Texas Children's Heart Center

Volumes and Outcomes

Texas Children's Hospital®

Contents

A Message from Our Leadership

At Texas Children's Heart Center, we're proud to share another year of innovation, collaboration and impact. For more than 70 years, we've been trusted to care for cardiac patients experiencing all types of cardiac conditions, from the most common to the most complex. With a patient population that spans from newborns to adults with congenital heart disease, we deliver outcomes that continue to set national benchmarks.

Consistently ranked as one of the nation's top children's hospitals, Texas Children's Hospital is the largest children's hospital in the U.S. with over five million annual patient encounters system-wide. In 2024, our Heart Center team provided care to more than 34,000 patients and received over 120 international referrals. We performed over 1,100 surgeries, 32 life saving heart transplants, 1,600 interventional procedures, 84 ECMO runs and nearly 40,000 echocardiograms. Every one of these numbers reflects our deep commitment to excellence — and the real lives changed behind the data.

This year's Volumes and Outcomes Report reflects the extraordinary breadth and depth of programs within the Heart Center. Whether pioneering the use of ambulatory ECMO, developing national guidelines, advancing AI in cardiac imaging or growing the reach of our expert team to the Austin area, we remain focused on delivering the highest-quality care, shaped by data, compassion and innovation.

We believe in transparency and continual improvement. Sharing outcomes not only holds us accountable but also informs collaboration with referring providers across the country and around the world. Together, we're driving progress in the field of pediatric and congenital cardiology — and shaping better futures for our patients and their families.

We're honored to share this work with you and grateful for the trust you place in us.

Sincerely,

Daniel Penny, MD, PhD, MHA
Executive Co-Director, Texas Children's Heart Center

Caner Salih, MD, MBCHB, FRCS
Executive Co-Director, Texas Children's Heart Center

Jeffrey Kim, MD
Division Chief, Cardiology

Jeffrey Heinle, MD
Division Chief, Congenital Heart Surgery

Emad Mossad, MD, MBBCH
Division Chief, Cardiovascular Anesthesia

Katri Typpo, MD, MPH
Division Chief, Critical Care

About Us

Heart Center
Overview

The Heart Center at Texas Children's Hospital is headquartered in the Lester and Sue Smith Legacy Tower, located in the Texas Medical Center in Houston. This state-of-the-art center spans nine floors exclusively dedicated to cardiac care, where every floor was purposefully built with one goal in mind: to provide world-class cardiac care in a space that feels as supportive as it is sophisticated.

Our Houston location includes 54 private cardiac intensive care unit rooms, 48 acute care cardiology beds, 16 universal care adult congenital heart beds and 33 outpatient exam rooms. We also house four cardiovascular operating rooms and four cardiac catheterization labs to ensure adequate capacity for our volumes. The Heart Center features a specialized, advanced catheterization room paired with local MRI to assist with diagnostic information, enabling interventionalists to guide procedures, decrease radiation use and perform MRI-guided cardiac catheterizations.

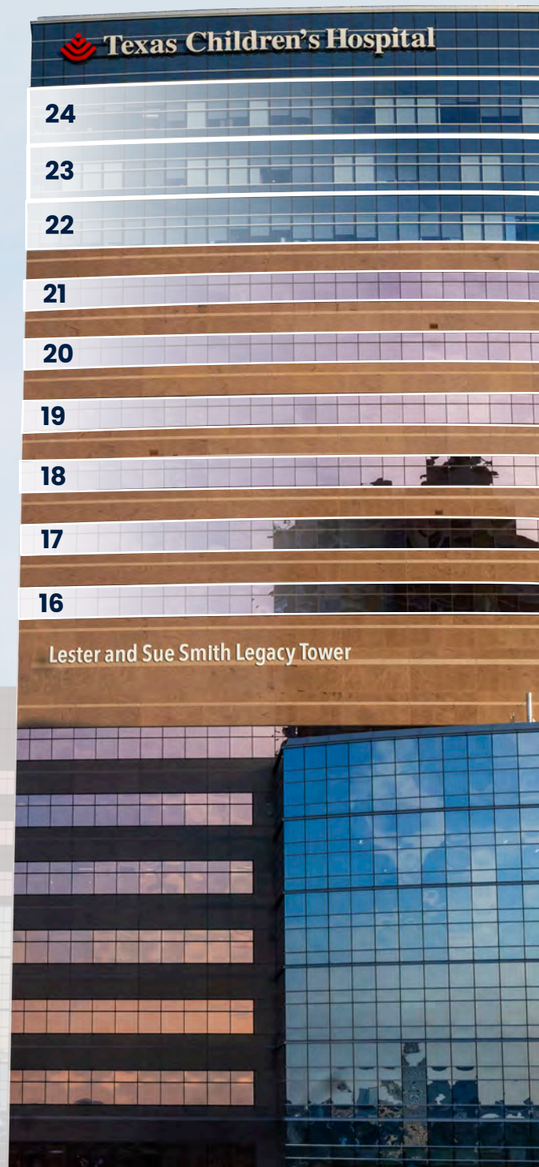
Our dedicated team of over 100 board-certified experts delivers top-tier cardiac care. Our commitment to excellence is reflected in our comprehensive support system for patients, families and referring providers, which includes a referral team, consulting cardiologists, a second opinion team, psychologists and heart-specific gyms and therapies. As the No. 1 pediatric heart center for nine consecutive years, as recognized by U.S. News and World Report, patients benefit from the full spectrum of nationally ranked specialties at Texas Children's, ensuring seamless, comprehensive care.

As part of the largest women's and pediatric health care system, our expertise reaches beyond the Texas Medical Center. Our hospital has two additional campuses in Houston and one in Austin, as well as specialty care clinics around the Houston and Central Texas area.

Legacy Tower
A look inside

Within the Heart Center flagship location, all patient rooms are private, with each floor featuring dedicated space for families. Our stacked-floor design enables team members to respond quickly to patient and family needs or emergencies and promotes collaboration among our multidisciplinary team. We're only seconds away from patients who need care.

- **Level 24**
  Adult Congenital Heart Program clinic and diagnostic lab, cardiac rehabilitation gym and 16 universal care beds equipped for all levels of treatment
- **Level 23**
  Cardiac Patient Care Unit (30 rooms)
  Inpatient physical and occupational therapy gym
- **Level 22**
  Cardiac Patient Care Unit (18 rooms)
- **Level 21**
  Clinics and diagnostic services, including a stress lab, exercise lab, echo and EKG testing
- **Level 20**
  4 cardiac catheterization labs including integrated MRI
- **Level 19**
  Administrative offices
- **Level 18**
  Neonatal Cardiac Intensive Care Unit (12 rooms),
  4 dedicated operating rooms
- **Level 17**
  Cardiac Intensive Care Unit (24 rooms)
- **Level 16**
  Heart Failure Intensive Care Unit (12 rooms)
  Heart Center conference facilities



Expanding to Austin

Our expertise for Central Texas

As a true extension of the No. 1 pediatric heart program in the country, our North Austin campus delivers the same clinical excellence, evidence-based protocols and multidisciplinary collaboration that define Texas Children's Heart Center.

Located within Texas Children's Hospital North Austin, this comprehensive site offers families in Central Texas immediate access to a wide range of cardiac services — including congenital heart surgery, fetal and pediatric cardiology, electrophysiology, advanced imaging and more.

With a strategic focus on accessibility, the North Austin campus is developing a web of specialty satellite clinics throughout the Central Texas region. By offering after-hours appointments, including evening and Saturday clinics, the team is meeting families where they are —logistically and emotionally.

Behind every diagnosis is a highly trained, collaborative team. From fetal cardiologists, congenital heart surgeons and subspecialty trained pediatric and cardiac intensivists to ICU-trained anesthesiologists and cardiologists, the Austin campus expands the integrated, team-based decision-making that defines our Houston locations. Referring providers and families alike benefit from the power of a single care team — backed by Houston's depth of resources delivered with a community, hands-on feel.

With intentional growth, empathetic care and shared values, the Heart Center in Austin is not just expanding its reach — it's expanding what's possible for children with heart disease across Central Texas.

Heart Center and Pavilion for Women

Two centers, one purpose

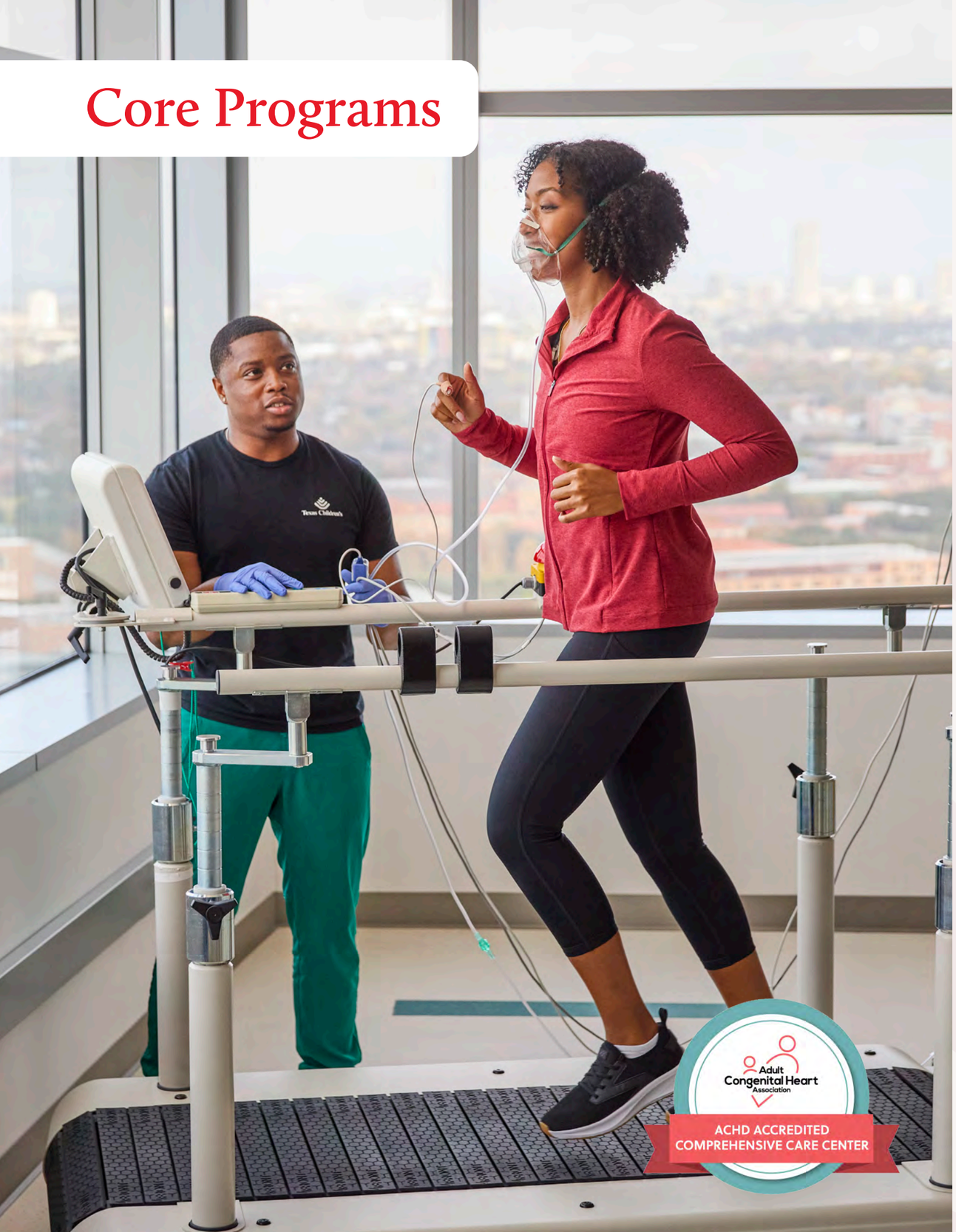
The physical proximity and collaborative spirit between the Heart Center and the Pavilion for Women create a seamless continuum of care that's truly unique. Together, we've built a comprehensive ecosystem that begins before birth and extends well into adulthood — ensuring that every child with congenital heart disease, and every mother with cardiac risk, receives specialized care from day one.

