




**UPMC CHILDREN'S
HEART INSTITUTE**

2023

OUTCOMES AND HIGHLIGHTS

UPMC | **CHILDREN'S**
HOSPITAL OF PITTSBURGH



The Heart Institute at UPMC Children's Hospital of Pittsburgh is an internationally recognized leader in cardiology and heart surgery. Each year, more than 18,000 patients of all ages travel from around the globe to receive care at our center in Pittsburgh and surrounding regional locations across the UPMC footprint. Our team achieves outstanding surgical outcomes that award our program top ratings and recognition from the Society of Thoracic Surgeons (STS). Our commitment to surgical excellence, combined with our dedication to patient and family-centric care that extends beyond the operating room, consistently rank UPMC Children's among the top 10 in the nation for Pediatric Cardiology and Heart Surgery by *U.S. News and World Report*.

At the Heart Institute, we take a unique approach to ensure patients receive comprehensive care during every stage of their journey. Our program spans across a patient's lifetime – from fetal to childhood to adulthood – and offers the resources to seamlessly transition care from one stage to another. This collaborative effort across the UPMC footprint sets the Heart Institute apart and positions us as a leader in the comprehensive treatment of heart disease. Our referral team maintains a robust second opinion program and welcomes the opportunity for consultations to carefully evaluate each case.



VICTOR O. MORELL, MD

Eugene S. Wiener Endowed Professor of Pediatric Cardiothoracic Surgery
Chair, Department of Cardiothoracic Surgery
Co-Director, Heart Institute at UPMC Children's Hospital of Pittsburgh

JACQUELINE KREUTZER, MD

Peter and Ada Rossin Endowed Professor of Pediatric Cardiology
Chief, Division of Cardiology, Department of Pediatrics
Co-Director, Heart Institute at UPMC Children's Hospital of Pittsburgh

OUR PROGRAMS AND SERVICES

The Heart Institute at UPMC Children's Hospital Accepted into Pediatric Heart Network

The Heart Institute at UPMC Children's Hospital of Pittsburgh has been accepted into the Pediatric Heart Network (PHN), an international consortium of nine congenital heart programs across North America. Funded by the National Heart, Lung, and Blood Institute, the PHN enables the selected congenital heart centers to collaborate and carry out seven years of meaningful, multi-site research in pediatric and congenital heart disease projects. As a result, patients in Pittsburgh and other participating sites will have access to new cutting-edge treatments, trials, and studies.

The initial project proposal was led by **Laura Olivieri, MD, FAHA, FSCMR, Ashok Panigrahy, MD, and Bryan Goldstein, MD**, but involved collaboration from multiple centers across UPMC.

This acceptance into the PHN was the first application to come from UPMC Children's Hospital of Pittsburgh. This distinction recognizes the Heart Institute's exemplary research and clinical staff, as well as the team's dedication to patient care and innovation in the field of pediatric and congenital heart disease.

"Participating in the prestigious PHN will provide our patients, families, faculty and staff with access to field-leading cutting edge clinical trials and research studies," says Dr. Goldstein. "We anticipate that PHN membership, along with so many other recent clinical and research accomplishments, will continue to elevate the national and international reputation of the Heart Institute at UPMC Children's and at Pitt's School of Medicine."



The Da Silva Center for Ebstein's Anomaly

Celebrating 30 Years of the Cone Procedure for Ebstein's Anomaly

Three decades ago, in 1993, **José Pedro da Silva, MD**, created the cone technique to repair Ebstein's anomaly, a rare congenital heart disease (CHD). In patients with Ebstein's anomaly, the tricuspid valve (TV) is malformed and displaced inside of the right ventricle (RV). This displacement and malformation cause tricuspid regurgitation into the right atrium. The cone procedure creates a durable repair using the patient's own tissue, which creates a TV capable of appropriate growth.

Now, the Da Silva Center for Ebstein's Anomaly at the Heart Institute is the premier center for treatment of this congenital heart defect. Dr. da Silva, alongside **Luciana da Fonseca da Silva, MD, PhD**, have performed more than 360 cone procedures on patients of all ages and have achieved excellent outcomes. They travel around the world to perform this procedure and share their expertise with other physicians.

