Pediatric Heart Transplant Society

# PEDIATRIC HEART TRANSPLANTATION TODAY

## PHTS Newsletter

Dr. Juan "Chuck" Alejos, Senior Editor
Dr. Neha Bansal, Junior Editor

## December 2025



As we approach the close of another year, the Pediatric Heart Transplant Society extends heartfelt gratitude to our community of clinicians, researchers, families, and patients who continue to inspire and drive our mission forward. This season is a meaningful time to reflect on the milestones we've achieved together: the advances in care, strengthened collaborations, and the stories of resilience that remind us why our work matters. Amid the busy season, we hope you find moments of rest, connection, and joy. We also look ahead to the innovations and opportunities awaiting us in the coming year. Thank you for your unwavering commitment to the children and families we serve.

A special holiday shout-out to Claire and DeAnna, whose organization and unfailing dedication keep PHTS running strong all year long. Their behind-the-scenes work supports our members, advances our mission, and ensures that every project moves forward with excellence. We are deeply grateful for their energy, expertise, and heart. Thank you, DeAnna and Claire, for everything you do for the Pediatric Heart Transplant Society!

Wishing you peace, good health and renewed hope this holiday season.

*Neha and Chuck*

## PHTS GROWTH*

13,451 → Patients Enrolled Total
13,844 → Listings/relisting entered
10,218 → Transplants entered
537 → Listings for 2024
415 → Transplants for 2024
366 → Listings for 2025
289 → Transplants for 2025

*as of December 1, 2025

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# Partial Heart Transplantation: A Growing Solution for Pediatric Valve Disease

Congenital heart valve disease remains one of the most challenging problems in pediatric cardiac surgery. For decades, surgeons have relied on mechanical valves, bioprostheses, and cryopreserved homografts. These options that offer reliability in adults but fall short in infants and young children who need valve replacements capable of growing with them. Reinterventions are the rule, not the exception, and the cumulative operative risk, anticoagulation burden, and risk of structural deterioration all compound over a child's lifetime.

Partial heart transplantation (PHT) has emerged over the past several years as an innovative strategy designed to fill this longstanding gap. By transplanting living valve and root tissue from a donor and maintaining cellular viability through limited immunosuppression, PHT seeks to replicate the biological behavior of a native valve which includes the capacity for somatic growth and adaptive remodeling. What began as a solution for critically ill neonates with truncal valve disease is now evolving into a broader platform with applications across congenital heart surgery, heart transplantation, and even adult valve disease. Although early in its clinical development, PHT is rapidly moving from a compelling idea to a reproducible reality.

This article provides an overview of the current state of PHT, integrating published experience in humans, emerging applications such as the "living Ross" and mitral PHT, and multicenter adoption.

## Rationale for Partial Heart Transplantation

The concept of replacing valve tissue while maintaining viability is not new. Early attempts at "homovital" homografts delivered fresh valve roots with encouraging early function, but without immunosuppression or modern preservation techniques, these implants inevitably lost viability. Advances in pediatric heart transplantation, cold ischemia tolerance, and immunologic understanding have now made living valve transplantation both biologically and clinically feasible.

PHT leverages several key biologic principles:

1. **Relative immune privilege of valve tissue.** Rejection predominantly targets myocardium, not valve endothelium or matrix, meaning valve-only transplantation may require much less immunosuppression.
2. **Living tissue grows.** Pediatric heart transplant recipients experience somatic growth of their donor organs. Transplanting a living valve offers the same potential.
3. **Cold-preserved valve roots maintain cellular viability** far longer than previously appreciated, creating flexibility in graft use and transport.

Together, these principles support the central premise of PHT: a living graft capable of remodeling and growing with the patient while requiring less immunosuppression than a full orthotopic heart transplant.

**Clinical Experience: Semilunar PHT in Children**

The first-in-human partial heart transplant, performed in 2022, marked a pivotal moment for congenital heart surgery.[1] Since then, the early clinical experience has expanded and is best summarized in a recent case series describing 19 patients.[2]

This cohort includes infants, older children, and adults, with the largest experience in aortic and pulmonary root PHT. Several variants including primary root replacement, domino grafts, and split-root implantation have been adapted to the needs of each patient and available donor tissue.

Across these diverse applications, several consistent findings have emerged:

- **Excellent early function.** No cases of early structural valve failure or major leaflet dysfunction have been reported within the initial follow-up periods.
- **Evidence of true somatic growth.** Infants demonstrated substantial increases in annular diameter and leaflet length, tracking appropriately with expected z-score growth curves.
- **Minimal immunosuppression suffices.** Most patients transitioned to tacrolimus monotherapy after the first month. One patient, who discontinued all immunosuppression for unrelated reasons, continued to demonstrate growth and preserved function.