Approximately 80% of congenital heart defects are diagnosed prenatally, making early coordination essential. Because our Fetal Center, Pavilion for Women and Heart Center are housed in the same building, families can meet with maternal-fetal medicine specialists, fetal cardiologists and heart surgeons without ever leaving our campus. When babies are born with known heart defects, our nurse coordinators — who often begin working with families during pregnancy — guide the transition with tours, classes and one-on-one education. This intentional design and warm handoff helps parents feel seen, supported and empowered in an otherwise overwhelming moment.

When the mother's heart health is also a concern, our Maternal Heart Program (see page 45) is there — a one-of-a-kind collaboration where maternal-fetal medicine, adult congenital heart disease (ACHD) and genetic counseling intersect. Whether navigating pregnancy with a known cardiac condition or planning for a future pregnancy, women receive individualized care and coordinated expertise that puts safety first without sacrificing hope.

From preconception to delivery to long-term follow-up, this unique partnership cares for families at the most critical points in their journey. As more children with CHD grow into adulthood, and more adults with CHD become parents themselves, our integrated model ensures we're not just caring for hearts — we're caring for generations.

Core Programs



Adult Congenital Heart Disease (ACHD)

16 variable acuity bed unit | Dedicated adult outpatient clinic

Our program delivers specialized, lifelong care to adults with congenital heart disease (CHD), combining the nation's No. 1 pediatric heart expertise with leading-edge adult cardiac care. Located in our dedicated, 27,000-square-foot ACHD facility, built for adults with CHD, by adults with CHD.

We're the largest accredited ACHD program in Texas and one of the most prominent in the country, offering unmatched depth and breadth of services. Our team consists of 16 board-certified ACHD physicians and adult-trained intensivisits, internal medicine physicians and adult non-cardiac subspecialists offering a comprehensive care system for our adult patients. We tailor each treatment plan to the individual needs of every patient — including specialized care for women with cardiac concerns during pregnancy through our Maternal Heart Program (see page 45).

Our facility is the only one of its kind with 16 variable acuity beds to adapt to each patients' needs and case. Our outcomes speak for themselves: With a surgical case volume of over 110 cases annually and a **1-year survival rate of 96%**, our outcomes for ACHD transplant patients significantly outperform national expectations.

We proudly welcome referrals from across the U.S., offering patients access to the latest research, innovative wellness programs, complex electrophysiology procedures and world-class surgical and transplant care — all within a system designed for their lifelong journey.

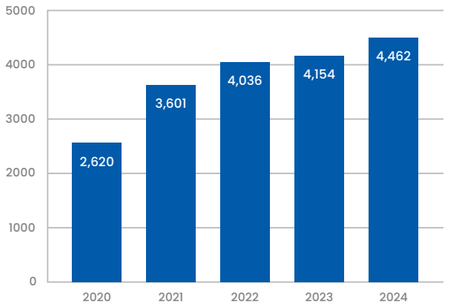
ACHD *at a glance*

- Largest accredited ACHD program in Texas
- Dedicated 27,000 sq/ft facility (first and only of its kind), including a cardiac rehabilitation gym
- Largest dedicated ACHD inpatient unit in the country
- ACHD transplant patients achieve 96% 1-year survival rate
- Surgical outcomes significantly outperforming national expectations
- Full complement of specialists from Baylor College of Medicine
- Cared for 13,000+ ACHD patients since 1995

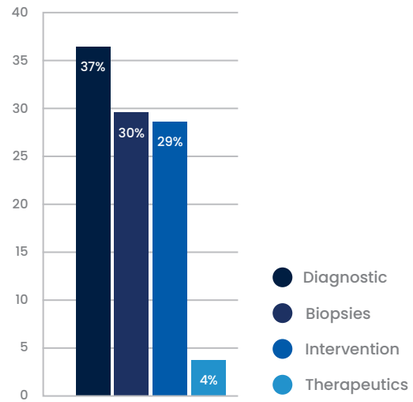
Why Choose Texas Children's Adult Congenital Heart Program?

	Over 13,000 ACHD patients since 1995		Integrated inpatient/ outpatient space
	Individualized care for adolescents through seniors		World's leading experts in congenital heart care

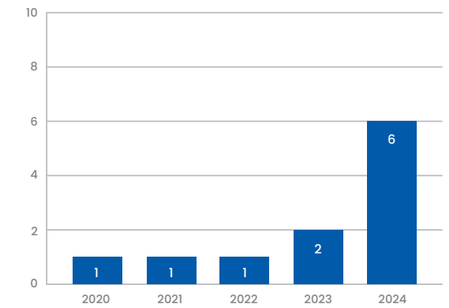
ACHD Outpatient Clinic Volume Per Calendar Year



ACHD Catheterization Case Distribution for 2024



Total Adult Transplants Per Calendar Year



Jessica's story: *A life reclaimed through advanced transplant care*

Jessica had spent her entire life navigating congenital heart disease — from being born cyanotic with a single ventricle defect to undergoing eight open-heart surgeries before her seventh birthday. Decades later, she had achieved her childhood dream of becoming a cardiac nurse, only to face an unexpected turn: heart failure.

By 2021, Jessica's symptoms had progressed, and her cardiologist referred her to Texas Children's Adult Congenital Heart Program — one of the few centers in the country with deep expertise in high-risk adult congenital transplants. Under the care of Dr. Edward Hickey and a multidisciplinary transplant team, Jessica was evaluated for a heart transplant despite the complexity of her condition.

"Jessica essentially has half a heart," Dr. Hickey explains. "These are among the most challenging transplants, and our team is uniquely experienced in managing them."

In October 2024, after a 2-month inpatient stay, Jessica underwent a successful 16-hour heart transplant. The transformation was immediate. For the first time, her hands were warm, her fingers pink. She had the energy to live — not just survive.

Today, Jessica is back in Kansas, training for her first 5K, restarting her nursing career as a cardiopulmonary rehabilitation nurse and making good on a promise to her stepdaughter: a summer rollercoaster ride, made possible by world-class care at Texas Children's.

Congenital Heart Surgery

8 Cardiac surgeons | 12 APPs | 5 State-of-the-art operating rooms

At Texas Children's we are the most respected congenital heart surgery program in the nation, achieving excellent outcomes while seeing some of the highest volumes in the country, performing more than **1,100 cardiac surgeries annually**.

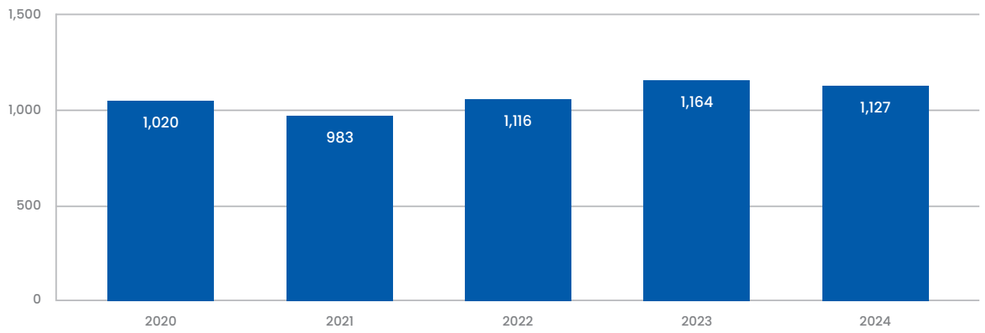
Our program offers every surgical option available for congenital heart disease and defects, spanning the full spectrum of complexity for our patients, ranging from the tiniest newborns to adults with congenital heart conditions.

Our program is supported by 5 state-of-the-art cardiovascular operating rooms with the most advanced technology available, as well as dedicated pharmacy services, perfusionists, and anesthesiologists for every procedure. Each operating room is equipped with an individual thermostat to support temperature needs for even our tiniest patients, dedicated cardiovascular anesthesia equipped with cerebral monitoring and personal monitors projecting the procedure to each team in the room. Patients benefit from a multidisciplinary team that places them at the center of everything we do.

Why Choose Texas Children's Congenital Heart Surgery Program?

Outcomes among the best in the nation	State-of-the-art facilities with dedicated specialists
Full spectrum of surgical procedures available	Expertise in care from premature newborns to adults
National leader in congenital heart disease innovation and therapy development	

Congenital Heart Surgery Case Volume



Data Source: Texas Children's Internal Data

Surgical Outcomes, January 2021–December 2024

Operative and adjusted operative mortality (January 2021-December 2024)

Population	# Eligible	Observed	Expected	O/E Ratio (95% CI)	AMR* (95% CI)
Overall	49/2477	1.98%	2.80%	0.71 (0.52, 0.89)	1.88 (0.40, 2.38)
STAT Mortality Category 1	31/1204	0.25%	0.57%	0.43 (0.09, 1.27)	0.26 (0.05, 0.75)
STAT Mortality Category 2	4/464	0.86%	2.03%	0.43 (0.12, 1.08)	0.86 (0.23, 2.17)
STAT Mortality Category 3	8/365	2.19%	3.11%	0.70 (0.31, 1.37)	2.34 (1.01, 4.56)
STAT Mortality Category 4	20/352	5.68%	7.45%	0.76 (0.47, 1.16)	5.67 (3.50, 8.62)
STAT Mortality Category 5	14/92	15.22%	16.81%	0.91 (0.51, 1.44)	13.89 (7.83, 22.10)

Data in this table is for the four year analytic window of 01/01/2021 to 12/31/2024, inclusive.

