



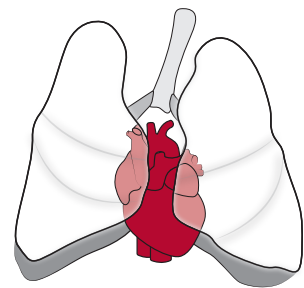
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2021 Annual Report



Section of

Pediatric Cardiothoracic Surgery

Red scrub cap: Pirooz Eghtesady, MD, PhD.



Pediatric cardiothoracic surgeons treat children with congenital cardiac disorders. These surgeons treat a range of conditions, from atrial septal defects to complex single ventricle anomalies, neonatal surgery, surgery for congenital heart disease and tracheal reconstruction. The Lung Transplant Program at St. Louis Children's Hospital is the most active of its kind in the world, attracting patients with cystic fibrosis and other lethal lung diseases. The Pediatric Heart Transplant Program is considered one of the leaders in the United States.

	1,345 operating room cases		48 clinical research studies
	1,511 visits		\$1,474,538 research funding
	3 faculty		



We've Got Heart

From left: Jacob Miller, MD, and Dilip Nath, MD.

People born with congenital heart defects often require multiple interventions and lifelong management to ensure their hearts are pumping blood through the body properly. Heart defects can lead to chronic congestion, which can cause problems with both the heart and liver. When these problems progress to liver dysfunction and liver failure, transplant may be the best treatment option.

Congenital cardiac surgeons **Jacob Miller, MD**, and **Dilip Nath, MD**, combine clinical expertise and multidisciplinary care to achieve the best outcomes for heart-liver transplant patients at the Washington University and St. Louis Children's Hospital Heart Center.

"These are patients who may have had several previous surgeries to treat their heart defects," says Miller, who completed cardiothoracic and congenital cardiac fellowship training at the School of Medicine. "When their condition has worsened to the extent that they require heart-

liver transplant, they need to see a team with the coordination and capability to make them better."

The Heart Center, the first pediatric center in the Midwest to perform over 500 heart transplants, is nationally recognized as a top heart program by U.S. News & World Report. Miller and Nath partner with the Pediatric Liver and Transplant Center team at St. Louis Children's Hospital, led by Director of Liver Transplant and Mid-America Transplant/Department of Surgery Distinguished Endowed Chair in Abdominal Transplantation Maria B. Majella Doyle, MD, MBA, to coordinate care for heart-liver transplant procedures, which can take 12 or more hours to complete and require a large operating room staff.

"We have seen excellent results in these challenging cases," says Nath. "We have one of the leading pediatric heart transplant programs in the country. Our patients can see our track record of outstanding outcomes and know that they are in good hands."

"I consider myself one of the most fortunate people alive to be working with such wonderful, talented individuals. Our team continues to grow and improve the health of our patients. We've got heart."

-Pirooz Eghtesady, MD, PhD

The Heart Center is led by Section Chief of Pediatric Cardiothoracic Surgery **Pirooz Eghtesady, MD, PhD**, the Cardiothoracic Surgeon-in-Chief at St. Louis Children's Hospital, who has performed heart transplants in children, teens and adults at the School of Medicine.

"I consider myself one of the most fortunate people alive to be working with such wonderful, talented individuals," says Eghtesady, who is the Emerson Chair in Pediatric Cardiothoracic Surgery at St. Louis Children's Hospital. "Our team continues to grow and improve the health of our patients. We've got heart."

Pediatric Cardiothoracic Surgery Highlights



St. Louis Children's Hospital.

Clinical

Washington University pediatric cardiothoracic surgeons are international leaders in Potts shunt procedures for children with severe pulmonary hypertension. The procedure connects the left pulmonary artery to the descending aorta as a palliative treatment for children who may otherwise need lung transplantation. The Section of Pediatric Cardiothoracic Surgery is among the most clinically active in North America, receiving national and international referrals for this procedure. Midterm outcomes are comparable to lung transplant, according to a recent School of Medicine study published in the *Journal of Thoracic and Cardiovascular Surgery*. As data becomes available, the section will study long-term outcomes and refine the patient selection process.

Research

Pregnant women with type 1 diabetes are at increased risk of having children with congenital heart defects. Researchers in the Section of Pediatric Cardiothoracic Surgery are investigating the role of certain pathogenic viruses in altering the maternal microbiome, which may play a role in causing congenital heart defects. In a recent study published in the *Journal of the American Heart Association*, the research team found an association between a virus and congenital heart defects in an animal model. An upcoming multidisciplinary clinical study will examine the gut virome of women to understand the link between viruses and congenital heart defects.



From left: Pirooz Eghtesady, MD, and Jacob Miller, MD.

Education

In 2020, the Section of Pediatric Cardiothoracic Surgery at Washington University School of Medicine introduced an ACGME-accredited Congenital Cardiac Surgery Fellowship. The program became one of only 11 congenital cardiac fellowships in the United States. Accredited fellowship training in congenital cardiac surgery provides opportunities for cardiothoracic surgeons to develop the expertise necessary for subspecialization in these complex procedures. **Jacob Miller, MD**, the inaugural fellow, joins the section as Instructor of Cardiothoracic Surgery. Current fellow **Vinod Sebastian, MD**, completed cardiothoracic fellowship training at UT Southwestern Medical Center and has over a decade of experience as a practicing cardiothoracic surgeon.



Vinod Sebastian, MD.



Growth Potential

Pirooz Eghtesady, MD, PhD.

Tetralogy of Fallot is a congenital heart defect that affects normal blood flow through the heart. It consists of pulmonary stenosis, ventricular septal defect, overriding aorta and right ventricular hypertrophy. Together, these defects can reduce the amount of oxygen in the blood that flows to the rest of the body. Congenital cardiac surgeons at Washington University School of Medicine combine clinical expertise with innovative research to solve the problems facing patients with congenital heart disease.

Treating tetralogy of Fallot requires surgery to widen or replace the pulmonary valve. Patients treated for the condition require lifelong monitoring. Blood flow may still be restricted after surgery. Deterioration of childhood heart repairs can lead to pulmonary valve regurgitation. Cardiac arrhythmias are common in patients after tetralogy of Fallot surgery. These problems lead many patients to require repeat interventions throughout their lifetime.

Chief of Pediatric Cardiothoracic Surgery **Pirooz Eghtesady, MD, PhD**, is developing a novel surgical technique using heart tissue to replace the pulmonary valve. Eghtesady, who is Cardiothoracic Surgeon-in-Chief at St. Louis Children's Hospital, takes tissue from the right atrial appendage and creates a replacement valve.

“Surgeons have done valve repairs for decades using other materials,” says Eghtesady, the Emerson Chair in Pediatric Cardiothoracic Surgery. “Specifically, the pericardium has good tensile strength. The problem is that the pericardium degenerates and does not have growth potential. I asked myself, ‘Is there something else a surgeon could use that has growth potential?’”

A replacement valve with the potential to grow with a patient, like a functional valve in a heart without congenital defect, might reduce the number of issues common to patients with tetralogy of Fallot and other congenital heart defects. From this initial idea, Eghtesady began collaborating with Washington University biomedical engineers to test atrial appendage tissue. He has now used the approach in select cases with positive results.

Eghtesady, who leads a research laboratory at the School of Medicine, is developing plans to further study the use of this tissue in valve repair. If proven effective, the technique could revolutionize the treatment of congenital heart disease, including common problems with few current treatment options, such as bicuspid aortic valve.