

UT Southwestern
Medical Center
Department of Pediatrics

Pediatric Cardiology
2023 Annual Report

Pediatric Cardiology – 2023 Annual Report

The [Division of Pediatric Cardiology](#) provides comprehensive care for children with congenital and acquired heart disease as well as young adults with congenital heart disease; conducts seminal research; promotes innovation and quality improvement; and oversees an internationally recognized training program.







Under the direction of Nicolas Madsen, M.D., M.P.H., the Division provides services at Children's Medical Center Dallas, Children's Medical Center Plano, Parkland Health, William P. Clements Jr. University Hospital, and across Texas in:

- Outpatient clinics (more than 20,000 visits per year)
- A 32-bed dedicated Acute Care Cardiology Unit
- A 30-bed dedicated Cardiac Intensive Care Unit
- Three comprehensive Dallas-based, and one Plano-based, catheterization laboratories for diagnostic and interventional procedures
- An imaging facility with a 1.5T dedicated cardiac magnetic resonance imaging (MRI) scanner that is conveniently located near the cardiac catheterization lab to support combined MRI-cardiac catheterization procedures
- Imaging facilities in close proximity to the operating rooms, allowing intra- and periprocedural collaboration, including 3D imaging
- Several geographic centers of care dedicated to fetal echocardiography in support of comprehensive and accessible care



Nicolas Madsen, M.D., M.P.H.
Professor, Division Chief

Numbers at a Glance

 <p>Faculty: 39 New Faculty: 12 Promotions: 3 <i>U.S. News & World Report</i>: #35</p>	 <p>Clinical Fellows: 23 Clinical Sites: 4</p>	 <p>Inpatient Encounters: 34,140 Outpatient Encounters: 38,444</p>
 <p>Research Funding Total* Grants: \$54,500 Contracts: N/A Total # Proposals Awarded: 3 Public Federal (# K Awards): N/A Public State of Texas: N/A Other: 3 Revenue from Active Clinical Trials as of 12/31/2023: \$1,203,358</p>	 <p>Active Clinical Trials: 14*</p>	 <p>Conferences/Lectures/Presentations: 60 Publications: 137* Citations: 3,453* Book Chapters: 4</p>

*Sources: Orbit report of RHI032 Organizational Research Dashboard, UTSW Office of Research and Grants Support, Faculty Affairs, Education Alumni Affairs, Clinical Business Operations-invoice creation period for 2023, CVs

Pediatric Cardiology – 2023 Annual Report

Honors/Awards

Best Pediatric Specialists in Dallas, *D Magazine*

- Maria Bano
- Ryan Butts
- Catherine Ikemba
- Matthew Lemler
- Lynn Mahony
- Claudio Ramaciotti
- Surendranath Veeram Reddy
- Joshua Wolovits

Texas Super Doctors, *Texas Monthly*

- Melinda Cory (Rising Star)
- Erin Gordon
- Catherine Ikemba
- Colin Kane
- Javier Lasa
- Matthew Lemler
- Claudio Ramaciotti
- Surendranath Veeram Reddy
- Thomas Zellers

Nathanya Baez Hernandez

- Member – Second International Pediatric Cardio-Oncology Conference Steering Committee

Radomir Chabiniok

- Board of Directors – International Conference on Functional Imaging and Modeling of the Heart (FIMH)

Jordan Ezekian

- Subspecialty Fellow Teaching Excellence Award – Labatt Family Heart Centre Hospital for Sick Children

Mansi Gaitonde

- Fellow – American Society of Echocardiography (FASE)

Javier Lasa

- Clinical Informatics: Certified 1/1/23 – The American Board of Preventive Medicine

Nicolas Madsen

- Outstanding Investigator Award Finalist – Children’s Hospital of Philadelphia

Sadia Malik

- Joint appointment – School of Public Health at UT Southwestern Medical Center
- AHA Award (PI) – AHA Second Century of Science Clinical Fellow Research Education

Top Five Conference Locations:

- 8th World Congress of Pediatric Cardiology and Cardiac Surgery, Washington, D.C., August-September 2023
- American Heart Association Scientific Sessions, Philadelphia, November 2023
- International Conference on Functional Imaging and Modeling of the Heart (FIMH), Lyon, France, June 2023
- ASAIO, formerly the American Society for Artificial Internal Organs, San Francisco, June 2023
- Annual Update on Pediatric and Congenital Cardiovascular Disease, Puerto Rico, February 2023

Pediatric Cardiology – 2023 Annual Report

Education and Training

The Division is dedicated to the training of fellows, residents, and medical students.