**Adjusted Operative Mortality Rate*

Benchmark Operations: Overall Aggregate and Participant-Specific

Mortality and Post-Operative Length of Stay (LOS), Last 4 Years

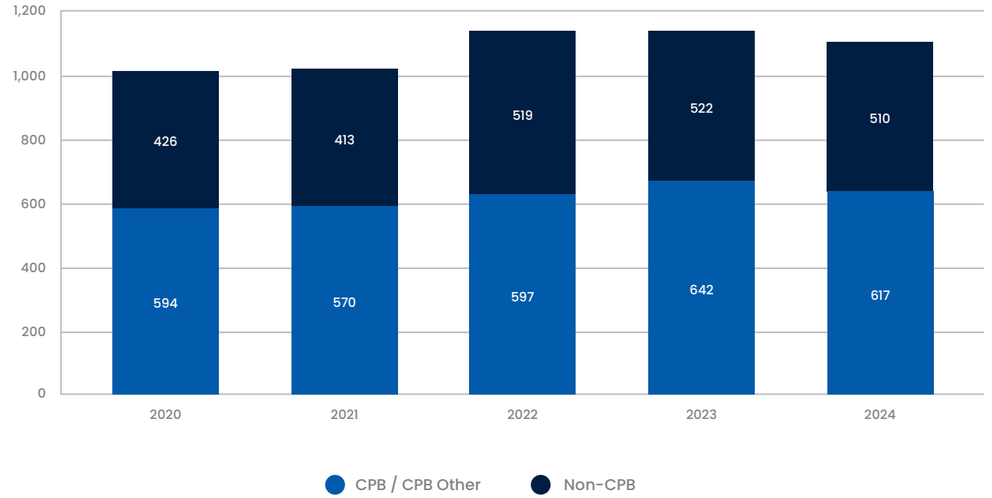
Population	# Eligible	TCH Observed Mortality (Rate)	STS Aggregate Mortality Rate	TCH Median LOS	STS Median LOS
VSD	202	0 (0.00%)	0.31%	4.00	10.19
Fontan	120	1 (0.83%)	0.99%	10.00	12.76
TOF	102	0 (0.00%)	0.65%	7.00	11.95
Glenn/HemiFontan	89	0 (0.00%)	1.34%	7.00	13.31
Off Bypass Coarctation Repair	73	0 (0.00%)	1.20%	11.00	13.87
Norwood	54	3 (5.56%)	12.59%	47.00	51.65
AVC	50	1 (2.00%)	2.31%	11.50	17.10
Arterial Switch	31	0 (0.00%)	1.70%	15.00	18.81
Arterial Switch + VSD	17	0 (0.00%)	4.01%	19.00	21.30
Truncus	17	1 (5.88%)	6.25%	23.50	38.43

Data in this table is for the four year analytic window of 01/01/2021 to 12/31/2024, inclusive.

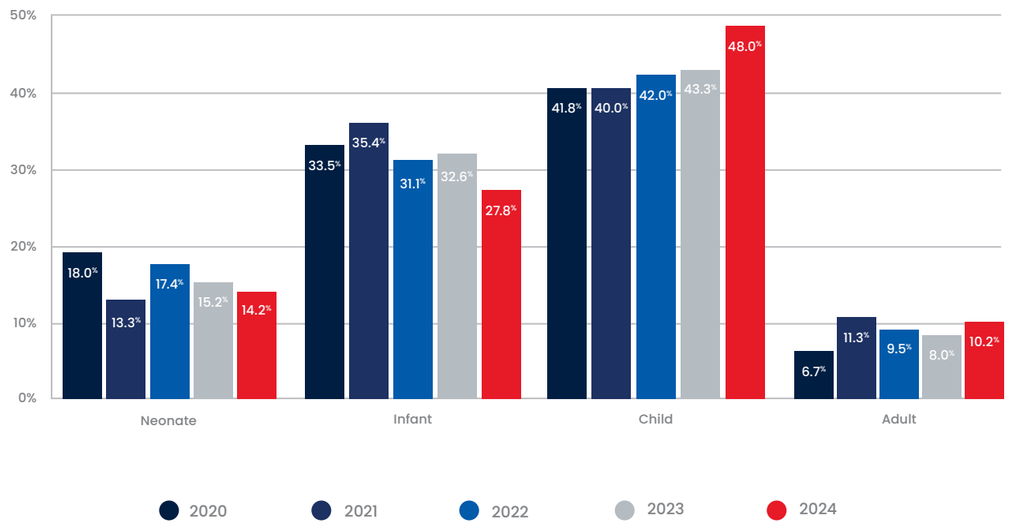
**Post Operative Length of Stay calculation includes operative mortalities*

As the specialty's leader in quality improvement, the STS National Database™ provides a true national benchmark for cardiothoracic surgery. It is one of the largest and most comprehensive clinical registries. STS Aggregate Mortality Rate is based on all participating centers.

Cardiopulmonary Bypass (CPB) Surgery Case Volume



Cardiovascular and Thoracic Surgery Case Volume by Age



Age categories are as follows: Neonates are age 30 days or less from date of surgery, Infants are 31 days to 1 year in age from date of surgery, children are > 1 year to < 18 years in age from date of surgery, and adults are 18 years or more in age from date of surgery.

Electrophysiology

8 Physicians | 1 APP | 2 Genetic counselors

As one of the largest programs in the nation, we provide comprehensive care across the full spectrum of arrhythmia diagnosis, management and advanced therapies.

We specialize in catheter-based electrophysiology studies, pacemaker and defibrillator implantation and innovative treatments for complex conditions like cardiomyopathies and genetic arrhythmia syndromes.

Beyond clinical care, Texas Children's is a leader in research, education and global outreach initiatives, including partnerships like Project ADAM® and the Heart Rhythm Society's Latin American branch, expanding our impact beyond our hospital walls.

From advanced diagnostics and minimally invasive treatments to continuous outpatient follow-up and family support, our Electrophysiology Program offers world-class expertise and compassionate care at every step of the journey. When it comes to treating heart rhythm disorders, there's simply no better choice.

Electrophysiology By The Numbers

55,000+	5,000+	350+	110+
Electrocardiogram readings (ECGs)*	Holter monitor readings*	EP procedures performed*	Lead extractions performed

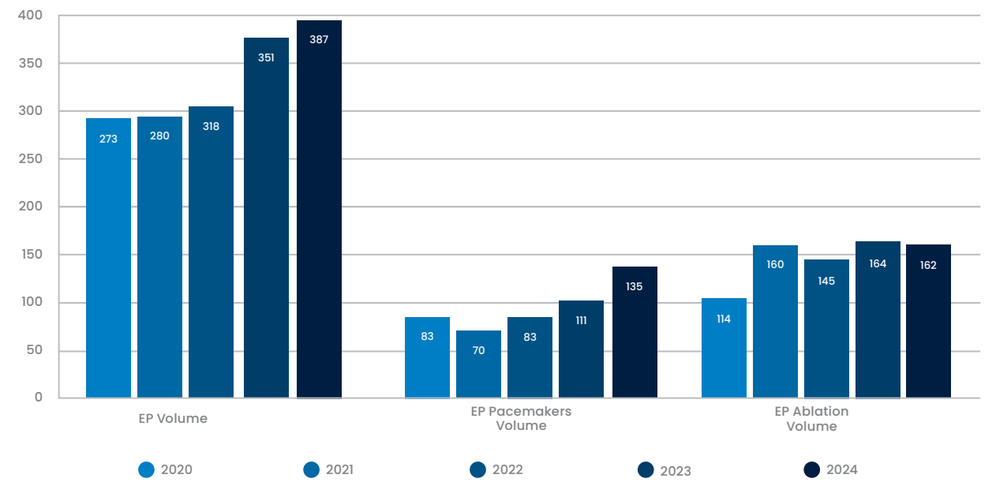
One of the highest volume pediatric programs in the U.S.

**based on annual volumes of 2024*

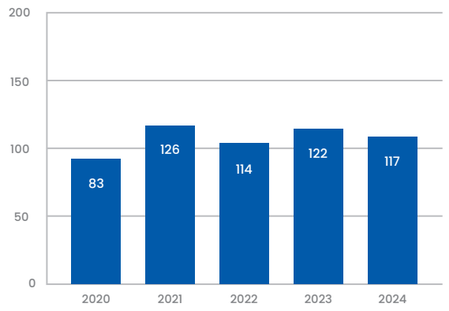
Why Choose Texas Children's Electrophysiology Program?

One of the largest pediatric electrophysiology programs in the U.S.	Success rates for ablation significantly exceed national averages
Innovative treatments: cryoablation, robotic magnetic navigation	National and international research and outreach initiatives
Specialized care for children and adults with congenital heart disease	

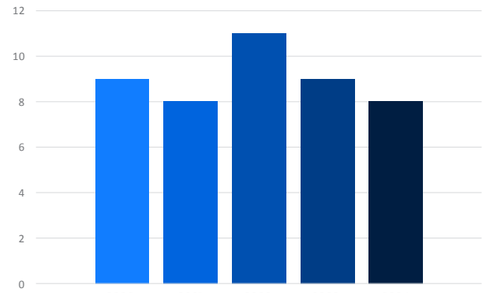
Electrophysiology Case Volume by Type per Calendar Year



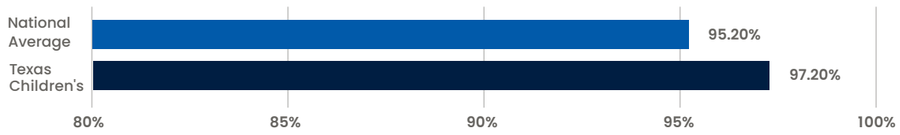
SVT Ablations Per Calendar Year



Lead Extractions Per Calendar Year



SVT Ablation Outcomes Acute Success Rate



Source: Pediatric Radiofrequency Catheter Ablation Registry

Our success rates for ablation procedures significantly exceed national averages, and we're committed to pioneering safer, more effective care by minimizing radiation exposure and offering advanced options like cryoablation and robotic magnetic navigation. Our pediatric electrophysiologists are experts in identifying and treating arrhythmias early, ensuring that patients receive personalized, effective care tailored to their unique needs.

Theo's story: *Pioneering heart care across campuses*

At just 7 years old, Theo has already faced a diagnosis that would challenge most adults: complete heart block, a condition where electrical signals can't travel properly between the chambers of the heart. Despite his diagnosis, Theo is a bright, active and curious kid who loves Legos, gadgets and adventuring with his family. You'd never guess his heart once struggled to keep up.

After years of expert care from Dr. Taylor Howard at Texas Children's in Houston, including a heart procedure at age 4, Theo's heart rate began to slow again. A traditional pacemaker was on the table, but given Theo's predicted growth and young age, his family was looking for something less invasive and more sustainable.

Now back home in Austin, they turned to Texas Children's North Austin Campus, where Dr. Srikant Das — a national leader in both electrophysiology and interventional cardiology — collaborated with Dr. Howard and offered a groundbreaking solution: a leadless pacemaker. This capsule-sized device avoids external wires and long surgical recovery. The procedure would be the first of its kind performed at Texas Children's, and Theo was just barely big enough to qualify.

With support from a cross-campus team, Dr. Das modified the device delivery system to safely fit Theo's anatomy. The result? A seamless placement, no visible stitches and a dramatic improvement in Theo's energy and quality of life just days later.