On Aug. 28, 2023, the Heart Institute at UPMC Children's Hospital of Pittsburgh celebrated the invention of the cone procedure to treat Ebstein's anomaly with a special CME-accredited program in Washington D.C. as cardiologists and cardiothoracic surgeons gathered for the concurrently held 8th World Congress of Pediatric Cardiology and Cardiac Surgery.

UPMC Adult Congenital Heart Disease Program Earns Accreditation from the Adult Congenital Heart Association (ACHA)

Individuals with congenital heart disease (CHD), the most common birth defect diagnosed in one in 100 births, are living longer. There are nearly 2 million adults in the United States living with one of the many different types of congenital heart defects, ranging from simple to complex. These patients require lifelong surveillance to detect and treat complications early, which ultimately improves outcomes.



The UPMC Adult Congenital Heart Disease Program, a program bridging the Heart Institute at UPMC Children's and the UPMC Heart and Vascular Institute, recently earned accreditation from the **Adult Congenital Heart Association (ACHA)**, a nationwide organization focused on connecting patients, family members, and healthcare providers to form a community of support and a network of experts with knowledge of CHD. The accreditation recognizes our program's expertise in serving patients with CHD and was earned through a rigorous accreditation process over several years.

"Earning ACHA accreditation for our Adult Congenital Heart Disease Center is a reflection of the exceptional clinical care we provide at UPMC and of the tremendous effort by our entire team and hospital over many years," says **Arvind Hoskoppal, MD, MHS**, director of the ACHD Program.

Harmony™ Transcatheter Pulmonary Valve in Congenital Heart Disease Patients



In May 2021, **Bryan Goldstein, MD**, and his team at the Heart Institute at UPMC Children's became one of the first sites nationwide to implant the Harmony™ transcatheter pulmonary valve (TPV), a newly approved device by the U.S. Food and Drug Administration (FDA).

The Medtronic Harmony TPV is the first FDA-cleared, commercially available device designed for transcatheter pulmonary valve replacement (PVR) in patients with congenital heart disease and RV outflow tract dysfunction — without an existing surgical graft/conduit or prosthesis in the pulmonary position.

Dr. Goldstein and his team have successfully implemented the use of the Harmony TPV to expand our existing portfolio for transcatheter PVR, which also includes the Medtronic Melody TPV, Edwards Sapien 3, and Edwards Alterra Adaptive Prestent.

This collaborative effort has allowed **Arvind Hoskoppal, MD**, director of the UPMC Adult Congenital Heart Disease Program, to treat a much larger cohort of congenital heart disease patients than were previously amenable to transcatheter PVR. This dual effort provides an opportunity for Dr. Hoskoppal to refer patients who previously required cardiac surgery for PVR to undergo catheter-based intervention for PVR with Dr. Goldstein and his team instead. Our center remains among the highest volume implant centers in the country.