These findings validate the fundamental rationale for PHT and suggest durability and growth potential beyond any previous valve substitute.

**Global Adoption and Early Multicenter Experience**

One of the strongest signals that PHT is maturing from an experimental concept to a reproducible platform is its rapid adoption across centers. Within the last three years, PHT has been performed at more than a dozen programs across the United States and Europe.

U.S. centers performing PHT include:

- Duke University
- Columbia University
- Boston Children’s Hospital
- Medical University of South Carolina
- Dell Children’s Medical Center / UT Austin
- Loma Linda University Children’s Hospital
- Children’s National Hospital
- Washington University / St. Louis Children’s Hospital
- Cincinnati Children’s Hospital
- Rady Children’s Hospital

European centers include:

- Geneva University Hospital, Switzerland
- Gregorio Marañón General University Hospital, Madrid, Spain

This breadth of adoption demonstrates:

- Technical reproducibility across diverse congenital programs,
- Growing comfort with immunosuppression-light strategies, and
- Broad applicability across various congenital pathologies and age groups.

The number and geographic diversity of programs now performing PHT is itself an important early outcome, one that reflects both the feasibility of the operation and the unmet need it seeks to address.

**Organ Stewardship: Domino and Split-Root PHT**

PHT also introduces new strategies for donor stewardship and valve availability.

**Domino grafts**
Valves explanted from heart transplant recipients, previously discarded, can now be used as viable grafts for children requiring PHT. This has dramatically expanded donor access and is used in most PHT cases.

**Split-root grafts**
A single donor heart may be divided into an aortic and pulmonary root, each used for a separate PHT recipient. This mirrors split-liver transplantation and represents a powerful method to increase the utility of each donor organ.

**Expanding Indications: The Living Ross Procedure**
The Ross procedure remains an attractive operation for children and young adults requiring aortic valve replacement, offering survival comparable to the age-matched general population. However, homograft degeneration in the RV-PA position remains a major limitation.

The “Living Ross” integrates PHT into the Ross procedure by using a living pulmonary root from a donor instead of a cryopreserved homograft.[3] If long-term data confirm improved durability, the Living Ross may redefine the standard for pediatric aortic valve disease, combining the advantages of the Ross with the biologic benefits of PHT.

**Beyond Semilunar Valves: Atrioventricular PHT**

Although the semilunar valves have been the first clinical frontier, the need for growth-capable mitral valve replacement is urgent. Mechanical valves in infants carry high morbidity, and multiple reoperations are expected.

A recent in vivo porcine study demonstrated that atrioventricular PHT is not only feasible but biologically active.[4] Gross pathology showed healthy tissue integration without calcification. This has now been translated to human mitral PHT at two centers in the US.

**Immunologic Considerations**

Optimal immunosuppression for PHT is still being refined, but early observations suggest a far lower immunologic burden than orthotopic heart transplantation.

Key emerging themes include:

- Tacrolimus monotherapy appears sufficient for most patients,
- DSA formation has not clearly correlated with graft dysfunction

The ability to maintain valve viability with minimal immunosuppression may ultimately become one of the most important advantages of PHT.

**The Road Ahead**

Partial heart transplantation is rapidly evolving from a novel solution for newborns with truncal valve disease into a broader platform. The early multicenter adoption across the U.S. and Europe underscores its feasibility, while its application in the atrioventricular position points to future expansion into the most challenging domains of pediatric valve replacement.

For cardiac surgeons and cardiologists, PHT represents a biological, technical, and conceptual shift. PHT is a living valve replacement strategy with the potential to reshape valve replacement for decades to come.

**References**


1. Turek JW, Kang L, Overbey DM, et al. Partial Heart Transplant in a Neonate With Irreparable Truncal Valve Dysfunction. JAMA. 2024.
2. Overbey DM, Aykut B, Kucera JA, et al. Partial Heart Transplant for Congenital Heart Disease. JAMA. 2025.
3. Kesseli S, Wolf SEM, Schroder JN, et al. The Living Ross Procedure – A New Paradigm in Partial Heart Transplantation. Ann Thorac Surg Short Rep. 2024.
4. Wolf SEM, Kucera JA, Ngeve SM, et al. In Vivo Feasibility and Growth of Atrioventricular Partial Heart Transplantation in a Porcine Model. 2024.