Fetal Cardiology

20 Specialized providers | 7 Locations

With decades of experience at 7 locations and a legacy of innovation, we offer families world-class expertise from diagnosis to delivery and beyond.

Thanks to the seamless collaboration between Texas Children's Fetal Center and the Pavilion for Women — both housed under one roof — our patients benefit from comprehensive care without leaving the building. Families are able to meet with all other collaborative specialties, including maternal-fetal medicine, prenatal genetics, neonatology, congenital heart surgery, the single ventricle team, and any other needed teams. This proximity enables us to facilitate safe, comfortable deliveries, minimizing the need for elective C-sections and ensuring immediate, critical cardiac care for newborns when needed.

We offer the most advanced diagnostic and therapeutic services available, including fetal cardiac MRI and EKG, maternal hyperoxygenation testing to refine risk stratification and novel fetal cardiac interventions. Texas Children's is proud to perform more fetal atrial septal interventions in hypoplastic left heart syndrome than any other center in the world, recently publishing the largest series ever on these groundbreaking techniques.

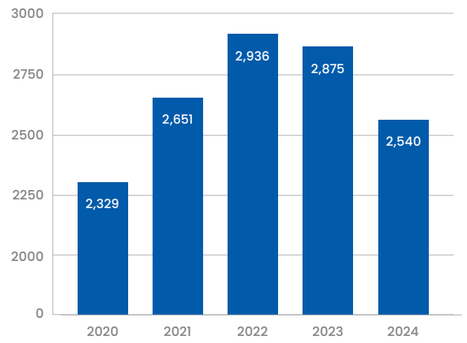
Our program is driven by a commitment to quality. Every fetal case has been rigorously reviewed for quality improvement since 2021, demonstrating our continuous pursuit of excellence. Research is also central to our mission: Our team leads and collaborates on national and international studies, with faculty presenting groundbreaking work across the globe.

Expanded services in Austin now bring our concierge-style fetal cardiology care to more families, with seamless access to maternal-fetal medicine and genetic counseling.

Why Choose Texas Children's Fetal Cardiology Program?

	Concierge-style fetal cardiology services in both Houston and Austin		Internationally recognized for clinical excellence and research
	Seamless delivery and cardiac care at the Pavilion for Women		High-volume program with rigorous quality initiatives
	Largest published series of novel fetal cardiac interventions worldwide		

Fetal Evaluation Visits Per Calendar Year



Decline in volumes is attributed to evaluations no longer being required for IVF in Texas.

Fetal Cardiology Volumes and Outcomes at a Glance

48	Total Cardiac Interventions Since 2012
27	Total Fetal Stent Placement Volume
75%	Fetal Stent Placement Survival Rate

Grace's story:
Coordinated care from the very start

When Brian and Tiffani went in for a routine 20-week anatomy scan, they never expected to hear that their baby had a complex and life-threatening heart condition. Grace was diagnosed with a single ventricle heart defect — a rare congenital condition requiring expert, multidisciplinary care from day one.

Referred to Texas Children's just days after the initial scan, the family was immediately connected with our Fetal Cardiology team, where they saw Dr. Joshua Kailin. With a comprehensive diagnosis in hand and a clear plan forward, Grace's care team outlined a three-stage surgical journey tailored to her needs.

Her first surgery — a palliative arterial switch operation at Texas Children's — was performed at just 1 week old. She underwent a second surgery at 4 months and she's now seen by Dr. Rocky Tsang who leads our nationally recognized Single Ventricle Program. Her final surgery will come before age 6.

Throughout her care, Grace has benefited from seamless collaboration between cardiology, surgery, developmental care and support services. Her family emphasizes the compassion and expertise that have carried them through every step.

"Texas Children's has given us the resources and support to give Grace her best life," said Tiffani. "We know they will continue to help us best meet Grace's needs for a long, fulfilling life."

Fetal Atrial Stent Outcomes

27 with severely restrictive or intact artial septum undergoing intervention

20 technically successful

Fetal

Postnatal

20 liveborn

5 deaths

15 alive

1 post Ross (mitral valve dysplasia)
2 post Norwood
6 post Glenn
6 post Fontan

75% Surivival in Technically Successful

Inclusion Criteria

- Singleton Pregnancy
- Fetal hypoplastic left heart syndrome (HLHS) or evolving HLHS, or HLHS variant (double outlet right ventricle with mitral stenosis/ atresia and aortic stenosis) with restrictive and/or intact atrial septum with pulmonary vein forward to reverse flow VTI ratio <3.
- Gestational age at the time of the procedure will be between 28 0/7 and 31 6/7 weeks, referral appreciated as soon as restricted or intact septum noted.
- Absence of chromosomal abnormalities and major associated anomalies.
- The family meets psychosocial criteria (sufficient social support, ability to understand the requirements of the surgery).

Exclusion Criteria

- Severely hypoplastic left atrium and/or complex left atrial anatomy (complex cor triatriatum.)
- Increased risk for preterm labor including short cervical length (<1.5 cm), history of incompetent cervix with or without cerclage.
- Placental abnormalities (previa, abruption, accreta) known at time of evaluation.
- Maternal-fetal Rh alloimmunization, Kell sensitization or neonatal alloimmune thrombocytopenia affecting the current pregnancy.
- Maternal medical condition that is a contraindication to surgery or anesthesia.
- Maternal HIV, hepatitis-B, hepatitis-C status positive because of the increased risk of transmission to the fetus during maternal-fetal surgery.
  If the patient's HIV or hepatitis status is unknown, the patient must be tested and found to have negative results during evaluation.
- Low amniotic fluid volume (amniotic fluid index <6 cm) if deemed to be due to fetal anomaly, poor placental perfusion or function, or membrane rupture.
- Patient does not have a support person (i.e. spouse, partner, family member or close friend) available to support the patient for the duration of the pregnancy.
- Inability to comply with the travel and follow-up requirements.

Heart Failure and Transplantation

8 Physicians | 2 APPs

As the first accredited pediatric heart failure institute in Texas and home to the nation's first Heart Failure Intensive Care Unit, we have a legacy of delivering specialized, multidisciplinary care that optimizes outcomes and quality of life.

We manage over 2,000 heart failure and cardiomyopathy encounters annually, offering individualized medical therapies, mechanical circulatory support and surgical options. Our ventricular assist device (VAD) program — one of the largest and most comprehensive in the world — performing over 40 procedures with VAD devices each year, pioneering their use for both recovery and as a bridge to transplant.

Our Heart Transplant Program, one of the nation's largest, has performed over 600 transplants with outcomes among the best in the country. We're proud to lead innovations that support neonates, children with congenital heart defects and adult congenital heart disease patients who require complex, tailored transplant strategies.

Our program is deeply committed to advancing care through research, participating in multicenter studies on personalized immunosuppression, emerging therapies and noninvasive rejection detection technologies. We also work tirelessly to reduce the burden on families, offering flexible pre-transplant care models whenever possible.

For referring physicians, we act as true partners in managing advanced heart failure and transplant patients, maintaining seamless communication and support from initial consultation through post-transplant follow-up.

One of the nation's largest heart transplant programs in the country

2000+ heart failure and cardiomyopathy encounters annually

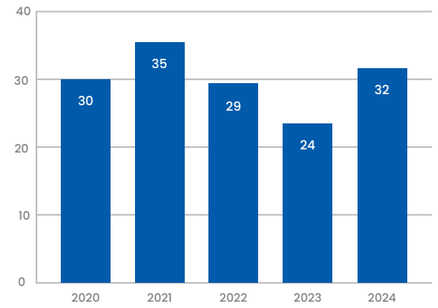
600+ transplants performed since program inception

400+ Pediatric VAD implants since program inception

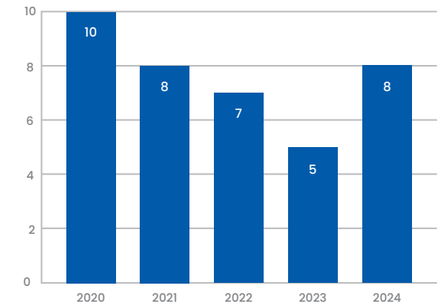
Why Choose Texas Children's Heart Failure and Transplantation Program?

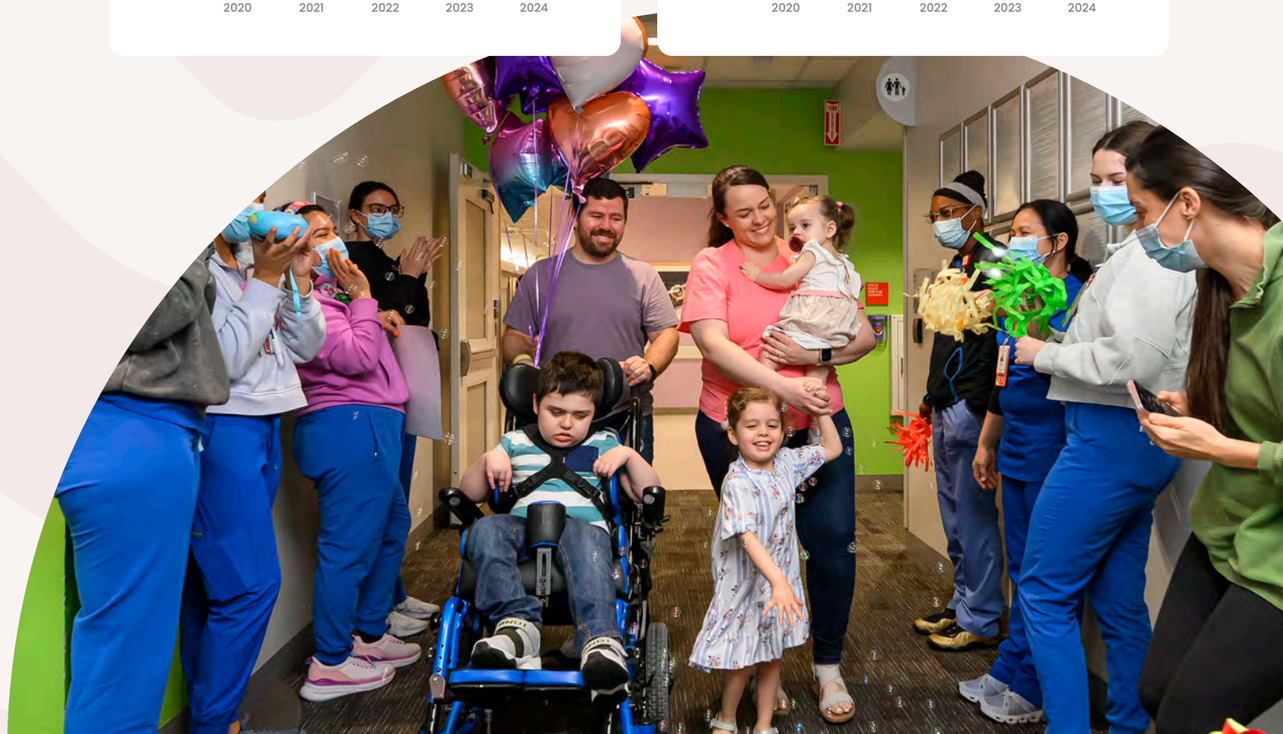
- Over 600 heart transplants performed since 1984
- Pioneers in using VADs for both recovery and as a bridge to transplant
- Specialized expertise for neonates and ACHD patients
- One of the largest and most successful VAD programs worldwide