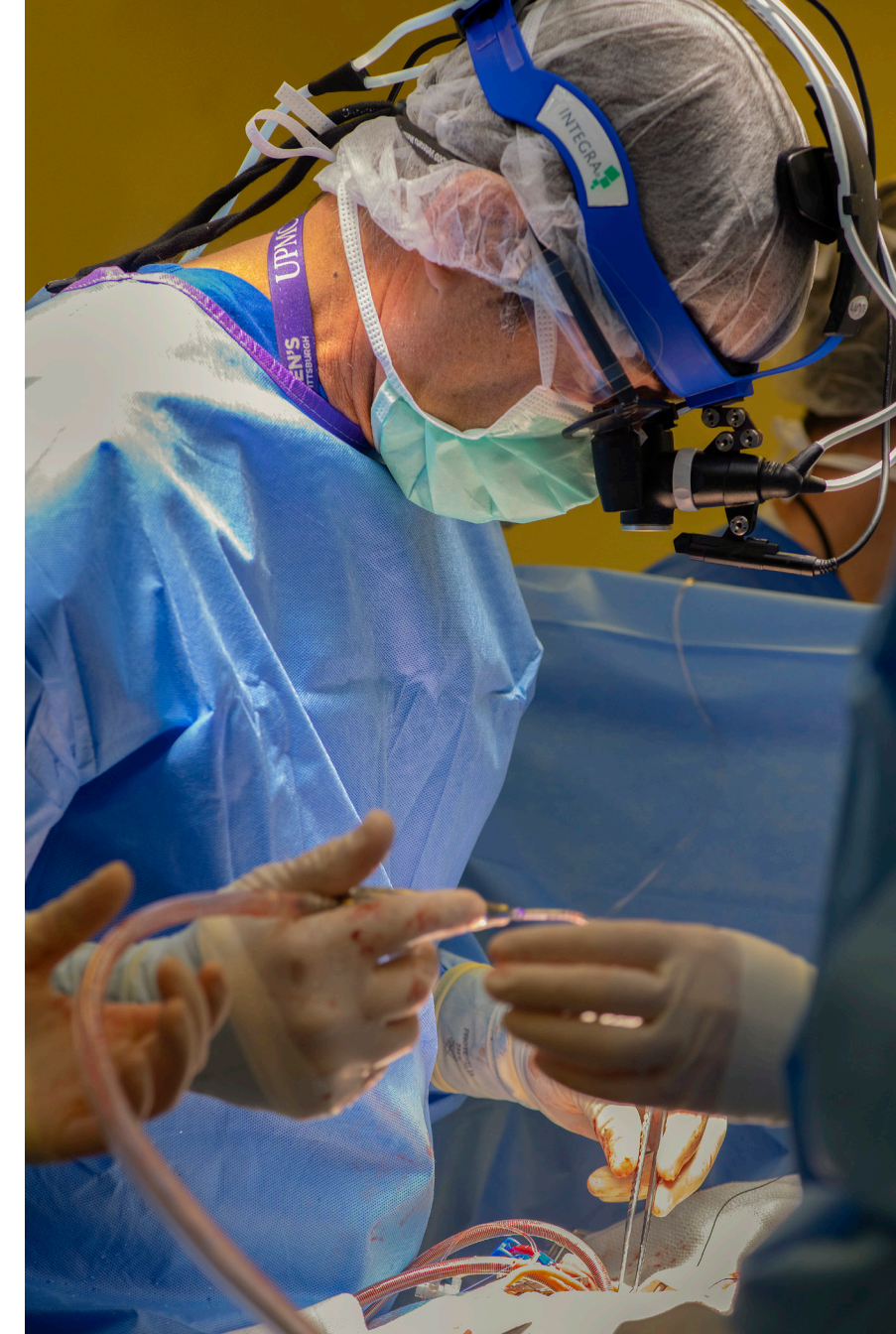
Extracorporeal Membrane Oxygenation (ECMO) Excellence at UPMC Children's Heart Institute



The extracorporeal circulatory support program at UPMC Children's Hospital of Pittsburgh, led by **Melita Viegas, MD**, continues to evolve, offering a variety of mechanical devices to support immediate and long-term cardiac and respiratory collapse. Some of the pediatric ventricular assist devices available include the Abbott Laboratories HeartMate 3™, the Berlin Heart EXCOR® pediatric system, the Abbott Laboratories CentriMag/PediMag™ acute circulatory support system, and the ABIOMED Impella®.

UPMC Children's takes a careful, multidisciplinary approach to ECMO patient selection to ensure our patients the best chance of a successful outcome.

Under Dr. Viegas's leadership, UPMC Children's has been awarded the ELSO Award for Excellence in Life Support – Platinum Level. The Award for Excellence in Life Support from the Extracorporeal Life Support Organization (ELSO) recognizes hospitals and medical centers around the world that demonstrate exceptional commitment to evidence-based processes and quality measures, staff training and continuing education, patient satisfaction, and ongoing clinical care in the use of extracorporeal membrane oxygenation (ECMO).



Latest Findings on Minimally Invasive Heart Transplant Rejection Monitoring Using Donor-Derived Cell-Free DNA Blood Testing



Faculty at the Heart Institute at UPMC Children's published updated findings in *Clinical Transplantation* on their use of a minimally invasive donor-derived cell-free DNA (dd-cfDNA) approach to monitoring pediatric heart transplant recipients for organ rejection.

Leading the study was **Brian Feingold, MD, MS, FAHA**, professor of Pediatrics and medical director of the Heart Failure and Transplant Program at the Heart Institute at UPMC Children's. Collaborating with Dr. Feingold were co-authors **Kirsten Rose-Felker, MD; Shawn C. West, MD, MSc; Susan A. Miller, MD, MBA**; and **Matthew D. Zinn, DO**, all from the Heart Institute.