Cardiology Fellows: The Pediatric Cardiology Fellowship Program currently accepts four trainees per year in the categorical program. Many fellows choose to complete a fourth year to pursue a specialized clinical interest. All pediatric cardiology faculty are actively involved in the fellows' training. In addition to the categorical three-year fellowship program, we offer additional fourth-year training programs in cardiac critical care, interventional cardiology, advanced cardiac imaging, fetal cardiology, electrophysiology, heart transplantation, preventive cardiology, and prospective clinical and basic research. Categorical fellows rotate through cardiac outpatient clinics, acute care, critical care, preventive cardiology, adult congenital heart disease, cardiac catheterization, electrophysiology, echocardiography, MRI, and cardiac transplantation over the course of their fellowship. They also spend more than a year participating in clinical, translational, or basic science research. The program provides fellows with the training, tools, and philosophy necessary to advance the field of pediatric cardiology within their areas of choice.

First Year

- Anusha Kodidhi, M.D.
- Matthew Mosgrove, M.D.
- Natalia Testo, D.O.
- Byrd Cicero Willis Pineda, M.D.

Second Year

- Sara Alhousseiny, M.D.
- Mohammad Mehdi, M.B.B.S.
- Sarah Zoretic, D.O.

Third Year

- Pezad Doctor, M.B.B.S.
- Lauren Thai, M.D.

Fourth Year

- Manal Alqahtani, M.B.B.S.
- Aya El Jerbi, M.D.
- Sukran Erdem, M.D.
- Stephanie Ghaleb, M.D.
- Tayaba Miah, M.D.
- Maria Ossa Galvis, M.D.

Residents: The Division of Pediatric Cardiology plays a major role in the training of pediatric residents. Training occurs at many levels. Interested residents can also participate in research endeavors with cardiology faculty members.

- Inpatient Training:
 - Three interns and one senior resident typically participate in the acute care cardiology inpatient service, caring for patients on a 26-bed cardiology floor with the supervision of the attending cardiologist.
 - An elective is available for residents to rotate in the cardiac intensive care unit, with the inpatient consult service, or with the transplant/heart failure service.
- Outpatient Training:
 - Second- or third-year residents are able to do an elective in the cardiology outpatient clinic under the supervision of the attending cardiologists. Residents can also rotate in the cardiac imaging laboratory to learn more about echocardiography, cardiac CT, and/or cardiac MRI.

Medical Students: The Division of Pediatric Cardiology provides opportunities for medical students to explore interests in inpatient and outpatient clinical settings.

- Third-Year Pediatric Cardiology Rotations:
 - Acute care cardiology inpatient rotation
 - Pediatric cardiology outpatient clinic
- Fourth-Year Electives in Pediatric Cardiology:
 - Pediatric cardiology outpatient clinic
 - Cardiac Intensive Care Unit
 - Cardiac imaging rotation (MRI, CT, echocardiography)

Pediatric Cardiology – 2023 Annual Report

Research Activities

Members of the Division of Pediatric Cardiology are engaged in multiple research projects to advance the care of children with heart disease.

Basic Science

An exciting new area of investigation is the study of pulmonary arteriovenous malformations. This line of research could result in personalized care to support patients impacted by these malformations and the development of tools to prevent their formation in others. Using mouse models, an investigation is underway to evaluate proteins responsible for injury.

Continued research into proteomic markers associated with poor outcomes in pulmonary hypertension is underway. The focus is the development of novel noninvasive models.

Another new area of investigation is the optimization of cardiovascular support therapy for pediatric patients with end-stage heart failure. Using multimodality data (imaging and cath lab), computational models are being developed to assist in the determination of optimal (VAD) management to improve liver and kidney function.

In close cooperation with the Department of Radiology, we have access to the [Advanced Imaging Research Center](#) at UT Southwestern. This gives our staff members access to novel cardiovascular research technology to contribute to existing research as well as design their own research projects.

A new surgical procedure called ventricular recruitment has been shown to promote the growth of small ventricles in children with single ventricle heart disease. When it is successful, ventricular recruitment allows some children to obtain a normal circulation with a biventricular heart. This approach is actively advanced within the Heart Center at Children’s Medical Center Dallas. We participate in developing methods of identifying whether the “borderline”-size ventricle of a given patient has the potential to grow/remodel. Biological approaches (multiomic profile of cardiac tissue for responders vs. nonresponders using single-cell RNA sequencing and proteomic analysis) and biophysical approaches (estimating myocardial tissue properties, such as stiffness, contractility, or contractile reserve, using in vivo multimodality data and computational models). The “biventricular repair” team is advancing the techniques and preparing a clinical study.