Heart Transplant Volumes per Calendar Year



Lung Transplant Volumes per Calendar Year

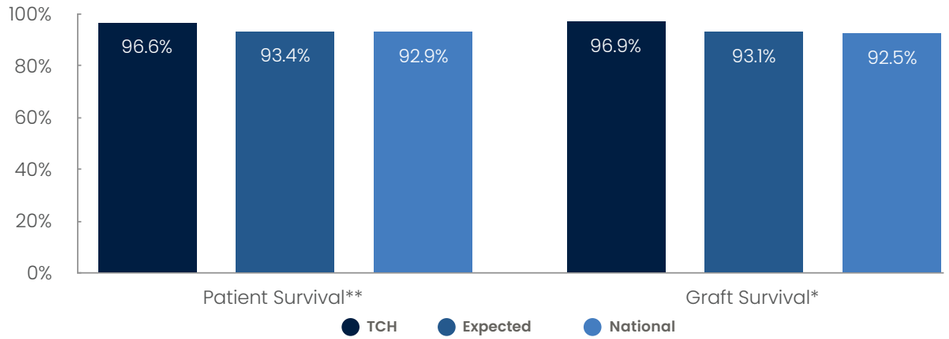




Heart Transplant Outcomes

One Year Pediatric Patient and Graft Survival

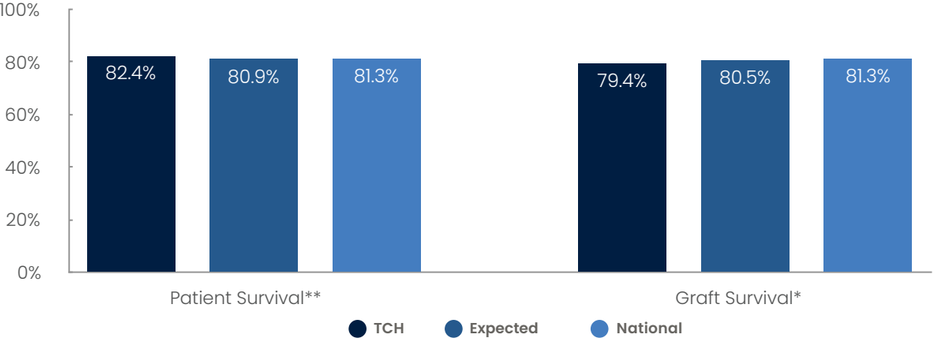
Based on 65 transplants performed January 1, 2022 to June 30, 2024.



Lung Transplant Outcomes

One Year Pediatric Patient and Graft Survival

Based on 17 transplants performed between January 1, 2022 to June 30, 2024.



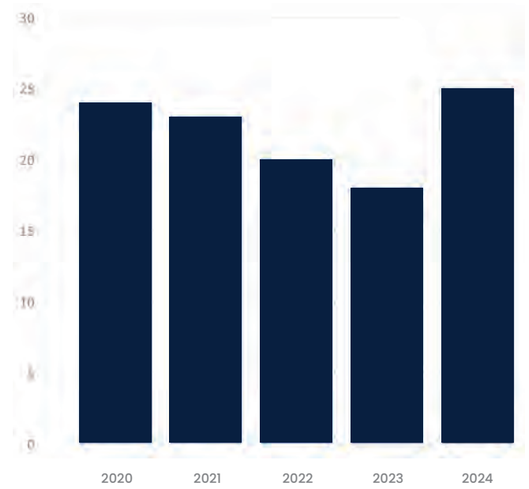
*There is not a significant statistical difference between Texas Children's rates and the expected rates
**Re-transplants are excluded in patient survival statistics

Innovation at Texas Children's

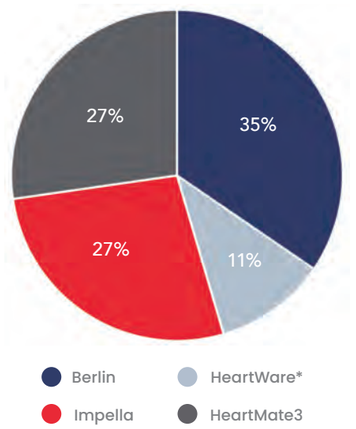
Beyond clinical care, Texas Children's is leading the future of congenital heart surgery. We were the lead center in the pivotal national study of the Berlin Heart EXCOR Pediatric Ventricular Assist Device — the only FDA-approved VAD for infants.

Our Pediatric Cardiac Bioengineering Lab, in collaboration with Rice University, continues to pioneer groundbreaking therapies that will shape the future of cardiac care.

VAD Implants Per Calendar Year



VAD Implants By Type



**HeartWare was taken off the market and no longer able to implant following our 3rd implant in 2021.*

Kamdyn's story: *Two transplants, one remarkable fighter*

By the time Kamdyn turned 6, he had already faced more than most do in a lifetime. Diagnosed with dilated cardiomyopathy at just 9 months old, he came to Texas Children's Hospital after his primary care physician in Beaumont recognized the urgent need for advanced cardiac care. That's when Kamdyn's journey with our Heart Center began.

Under the care of Dr. Joseph Spinner and a multidisciplinary transplant and ECMO team, Kamdyn underwent his first heart transplant in 2020. But in 2023, shortly after starting pre-K, a persistent fever and elevated heart rate revealed a devastating complication: graft failure. Once again, Kamdyn would need a new heart — and quickly.

He spent months in the CICU, relying on ECMO support for over 1 year while awaiting a donor heart. Despite the challenges, Kamdyn's spirit never wavered. He celebrated his sixth birthday in the hospital with a party from the nursing staff and remained the heart of the unit — remembering every caregiver, sharing music and lighting up the halls.

In December 2024, Kamdyn received his second transplant. The procedure was a success, and today, he's thriving: playing with his twin brothers, planning beach trips and dreaming of school, sports and adventures ahead.

For our team, Kamdyn is more than a patient — he's a superhero.

Interventional Cardiology

8 Physicians | 2 APPs

With over 1,600 cardiac catheterizations performed annually and an extraordinarily low complication rate, we're trusted by families and referring physicians across the region and the nation.

From routine procedures like balloon valvuloplasty and transcatheter pulmonary valve replacement to advanced interventions for pulmonary vein stenosis, hypoplastic left heart syndrome and coronary artery anomalies, our specialists tailor each treatment to the patient's unique anatomy and needs.

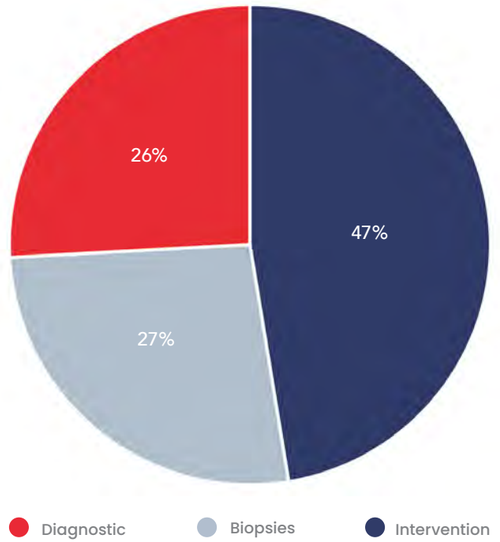
Texas Children's is proud to lead the way in fetal interventions, including atrial septal stenting, offering hope to the tiniest patients before birth. Our interventional cardiologists are also actively developing new technologies, leading and participating in national and international clinical device trials that are shaping the future of heart care.

With innovation, compassion and collaboration at every step, we redefine what's possible for patients with heart disease.

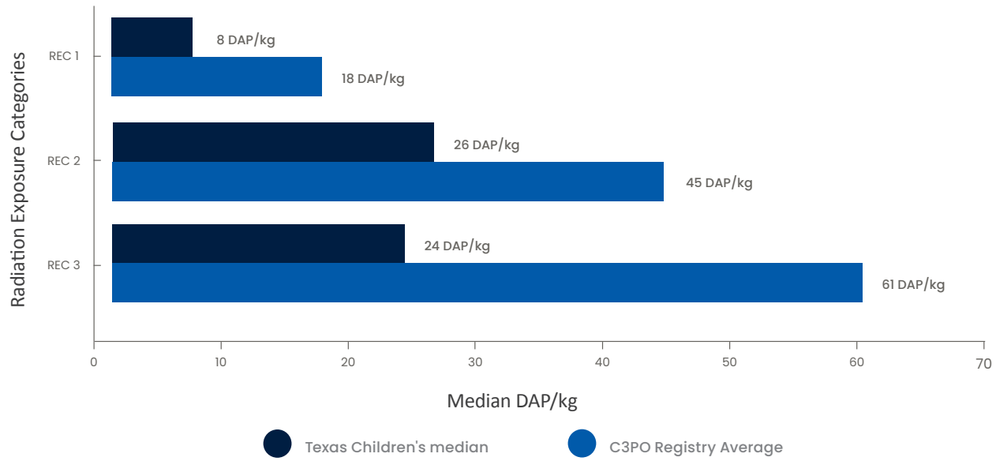
Why Choose Texas Children's Interventional Cardiology Program?