# PHTS Live!

**December 17, 2025**

"AI- Friend or Foe in the World of Heart Transplantation"

**Anthony Chang MD** - Children's Hospital of Orange County

PHTS Live continues to grow as a valuable space for shared insight and collaboration. As we plan for our 2026 sessions, we welcome your ideas for topics you would like to see highlighted. Your suggestions help keep PHTS Live relevant and impactful for our community.

## Host



**Juan Alejos, MD**



**Manu Varma, D.O.**



**Lynsey Barkoff, CPNP**

# Vanguard Center of Excellence Award Recipients

- Arkansas Children's Hospital
- Cardinal Glennon Children's Medical Center
- Children's Healthcare of Atlanta
- Children's Hospital and Medical Center
- Children's Hospital Colorado
- Children's Hospital of Los Angeles
- Children's Hospital at Montefiore
- Children's Hospital of Pittsburgh of UPMC
- Children's Hospital of Wisconsin
- Children's Mercy Hospital and Clinics
- Children's MN
- Children's of Alabama
- Cincinnati Children's Hospital Medical Center
- Cleveland Clinic Children's
- Columbia University – Morgan Stanley Children's Hospital of New York Presbyterian
- Dell Children's Medical Center
- Freeman Hospital, Newcastle upon Tyne
- Heart Institute (InCor) University of São Paulo Medical School
- Hospital for Sick Children
- Joe Dimaggio Children's Hospital
- Johns Hopkins All Children's Hospital
- Le Bonheur Children's Hospital
- Levine Children's Hospital- Atrium Health
- Loma Linda University Children's Hospital
- Mattel Children's Hospital
- Mayo Clinic
- Monroe Carell Jr. Children's Hospital at Vanderbilt
- Mount Sinai Medical Center
- Nationwide Children's Hospital
- Nemours Cardiac Center
- Norton Children's Hospital
- Ochsner Hospital for Children
- Phoenix Children's Hospital
- Primary Children's Hospital
- Seattle Children's Hospital
- St. Louis Children's Hospital
- Texas Children's Hospital
- The Children's Hospital of Philadelphia
- The Royal Children's Hospital Melbourne
- UC San Diego, Rady Children's Hospital
- UNC Children's Hospital
- University of Alberta
- University of California, San Francisco-Benioff Children's Hospital
- University of Florida, Shands Hospital
- University of Iowa Children's Hospital
- University of Minnesota Masonic Children's Hospital
- University of Texas, Children's Medical Center
- University of Virginia Medical Center

# New PHTS Roles



President

**Kevin Daly, MD**

Boston Children's Hospital



Vice President

**Kathleen Simpson, MD**

Children's Hospital Colorado



# Member Spotlight



Nursing and Allied Health Representative

**Karen Caulfield, Clinical Specialist Paediatric Physiotherapist**

Freeman Hospital



Nursing and Allied Health Representative

**Melissa Dazo, NP**

Children's National

# Award Winners



2025 PHTS Lifetime Achievement Award

**Richard Chinnock, MD**

Loma Linda University Children's Hospital



2025 PHTS Excellence Award for Nursing and Allied Health Professionals

**Amy Buckles, RN, BSN**

St. Louis Children's Hospital

# Accepted Proposals



**Anne Dipchand, MD**

**Comparing Institutional versus PHTS Listing and Post-Transplant Outcomes Among Patients with Congenital Heart Disease**



**Erin Bouska, MD**

**Geospatial Mapping of Child Opportunity Index with Post-Transplant Outcomes**



**Dean Karahalios, DO**

**Waitlist and post-transplant outcomes of pediatric patients listed for heart transplant as status 2: An analysis of listing benefit**



**Alicia Kamsheh, MD, MSCE**

**Long-Term Morbidity of Pediatric Heart Transplant Recipients After Transition to Adult Care: A Follow Up PHTS-SRTR Linkage Study**