Clinical Sciences

The Pediatric Cardiology Division participates in multiple multicenter trials. In interventional catheterization, current trials are assessing various devices, including those targeting the atrial septum, as well as others focused on the outcomes of stenting the patent ductus arteriosus vs. surgical management.

We are contributing to a quality initiative to assess the care of patients with hypoplastic left heart syndrome. A multicenter effort is also underway to evaluate the use of ventricular assist devices in the pediatric population. In patients with end-stage heart failure, our center is actively involved in multi-institutional studies investigating newer therapies, such as SGLT2-inhibitors and ventricular assist device support in single ventricle infants.

Ongoing areas of research interest include epidemiologic studies of congenital heart disease, both locally and utilizing international registries (Denmark); studies targeting pulmonary vein stenosis in neonates; MRI evaluation of pulmonary hypertension and for postoperative tetralogy of Fallot; exercise cardiology; markers for cardiac transplant rejection; and innovations in noninvasive cardiac monitoring.

Our imaging team is also studying modifiable factors involved in the prenatal mental health of parents of children with concern for complex congenital heart disease.

Efforts are underway to expand our Cardiac Fitness Training Program for patients with complex congenital heart disease, including studies of body composition pre- and post-cardiac fitness training or exercise training in complex patients, including those with heart failure, pulmonary hypertension, transplant, and VAD.

Pediatric Cardiology – 2023 Annual Report

Patient Care

Our faculty offer a comprehensive program of specialized care at [The Heart Center at Children’s Medical Center](#) for children with congenital and acquired heart diseases. The Heart Center's team of professionals includes cardiologists, cardiac surgeons, cardiac intensivists, neonatologists, and cardiac anesthesiologists. In addition to providing the highest-quality clinical and surgical care, we are committed to improving the health of children everywhere by sharing our innovations and research.

Inpatient Services

Our inpatient service is divided between our Pediatric Intensive Care Unit and the Acute Care Cardiology Unit, where all beds have telemetry capability with central monitoring. Both units are leaders in their respective learning network communities (PC4 and PAC3). As a result, both units specialize in guideline-directed therapy and improvement science and demonstrate some of the highest-quality outcomes in North America, as indicated by risk-adjusted registry data.

Outpatient Services

More than 20,000 cardiology outpatients are seen each year at The Heart Center and regional outreach clinics. Subspecialty cardiology clinics – including heart transplantation, heart failure, arrhythmia, pacemaker, preventive cardiology, and young adult congenital heart disease – are held on a weekly or monthly basis.

Multidisciplinary Clinic Programs

Several of our clinics are multidisciplinary, as exemplified by the Preventive Cardiology Clinic, which works to serve children with hyperlipidemia, hypercholesterolemia, and metabolic syndrome (obesity, insulin resistance, increased triglycerides, decreased high-density lipoprotein, and hypertension). Our team of physicians, dietitians, and nurses provides comprehensive physical assessments and dietary evaluations for patients and their families through the development of individualized programs. These clinics are coordinated with the Department of Pediatrics’ Divisions of Endocrinology and Nephrology.

Clinical Activities

Pediatric Echocardiography Laboratory

The Pediatric Echocardiography Laboratory at Children’s Health is accredited by the Intersocietal Accreditation Commission (IAC) for pediatric transthoracic, transesophageal, and fetal echocardiography. Dedicated subspecialty-trained physicians staff the laboratory and provide coverage 24/7. The team consists of highly trained pediatric sonographers who perform more than 15,000 studies a year and provide direct services for three primary hospitals and several outpatient sites. In addition, we provide support services for tele-echocardiography at many additional sites.

The laboratory offers the latest technology, including fetal echocardiography, stress imaging, 3D and strain imaging, and provides imaging support for the cardiac operating rooms, extracorporeal membrane oxygenation cannulation, and catheterization laboratory.

Fetal Heart Program

Our Fetal Echocardiography Program is IAC-certified and has performed more than 500 fetal echocardiograms and consultations in 2023. In concert with Pediatric Heart Specialists, The Heart Center’s outreach, and community-focused cardiologists, the Division continues to expand accessibility. The Fetal Heart Program expertly coordinates prenatal cardiac evaluation and counseling as well as pre- and postnatal cardiac care to ensure critical congenital heart condition patients receive the care they need at precisely the right time. Comprehensive multidisciplinary consultations may include an imaging cardiologist, cardiac nurse, cardiothoracic surgeon, social worker, intensive care cardiologist, electrophysiology nurse, neurodevelopmental psychologist, and an introduction to our Safe-at-Home Program for interstage single ventricle monitoring.