- Leaders in device innovation and clinical trials
- Full range of interventional procedures for complex heart disease
- 1,600+ interventional cardiac procedures annually
- Exceptionally low complication rates
- Experts in fetal atrial septal stents and rare congenital conditions

5 Year Distribution by Case Type (2020-2024)



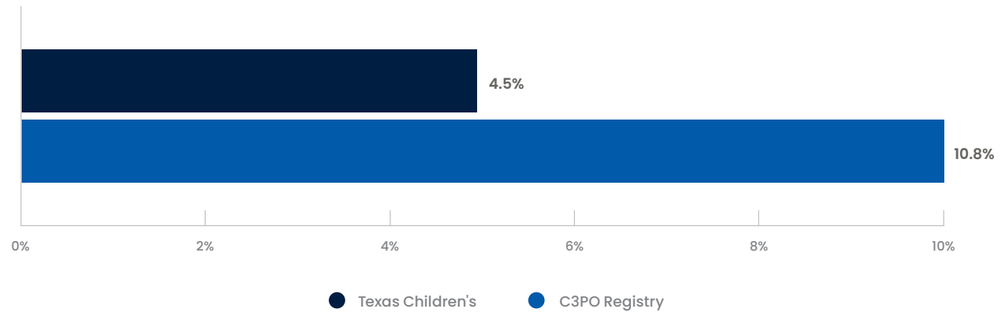
2024 Radiation Exposure: TCH vs. National Average



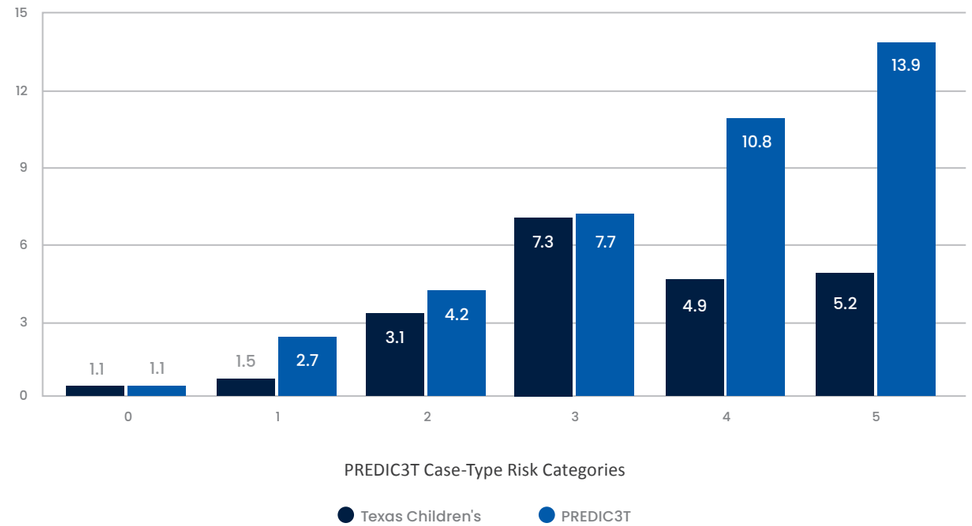
Procedures are grouped into three categories: REC 1 (low exposure), REC 2 (moderate exposure), and REC 3 (higher exposure) based on the amount of radiation used, which is measured in DAP/kg (Dose Area Product per kilogram). Texas Children's is committed to using the lowest radiation doses possible while ensuring safe, effective treatment. Compared to the registry average, our radiation levels are consistently lower, meaning safer procedures for our patients.

C3PO: Congenital Cardiac Catheterization Outcomes Project

2024 Adverse Event Frequency



Major Adverse Event Rate based on PREDIC3T Risk
Jan 2023-Dec 2024



Second Opinion

When a heart diagnosis carries life-changing decisions, a second opinion from the experts at Texas Children's can offer clarity, reassurance and a clear path forward. Our formalized Second Opinion Program, launched in 2022, was designed to make world-class expertise accessible to families everywhere — without the need for travel.

Our Approach

A multidisciplinary team of specialists from cardiac genetics, cardiac surgery, heart failure/transplant, interventional cardiology and radiology reviews every case to ensure a thorough, consistent evaluation.

- Every physician is contacted to review and discuss our recommendations, ensuring seamless communication
- Each recommendation is delivered in a detailed letter explaining not just what we recommend, but why

With over 600 opinions provided to families across 48 U.S. states and 30+ countries, our program has rapidly become a national leader. Physicians and families alike praise our program's fast turnaround times, outstanding organization and compassionate approach. For inpatient cases, we provide opinions within 48 hours — often sooner — because we understand that timely decisions can be critical.

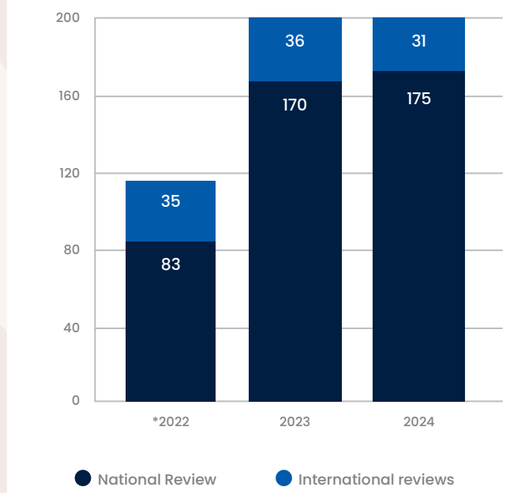
Families, even those facing terminal diagnoses, find peace in knowing they've received an in-depth, unbiased review from one of the nation's top heart centers — without pressure to transfer care.

At Texas Children's, we believe every child deserves the best possible chance and every family deserves the confidence of an expert opinion. For more information on how to request a Second Opinion, see our Contact Us section (page 72).

Why Choose Texas Children's Second Opinion Program?

	Free* — making expert care accessible to all		Multidisciplinary review by leading pediatric heart specialists
	48-hour turnaround time for inpatient requests		Personalized phone calls to every physician
	Fastest and most detailed second opinion program in the nation		

In the event an additional scan is required, patient family is financially responsible for the cost of testing/imaging.



Our Second Opinions Reach all over the world

428 Cases Nationally

109 Cities

42 States + Puerto Rico

102 Cases Internationally

28 Countries

Cumulative by the numbers through 2024

Noah's story: *A second opinion that changed everything*

At 16, Noah faced the unthinkable. After years of managing congenital heart disease, including Tetralogy of Fallot and a missing pulmonary valve, he began experiencing chest pain, shortness of breath and fatigue. A local cardiologist told his family the grim news: Noah's heart and lungs were failing, and he would need a double transplant to survive.

But Noah's mother, a nurse, wasn't ready to accept that treatment plan without exploring every option. That's when they turned to the Second Opinion Program at Texas Children's Heart Center.

Led by Dr. Emily Lawrence, our team re-evaluated Noah's case with advanced imaging and expertise in complex congenital heart conditions. The result?

Noah didn't need a heart–lung transplant after all. His symptoms were caused by a failing conduit placed in early childhood — something that could be surgically repaired.

In August 2024, Dr. Iki Adachi performed an 18-hour surgery to replace the conduit and repair Noah's tricuspid valve. Knowing Noah is a dedicated violinist, Dr. Adachi placed the bypass incision on the opposite side of his neck, ensuring he could return to playing without discomfort.

Today, Noah is thriving: back to school, physical activity and music. His story is a testament to the power of specialized care, surgical precision and the life-changing impact of a second opinion.

Marquee Programs

Cardiac Developmental Outcomes

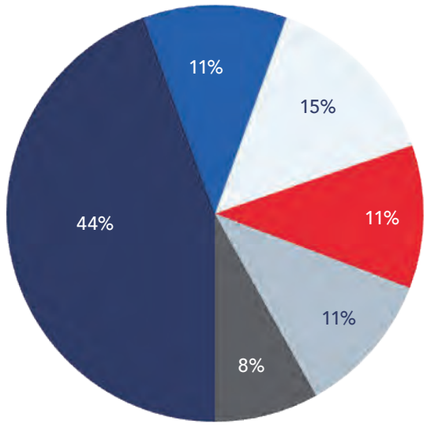
The journey for children with congenital heart disease (CHD) extends far beyond surgery or hospitalization. More than 75% of these children will face a neurodevelopmental delay in at least one domain — from attention and behavioral challenges to language, motor and learning delays that can affect them throughout their lives. That's why our program was created over a decade ago: to ensure that every child and family receives the support they need to thrive, not just survive.

Our program, the most mature and comprehensive of its kind in Texas, combines early detection, evidence-based intervention, and longitudinal monitoring. With over 600 clinic visits annually and hundreds of inpatients assessed each year, the Cardiac Developmental Outcomes Program offers integrated, holistic support beginning prenatally for parents of children diagnosed with CHD, and at birth and continuing through adolescence. For many, services begin with prenatal consultations and developmental rounds during hospitalization for babies under 6 months old.

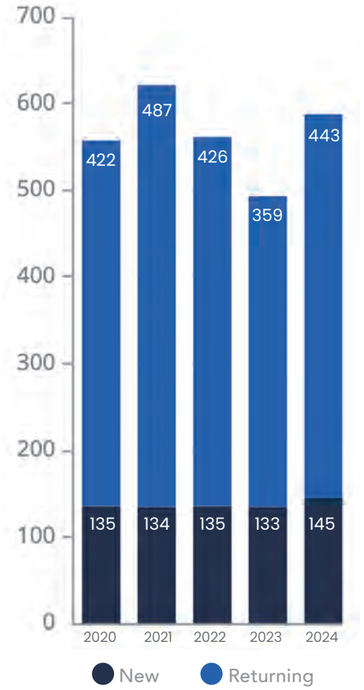
Unlike most programs, we provide developmental care in-house, initiating care before discharge and without requiring patients to leave the facility.

At Texas Children's, developmental care isn't an afterthought — it's a core part of our mission. Because every child deserves the opportunity to reach their full potential.

Referrals by age



Total Clinic Volume per Calendar Year



Why Choose Texas Children's Cardiac Developmental Outcomes Program?

	Inpatient and outpatient support		Full team: developmental pediatricians, psychologists, OT/PT, social workers
	Full complement of specialists from Baylor College of Medicine		Seamless transition to ACHD Program as children become adults
	Care begins as early as prenatal support and continues through birth and adolescence		

Cardiac Transition Medicine

Pediatric care doesn't end at adolescence — it evolves. Our program ensures that young adults with congenital heart disease (CHD) move seamlessly into adult care, equipped with the knowledge and skills to manage their health independently.

Our approach is hands-on, individualized and accessible. We use a transition readiness tool, visual and interactive learning strategies and motivational interviewing to tailor learning to the patient's strengths and deficiencies. Resources are available in English or Spanish, and we work with both patients and parents to promote shared understanding.

Each visit precedes a cardiologist appointment, giving patients real-time opportunities to apply what they've learned. As the patient nears adulthood, a dedicated "adult planning" visit includes a formal handoff to an adult congenital cardiologist, complete with transfer summaries, advanced care planning and scheduled follow-up.

We're not just preparing teens for their next doctor — we're building confident, lifelong partners in their own cardiac care.

	What parents can expect	What patients can expect
14 years old	Meet the team, discuss individual learning plan and transition expectations	Meet the cardiology transition team and learn about the process and opportunities
15–16 years old	Serial educational visits, targeted resources, encourage shared decision making	Complete transition readiness assessments, individualized CHD education and health care skills training
17 years old	Transition to a supportive role and prepare for child's health care changes at 18 years old	Take ownership of your health care and identify lifelong care plan
18–21 years old	Adult planning visit and prepare for transfer of care to adult specialist	Mastery of disease knowledge, health care skills and transfer to adult care

Upon starting our program

52% have minimal or no understanding of their congenital heart disease (CHD)

35% feel they have minimal or no skills to prepare for adulthood

After starting our program

63% are mostly or fully engaged in their future heart care

32% of patients report being ready for change

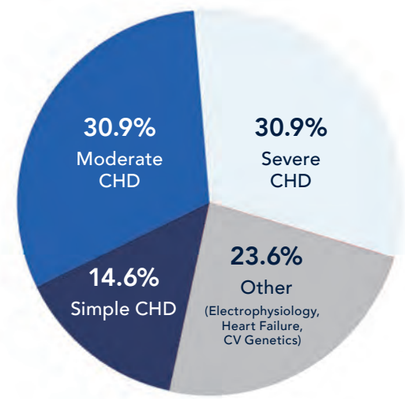
31% of patients are changing or maintaining their new more mature behavior

**Based on questionnaire given at the first and last appointment with Transition team*

Why Choose Texas Children's Cardiology Transition Medicine Program?

