Pediatric cardiovascular intensive care unit (CVICU)
- Pediatric trauma-neurologic injury intensive care unit (PTICU)
- Level II PICU (Children’s Medical Center of Plano)
The Division, in collaboration with the Division of Pediatric Cardiology and the Heart Center, provides state-of-the-art cardiovascular critical care services for children with congenital heart disease as well as other cardiac diseases. More than 2,000 critically ill patients are admitted each year, giving the facility the highest admission rate in the United States.

### 2016 Patient Statistics

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<th>Admissions</th>
<th>Patient (days)</th>
<th>Length of Stay (days)</th>
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<tbody>
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<td>CVICU</td>
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<td>PICU</td>
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<td>13,256</td>
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<td>Plano Campus</td>
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<td>1,564</td>
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### Current Grant Support

**Cindy Darnell-Bowens**

- **Grantor:** NIH
- **Title of Project:** Genetic Epidemiology of Life-Threatening Influenza in Children
- **Role:** Site Principal Investigator
- **Dates:** 06/2013 – 05/2016

**Joshua Koch**

- **Grantor:** NHLBI
- **Title of Project:** Therapeutic Hypothermia after Cardiac Arrest
- **Role:** Site Principal Investigator
- **Dates:** 09/2009 – 02/2016

**Darryl Miles**

- **Grantor:** NIH
- **Title:** Approached and Decisions for Acute Pediatric TBI (ADAPT Study)
- **Roles:** Site Principal Investigator
- **Dates:** 07/2013 – 06/2017

- **Grantor:** NIH
- **Title:** Magnetic Resonance Imaging (MRI) Markers of Outcome after Severe Pediatric Traumatic Brain Injury (TBI)
- **Roles:** Principal Investigator
- **Dates:** 04/2016 – 03/2017

**Jessica Moreland**

- **Grantor:** NIH
- **Title of Project:** A Novel Anti-inflammatory Role for the Neutrophil NADPH Oxidase
- **Role:** Principal Investigator
- **Dates:** 08/2014 – 07/2017
Julio Pérez Fontán

**Grantor:** NICHD K12 HD068369-07 (Child Health Research Career Development Award)
**Title of Project:** Antecedents and Sequelae of Childhood Onset Disease
**Role:** Principal Investigator
**Dates:** 12/2010 – 11/2017

Renee Potera

**Grantor:** NIH K12
**Title of Project:** Child Health Research Career Development Award
**Role:** Trainee
**Dates:** 10/2015 – 09/2016

Lakshmi Raman

**Grantor:** American Heart Association
**Title of Project:** Evaluation of Neurological risks with cerebral autoregulation impairments in Neonatal Extracorporeal support
**Role:** Collaborator
**Dates:** 7/2015 – 06/2017

**Grantor:** Texas Institute for Brain Injury and Repair
**Title of Project:** Maintenance of Cerebral Perfusion Pressure in Moderate to Severe Traumatic Brain Injury Attenuates CNS Inflammation of TBI
**Role:** Principal Investigator
**Dates:** 09/2015 – 08/2016

**Peer-Reviewed Publications**