**Standardizing Care Committee**

**Pneumocystis Jirovecii (PJP) infection after pediatric heart transplantation**

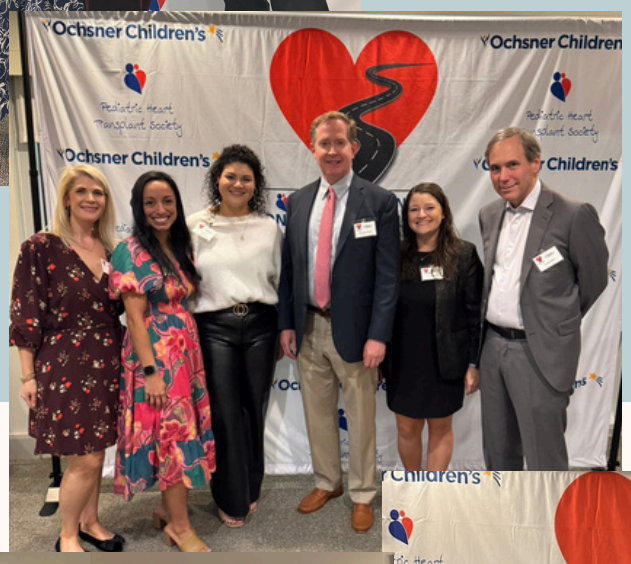


**Enduring Hearts/PHTS Award Recipient:**
**Shahn Amdani, MD**

**Listing and Transplant Outcomes in Children with Single Ventricle Congenital Heart Disease Following Norwood and Bidirectional Glenn: A PHTS Multi-Institutional Analysis**

# PHTS in New Orleans














Ochsner Children's

presented

## 10,000 Strong: Honoring the Journey

**Sunday, November 9, 2025**

**Benson Tower - New Orleans, LA**

## Guest Speaker

**Simon Keith**

The Simon Keith Foundation

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# Job Postings

## NP opportunity at Columbia/CHONY

The Division of Pediatric Cardiology at Columbia University Medical Center (CUMC)/Morgan Stanley Children's Hospital of New York is seeking a Nurse Practitioner to join our team in a full-time position to work within the Pediatric Advanced Cardiac Care and Transplantation Program.

Apply here: https://opportunities.columbia.edu/jobs/nurse-practitioner-columbia-university-medical-center-new-york-united-states-bdba0c30-93f4-4c26-a731-94f454279f80

## NP/PA HF/Tx Opportunity at UPMC Children's in Pittsburgh

We are growing again and looking to add 2 more APPs to our inpatient, dedicated HF and Tx team. We cover a busy primary HF/Tx service and consult daily and directly in the CICU and other units, as appropriate.

*For more information: Dana Schneck, DNP Dana.Casciato@chp.edu*

## Faculty position at Primary Children's Hospital

This is an outstanding opportunity to join a vibrant and collegial academic environment and work in a children's hospital ranked as one of the best in the U.S. The Department of Pediatrics, Division of Pediatric Cardiology at the Spencer Fox Eccles School of Medicine at the University of Utah is seeking a Pediatric Cardiologist with expertise in heart failure, cardiac transplantation, and ventricular assist device support.

*For more information: Adam Ware, MD, Division Chief of Pediatric Cardiology, at adam.ware@hsc.utah.edu.*

## Pediatric Transplant Cardiologist in Kansas City

he Ward Family Heart Center at Children's Mercy Kansas City seeks a board-certified/board-eligible Pediatric Cardiologist to join the Advanced Cardiac Therapies and Transplant (ACTT) Team at the assistant or associate professor level.

*For more information: David Sutcliffe, MD dlsutcliffe@cmh.edu*

## APP Position @ Children's Mercy - Kansas City

The Ward Family Heart Center at Children's Mercy Kansas City is seeking an Advanced Practice Provider to join the Advanced Cardiac Therapies and Transplant (ACTT) Team in a full-time position. Applicants with previous cardiology and/or transplant experience are preferred but not required.

*For more information: David Sutcliffe, MD dlsutcliffe@cmh.edu*

## Faculty Position at Columbia/NYP

Columbia University Irving Medical Center (CUIMC)/Morgan Stanley Children's Hospital-NewYork Presbyterian is seeking new faculty member for our Pediatric Advanced Cardiac Care and Transplantation Program at the Assistant, Associate or Professor level. Applicants must be board certified/eligible in Pediatric Cardiology and will have completed an advanced fellowship in pediatric heart failure/transplantation.

*For more infromation: Marc Richmond, MD, MS mr2306@cumc.columbia.edu*

# Job Postings

### Pediatric Cardiologist Heart Failure and Transplantation at Loma Linda

The division of Pediatric Cardiology at Loma Linda University Children's Hospital is seeking a pediatric heart failure and transplantation physician. Applicants should have formal 4th year fellowship training in pediatric heart failure, cardiomyopathy, transplantation, and mechanical circulatory support and must be board certified/eligible in Pediatric Cardiology. Those with additional interest in pulmonary hypertension medicine are highly encouraged to apply. All academic ranks will be considered, and current trainees are welcome to apply.

*For more information: Ileana Baroi ibaroi@llu.edu* & Dr. Micheal Kuhn mkuhn@llu.edu

**If you have a job posting that you would like to share with the PHTS Membership, visit the PHTS Basecamp board called Resources for Job Opportunities to add your job posting.**