- Dedicated social worker and nurse navigator
- Coupled clinic model allows real-time skill practice
- Active research program to improve follow-up and long-term outcomes
- Bilingual resources and family education support

Cardiology Transition Medicine Patient Population



400+ Patient encounters annually

Over 76% of patients have some form of congenital heart disease

Cardiovascular Genetics

Heart disease doesn't always start in the heart — sometimes, it starts in the genes. Our program delivers expert diagnosis, counseling and long-term management for children and families affected by both inherited and non-inherited (acquired) heart conditions.

With over 2,000 clinic visits annually, our multidisciplinary team — including genetic counselors, cardiologists, advanced practice providers and nurses — offers one of the most comprehensive cardiovascular genetics services in the nation. We focus on 4 key areas: heritable aortic disease, congenital heart defects, arrhythmias and cardiomyopathy.

Our care is family-centered. Heart conditions in children prompt evaluation and care for parents and siblings, enabling us to support the entire family in a single, coordinated program.

Research and innovation are core to our mission. We lead the Collaborative for Longutudinal Aortic Research In The Young (CLARITY) Registry, the world's largest pediatric aortic disease registry, and contributed to the first American Heart Association scientific statement on cardiovascular management of aortopathy. We serve as the medical home for many families with genetically-mediated conditions, like Marfan syndrome, Vascular Ehlers-Danlos syndrome, Loeys-Dietz syndrome, and Williams syndrome. Our team also advances care for ultrarare disorders, such as FLNA deficiency, Myhre syndrome, and arterial tortuosity syndrome. Our team is an international leader for TANGO2 research and is involved with gene therapy trials for cardiomyopathy.

At Texas Children's, we don't just treat genetic heart conditions — we help families understand them, manage them and plan for a healthier future together.

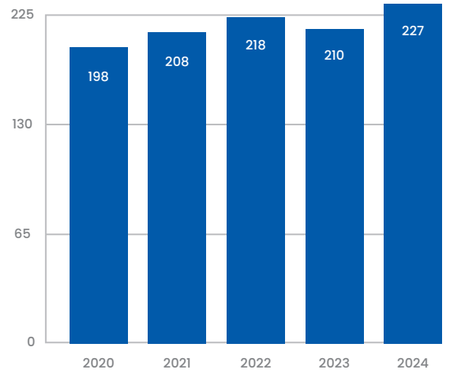
Genetic Visits Per Calendar Year

Year	Cardiomyopathy	EP	CHD and Aortopathy	Total
2020	0	210	700	910
2021	371	266	870	1,507
2022	787	390	986	2,163
2023	607	395	942	1,944
2024	574	391	1,056	2,021

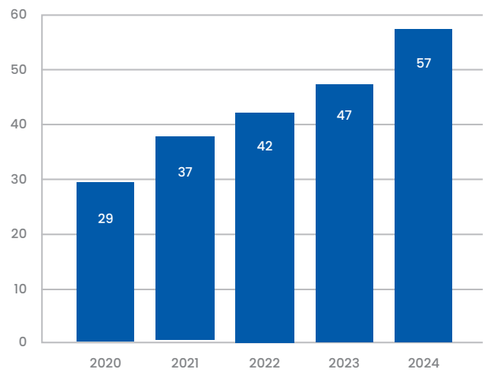
Why Choose Texas Children's Cardiovascular Genetics Program?

- Full-spectrum care for heritable heart conditions
- Care for the entire family across all ages
- Steered the first AHA scientific statement on cardiovascular management aortopathy
- Home to the world's largest pediatric aortic disease registry (CLARITY Registry)

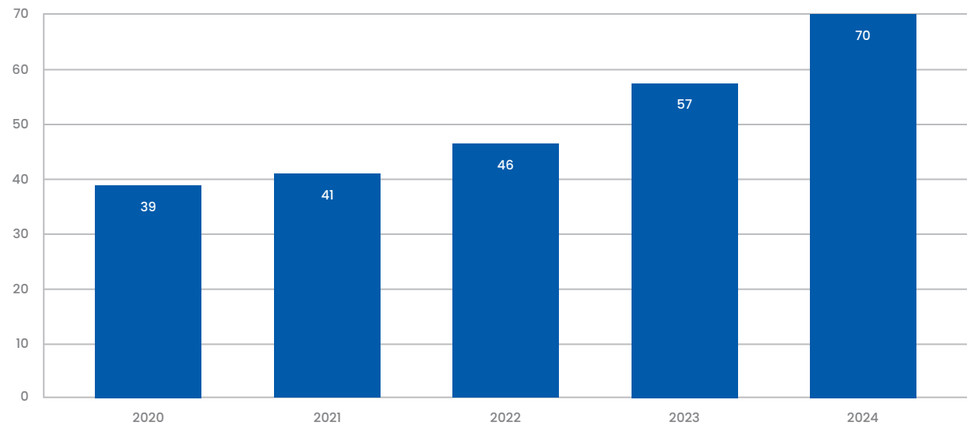
Marfan Syndrome Patient Count Per Calendar Year



Vascular Ehlers-Danlos Syndrome (vEDS) Patient Count Per Calendar Year



Loeys-Dietz Syndrome Patient Count Per Calendar Year



Coronary Artery Anomalies

With over 12 years of experience, our program is the first and most established program of its kind. We provide care for the largest single institution cohort of pediatric patients with coronary artery anomalies (CAAs), receiving patients from more than 40 states to our program.

Our program specializes in the diagnosis and management of conditions like anomalous aortic origin of a coronary artery and myocardial bridge, among others such as coronary artery atresia — these conditions can pose a risk of sudden cardiac arrest or death in young athletes. Our team uses a standardized, evidence-based approach to assess risk, drawing on the most extensive data set in the world and a dedicated, multidisciplinary team.

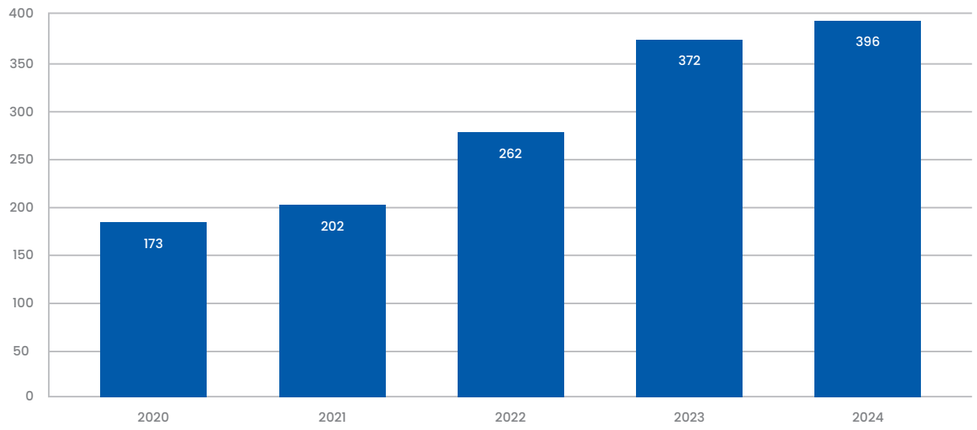
Evaluations typically take 3–4 days and include stress cardiac MRI, exercise stress testing and advanced cross-sectional of the coronaries with a CT angiogram — all guided by algorithms developed right here at Texas Children's. To date, our team has performed more than 600 stress cardiac MRIs and published the most influential data on CAA evaluation and management, including multiple high-impact papers in 2024 alone.

If your patient has been diagnosed with a coronary artery anomaly, there is no better place for expert evaluation and thoughtful care than Texas Children's — the global leader in clinical management, research and family-centered support.

Inaugural Professor Paolo Angelini Memorial Lecture

Our leadership also extends to education and advocacy — from launching the inaugural Professor Paolo Angelini Memorial Lecture at the 6th Coronary Artery Anomalies Symposium in 2024 to helping establish the non-profit National Coronary Anomalies Foundation.

CAA Patient Count Per Calendar Year



Why Choose Texas Children's Coronary Artery Anomalies Program?

- First and most experienced CAA program in the world
- Most influential contributor to global CAA research
- 12+ years of specialized expertise
- Helping shape CAA programs at centers nationwide
- Concierge-style support for families and referring providers

Our 360° approach

- Hepatology
- Pulmonology
- PHTN
- Pyschology
- Exercise Physiology

Fontan Go!

Completing the Fontan procedure is just one step in a lifelong journey. While surgery is typically completed by age 5, the impact of Fontan physiology continues across a child's lifetime, affecting the heart, liver, lungs and more. That's why we created Fontan Go!, a program designed to support children and adolescents with Fontan circulation as they grow, from thriving in school to transitioning into adulthood.

In 2024, we launched a dedicated ACHD-focused Fontan Go! clinic for patients 16 and older, recognizing the unique medical and social needs of older adolescents and young adults.

As one of only a few dedicated Fontan programs in the country — and the only one of its kind in the region — Texas Children's has become a national referral center for all types of Fontan patients. We're involved in the Fontan Outcomes Network and actively contribute to national registries and research, publishing in leading journals and developing clinical tools that shape care nationwide.

From school-age to adult transition, Fontan Go! helps each patient navigate the journey with strength, knowledge and support.

Why Choose Texas Children's Fontan Go! Program?

	Personalized, whole-person wellness model for lifelong care		Nationally published research and registry-based insights
	Dedicated ACHD team for patients 16+		More than 17 years of institutional experience with Fontan care

Kawasaki Disease

Our program delivers expert, multidisciplinary care for children affected by Kawasaki disease, vasculitis, lupus and other inflammatory cardiovascular conditions. Originally focused solely on Kawasaki disease, the clinic has expanded to address a growing spectrum of pediatric inflammatory diseases with significant cardiac involvement, seeing over 300 clinic visits every year.

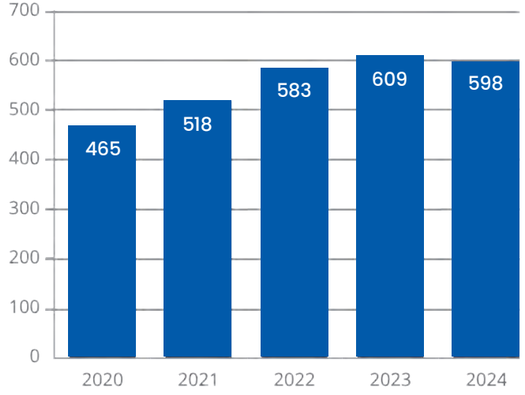
Children diagnosed with Kawasaki disease typically follow a structured longitudinal care pathway, with follow-ups at 2 and 6 weeks post-diagnosis, then every 3 months to a year. If stable, follow-ups can space out to every few years. For patients with vasculitis and other inflammatory diseases, care intervals are customized based on disease activity, often every 3–6 months.