In their new study, Dr. Feingold and colleagues compared the results of two surveillance protocols following pediatric heart transplantation: the traditional protocol using repeated biopsies and the new protocol relying upon dd-cfDNA surveillance. Dr. Feingold and the team examined clinical outcomes prior to and following a switch from EMB to dd-cfDNA in pediatric and young adult heart transplant recipients at UPMC Children's Hospital.

Results showed that over the course of nearly three years of clinical follow-up among 120 pediatric heart transplant recipients, the use of dd-cfDNA-led surveillance decreased the need for invasive EMBs by almost 82%. After the protocol dd-cfDNA was implemented, there was no increase in rejection events, the need for re-transplantation, or death. Additionally, dd-cfDNA-led surveillance is projected to cost between \$8,500 and \$24,500 less, per-patient over 20 years after heart transplantation, than traditional biopsy-led surveillance.

This work is helping to shift the standard of care after pediatric heart transplantation, enabling more cost-effective and less invasive care for patients.

New Research on Thromboprophylaxis in Fontan Circulation



Researchers from the Heart Institute published new findings in the *Journal of the American College of Cardiology* on methods of thromboprophylaxis and their efficacy in patients with Fontan circulation.

Tarek Alsaied, MD, MSc, was the study's senior author, along with **Bryan Goldstein, MD, FACC, FASCI, Arvind Hoskoppal, MD, MHS, Anita Saraf MD, PhD**, and **Brian Feingold, MD, MS, FAHA**.

About 1 in 10,000 children are born with a single ventricle heart defect that requires a Fontan palliation, wherein the typical blood flow in the heart is to bypass the hypoplastic ventricle. It is estimated that approximately 50% of all people in the United States living with Fontan palliation are under the age of 18 and have a more difficult time with related side effects of current anticoagulation treatments, including compliance and improper dosing levels.

The meta-analysis performed by Dr. Alsaied and colleagues demonstrates that the most effective treatment to reduce the potential for catastrophic cardiac events is a regular dose of aspirin in these pediatric populations and a non-vitamin K anticoagulant in high-risk patients. This conclusion is a highly significant finding in the field of cardiology, as questions of appropriate long-term care of Fontan palliation have lingered among pediatric cardiologists for decades.

A Collaborative Approach to Care – Lorenzo's Story

At a 20-week ultrasound appointment in their hometown of Harrisburg, Megan and Philip's son, Lorenzo, was diagnosed with hypoplastic left heart syndrome (HLHS). Although their doctor told the parents-to-be that Lorenzo wouldn't make it, Megan and Philip were determined to give their son the best chance at life.

They saw **Sunil Patel, MD**, a pediatric cardiologist and adult congenital heart disease specialist at UPMC Harrisburg. He connected Megan and Philip with **Victor Morell, MD**, chief of the Division of Pediatric Cardiothoracic Surgery at UPMC Children's and chair of the Department of Cardiothoracic Surgery, and the team at the Heart Institute at UPMC Children's Hospital of Pittsburgh to coordinate Lorenzo's delivery and next stages in care.

After Megan delivered Lorenzo at UPMC Magee-Womens Hospital in Pittsburgh, Lorenzo was transported to UPMC Children's, where he underwent open heart surgery with Dr. Morell, **Mario Castro-Medina, MD**, and **Luciana da Fonseca da Silva, MD**, two cardiothoracic surgeons at UPMC Children's. Lorenzo recovered well, and months later, underwent the Glenn procedure to redirect blood flow from his upper body directly to his lungs. Lorenzo and his family went home shortly after his recovery.

Now, Lorenzo and his parents see Dr. Patel regularly to monitor his condition. Dr. Patel closely and regularly communicates with the team in Pittsburgh to discuss Lorenzo's ongoing care. This collaborative approach allows for our teams to and a seamless patient experience from



A LOOK AHEAD

At the Heart Institute, our goal is to provide the highest quality care to every patient that comes through our doors. As we continue to grow and increase our services, we are excited to soon welcome patients at a newly expanded space at the hospital.

UPMC Children’s Hospital of Pittsburgh has announced plans to expand the Heart Institute at the main campus in Pittsburgh. This new, three-story space will be outfitted with the latest technology and equipment, allowing our team to continue to provide highly advanced services to patients. The 50,000-square-foot expansion will include new inpatient and outpatient procedural and diagnostic spaces, as well as staff support and reception rooms. The project is estimated to be completed by December 2025.

We believe that this new expansion will allow our team to continue to enhance our cardiac services and improve patient experience.