We support the Fetal Heart Society, whose mission is to advance the field of fetal cardiovascular care and science through collaborative research, education, and mentorship as well as participate in the National Pediatric Cardiology Quality Improvement Collaborative, whose mission is to decrease mortality and improve quality of life for all infants with single ventricle congenital heart disease.

Pediatric Cardiology – 2023 Annual Report

Patient Statistics

The following statistics include patient visits to Children’s Medical Center Dallas and Children’s Medical Center Plano as well as our many outreach clinics and our Telemedicine Program.

Cardiology Patient Procedures by Specialization and by Type by Year

Surgical Procedures

	2019	2020	2021	2022	2023
Cardiac Operations (Total)	845	618	519	542	656
ACHD Operations	48	31	26	39	83
Heart Transplant	20	24	19	17	36

Diagnostic Testing and Cardiac Imaging

	2019	2020	2021	2022	2023
Electrocardiograms (CMC Dallas/Plano, THD, Prosper, East Texas, PMH, CUH)	18,511	19,957	22,421	22,329	14,314
Telemedicine EKGs		665	2,908		-----
Echocardiograms (all locations and fellows)	13,179	11,159	12,305	12,975	14,169
Telemedicine ECHOS		880	250	166	135
Fetal Echo (total)	472	308	393	504	506
Fetal Echo – Dallas			215	250	276
Fetal Echo – Plano			178	232	285
Holters (Dallas & Plano)	935	825	1,011	1,236	1,475
Telemedicine Holters		11	44		-----
Cardiac MRIs	897	841	1,056	1,256	1,553
Cardiac CT			398	524	413
Stress Tests	173	160	236	292	334

Cardiac Catheterization Procedures

	2019	2020	2021	2022	2023
Interventional Cardiac Caths	430	413	436	453	627
Biopsy Cardiac Caths	68	97	94	81	75
Diagnostic Cases	136	151	117	120	179
Cath/MRI Hybrid Cases	25	15	30	26	7
EP Studies & Ablation Procedures	89	65	67	67	116
Pacemakers, Event Recorders, and Defibrillators	29	24	23	19	27

Outpatient Clinic Patient Encounters

	2019	2020	2021	2022	2023
Dallas	9,376	8,268	9,154	10,465	11,144
Plano	3,090	2,379	2,830	2,671	2,947
Presbyterian-Dallas	186	129	152	146	106

Pediatric Cardiology – 2023 Annual Report

Top Five Peer-Reviewed Publications and Book Chapters

1. Miles KG, Farkas DK, Laugesen K, Sørensen HT, Kasparian NA, **Madsen N**. [Mental health conditions among children and adolescents with congenital heart disease: A Danish population-based cohort study](#). Circulation. 2023 Oct 31;148(18):1381-1394. PMID: 37721036.
2. Torres G, Yang J, **Griffiths M**, Brandal S, Damico R, Vaidya D, et al. [Insulin-like growth factor binding Protein-4: A novel indicator of pulmonary arterial hypertension severity and survival](#). Pulmonary Circulation. 2023 May 3;13(2): e12235. PMID: 37152104
3. Ganigara M, Sharma B, Doctor P, Nagiub M, Dzelebdzic S, Sebastian R, **Fares M**, Dillenbeck J, **Greil G**, **Hussain T**. [Tolerability and efficacy of a reduced dose adenosine stress cardiac magnetic resonance protocol under general anesthesia in infants and children](#). Pediatr Radiol 2023 Oct;53(11):2188-2196. PMID: 37563320
4. **Gusseva M**, Castellanos DA, Greer JS, Abdelghafar Hussein M, Hasbani K, Greil G, Reddy S, **Hussain T**, Chapelle D, **Chabiniok R**. [Time-synchronization of interventional cardiovascular magnetic resonance data using a biomechanical model for pressure-volume loop analysis](#). Journal of Magnetic Resonance Imaging (JMRI). 2023 Jan;57(1):320-323. PMID: 35567583
5. Ortmann LA, Reeder RW, Raymond TT, Brunetti MA, Himebauch A, Bhakta R, Kempka J, di Bari S, **Lasa JJ**. [Epinephrine dosing strategies during pediatric extracorporeal cardiopulmonary resuscitation reveal novel impacts on survival: A multicenter study utilizing time-stamped epinephrine dosing records](#). Resuscitation. 2023 Jul;188:109855. PMID: 37257678