OUTCOMES

The team of specialists at the Heart Institute strives to achieve excellent clinical outcomes across our multidisciplinary services.

The following data was the most recently reported STS outcomes for Spring 2023 report.

Benchmark Operation Mortality

Our congenital cardiac surgery program consistently receives prestigious ratings from the Society of Thoracic Surgeons. The following data represents UPMC Children’s mortality percentage compared to the STS overall performance mortality percentage for the listed series of benchmark procedures.

UPMC Children’s Society of Thoracic Surgeons Benchmark Procedures 10-Year Study versus STS Overall Performance		
Benchmark Procedure	UPMC Children’s Mortality Percentage	STS Overall Performance Mortality Percentage*
VSD	0.34%	0.43% (0-0.79)
TOF	0.74%	0.90% (0-1.47)
AVC	1.18%	1.7% (0-2.04)
ASO	1.56%	1.81% (0-2.70)
ASO+VSD	2.86%	4.90% (0-8.33)
Glenn/HemiFontan	0.00%	1.54% (0-2.38)
Fontan	0.72%	1.08% (1-1.25)
Truncus	7.14%	8.88% (0-14.29)
Norwood	3.33%	11.79% (4.69-16.07)

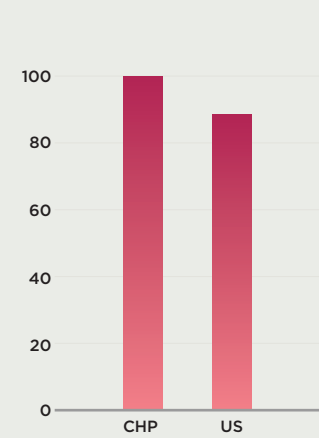
*STS mortality data reflects the most recent 4-year reporting period

POST TRANSPLANT PEDIATRIC OUTCOMES

*Based on SRTR published results July 2023

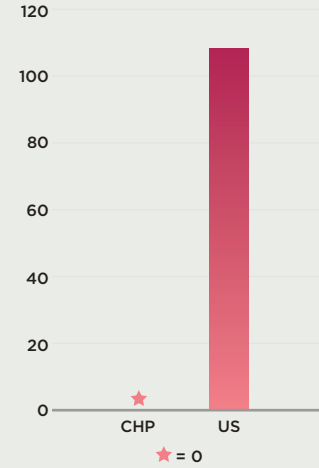
Observed probability of surviving with a functioning graft at 3 years (unadjusted for patient and donor characteristics)

CHP 100% vs US 88%



Number of observed graft failures (including deaths) during the first 3 years after transplant

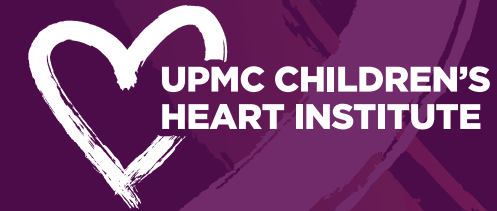
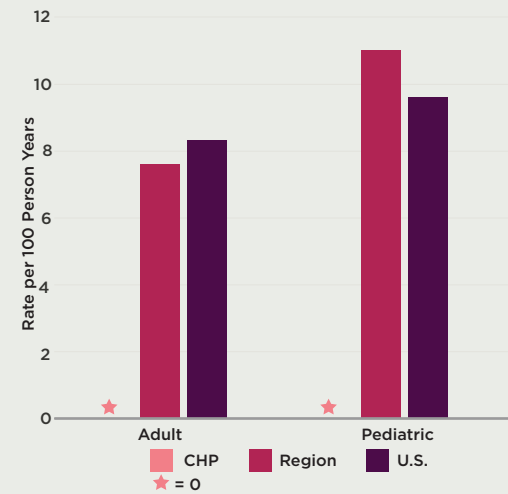
CHP 0 vs US 107



Pre-transplant Mortality Rates

Pre-Transplant Mortality Rates for Pediatric Population 2/2/2021-12/31/2022

O/E: Rate per 100 person years = 0 observed with Expected at 10.9 and/or Observed at CHP vs US: Rate per 10 person years = 0 at CHP and US 9.8



UPMC CHILDREN'S
HEART INSTITUTE



CONTACT US

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For providers or patients outside the United States, contact our International Services Department at **+1-412-692-3000** or **international@chp.edu**.

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