The clinic operates 3 times a week, with additional joint visits involving rheumatology and hematology once a week. This co-management model ensures timely diagnosis, coordinated treatment and improved outcomes.

Texas Children's is also a leader in NIH-funded research on MIS-C and Kawasaki disease, contributing to the growing understanding of inflammation-related heart disease in children. The team regularly presents at community events and physician education sessions to raise awareness of early Kawasaki symptoms.

Most importantly, our 24/7 availability for Kawasaki consultations ensures that referring physicians and families have access to immediate, expert guidance when it matters most.

Kawasaki Disease Clinic Volume Per Calendar Year



Why Choose Texas Children's Kawasaki Disease Clinic?

	24/7 on-call coverage for Kawasaki concerns		Advanced imaging and vascular monitoring
	Expanded focus on Kawasaki disease, vasculitis, lupus and MIS-C		Personalized care from diagnosis through long-term management
	Multidisciplinary team: cardiology, rheumatology, hematology and radiology		

Maternal Heart

Our program is transforming what's possible for women with heart disease who wish to start or grow their families. We bring together experts in adult congenital heart disease (ACHD), maternal-fetal medicine (MFM) and genetics, all within a Level IV maternal care center, the highest designation for obstetric care.

We care for women across Texas and beyond, particularly those with complex cardiac conditions such as arrhythmias, congenital heart defects and cardiomyopathy. As home to the largest ACHD program in Texas, we provide unmatched expertise in Cardio-Obstetrics care. Our approach also benefits the baby, with integrated access to fetal and neonatal cardiology if needed.

Our commitment extends beyond clinical care. The team contributes to groundbreaking research, including the REBIRTH Trial for peripartum cardiomyopathy and the HOPE Study on maternal and fetal outcomes. We also present nationally and internationally to advance care for this unique population.

At Texas Children's, we help families grow with confidence, collaboration and compassionate, world-class care.

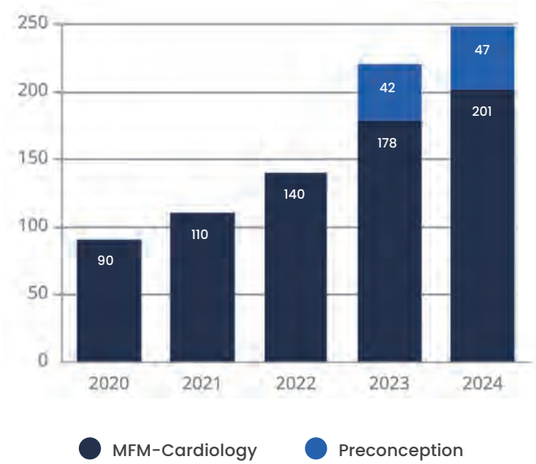
We offer two dedicated multidisciplinary clinics:

- **Antepartum Clinic** for high-risk pregnant cardiac patients, where MFM and cardiology specialists see patients together at Texas Children's Pavilion for Women.
- **Preconception Clinic**, the only clinic of its kind in the nation, intended for comprehensive pre-pregnancy cardiac risk evaluation and family planning discussions with ACHD, MFM and genetic counselors.

Why Choose Texas Children's Maternal Heart Program?

	Two specialized clinics: Preconception and Antepartum		Seamless access to neonatal and fetal cardiology if needed
	Multidisciplinary cardiac OB program in a Level IV maternal care center		Regional and national referral center for complex maternal cardiac cases
	Only dedicated preconception clinic in the nation with ACHD, MFM and genetics in one visit		

Maternal Heart Health Program Clinic Encounters Per Calendar Year



Preventive Cardiology

Our program is changing the future of heart health by focusing on early intervention, education and evidence-based care for children at risk for acquired cardiovascular disease. Whether due to a strong family history, high cholesterol, high blood pressure or related conditions like obesity or metabolic syndrome, our goal is clear: prevent heart attacks, strokes and cardiac events before they start.

We offer both in-person and telemedicine visits across our Houston-area clinics and in Austin, where we're expanding access to specialized care. By bringing our services into more communities, we're helping children receive early care where they live.

Referrals are welcome for any child meeting criteria for hypertension or lipid disorders, and we currently see 1,000 patients annually. Our team also participates in national clinical trials — including treatments for severe hypertriglyceridemia and lipoprotein lipase deficiency — and leads groundbreaking research on topics like sleep, vascular health and environmental exposures that impact cardiovascular risk.

With nationally recognized leadership, NIH-funded research and a uniquely diverse patient cohort, Texas Children's is advancing preventive pediatric cardiology in the clinic and beyond. Because the best way to treat heart disease is to stop it before it starts.

At a Glance

350 Patients per year in multidisciplinary hypertension clinic

200 Patients per year in multidisciplinary lipid clinic

1,000 New and returning general prevention patients annually

Why Choose Texas Children's Preventive Program?

Multidisciplinary care: cardiology, nephrology, endocrinology and nutrition	Site for national clinical trials on hypertriglyceridemia and rare lipid diseases
Dietitians present at every clinic to support lifestyle-based care	NIH-funded faculty leading research on cardiac disease drivers
Clinics available in Houston metro and Austin, with in-person and telehealth options	

Pulmonary Vein Stenosis

With a reputation for recurrence and complexity, pulmonary vein stenosis (PVS) requires a highly coordinated, expert approach — and that's exactly what our program delivers.

Built on more than 50 years of pediatric cardiac expertise, our program offers one of the largest and most experienced multidisciplinary PVS teams in the world. From catheter-based procedures and complex surgeries to immunomodulatory and targeted drug therapies, our care model is tailored to each patient's unique anatomy, history and disease progression. Many patients arrive after multiple failed interventions elsewhere — and families routinely relocate from across the U.S. and internationally to access our specialized care.

Texas Children's is a recognized global leader in PVS innovation. Our experts pioneered hybrid treatment strategies, combining surgical and catheter-based approaches in the same intervention. We were among the first to apply immunosuppressive therapy to reduce restenosis risk and are advancing research into drug-eluting stents and vein-targeted therapies.[1]

Every patient benefits from weekly multidisciplinary case reviews, collaborative planning and a nurse coordinator who works closely with referring physicians. Our team is also a founding member of the PVS Network Registry, supporting long-term research and global collaboration to improve outcomes.

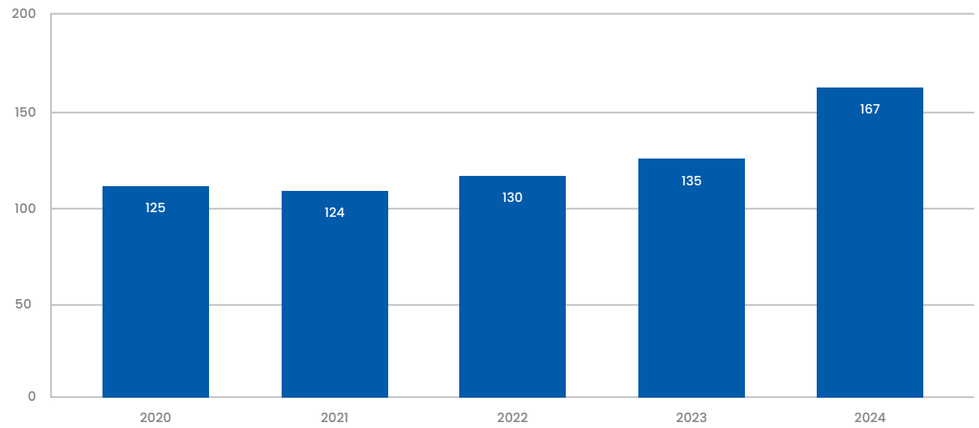
With expert care, long-term monitoring and ongoing innovation, Texas Children's is setting the standard for PVS treatment — helping children with one of the most difficult cardiac diagnoses live longer, healthier lives.

[1]*Kalustian AB, Hagan JL, Brlecic PE, Iacobas I, Vanderlaan RD, Burns J, Wu TT, Birla R, Gowda S, Bansal M, Gowda ST, Eilers LF, Khan A, Sandoval-Jones JP, Imamura M, Orr Y, Caldarone CA, Qureshi AM. Systemic Sirolimus Therapy Is Associated With Reduced Intervention Frequency in Pulmonary Vein Stenosis. JACC Adv. 2024 Nov 15;3(12):101401. doi: 10.1016/j.jacadv.2024.101401. PMID: 39817060; PMCID: PMC11733957.*

Why Choose Texas Children's Pulmonary Vein Stenosis Program?

Immunosuppressive therapies pioneered to slow disease recurrence	Long-term follow-up and shared care with referring physicians
Advanced hybrid surgical–catheterization treatment strategies	Weekly multidisciplinary case reviews
One of the largest and most experienced pediatric PVS programs globally	

Pulmonary Vein Stenosis Cases per Calendar Year



Single Ventricle

With more than 25 years of experience and nearly 500 Norwood operations performed since the program's inception, we provide expert, personalized care from diagnosis through each surgical stage and beyond.

Here, each child is assigned a dedicated physician who serves as the family's main point of contact and advocate, ensuring a consistent, personalized experience within the structure of one of the country's largest and most advanced heart centers. Our multidisciplinary team includes specialists in fetal cardiology, imaging cardiology, congenital heart surgery, interventional cardiology, cardiac anesthesiology, cardiac intensive care, developmental pediatricians, nutrition, therapy services and more — all focused solely on caring for single ventricle patients.

Our program includes a robust home monitoring program, helping families safely navigate the critical time between staged surgeries and recognize early signs of concern. We also work closely with ancillary services like speech, physical and occupational therapy to support long-term development and quality of life.

What truly sets us apart is the strength of our outcomes. As part of the No. 1 ranked heart center in the nation, our team can leverage every possible resource — including advanced mechanical support, heart transplant and fetal intervention — while delivering care that feels highly individualized, because it is.

Why Choose Texas Children's Single Ventricle Program?

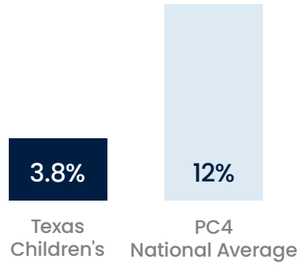
	Excellent outcomes exceeding national benchmarks		25+ years of dedicated program history
	Access to fetal interventions, mechanical support and transplant		Personalized physician assignment for each patient
	Multidisciplinary team focused exclusively on single ventricle patients		

Annual Volumes and Outcomes

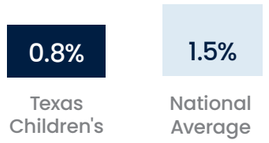
35+ New cases

20+ Norwood operations

Norwood mortality rate 2020-2024



Glenn mortality rate 2020-2024



Integrated Clinical Services

Cardiac Imaging

Our program is one of the busiest and most advanced in the nation, performing nearly 40,000 echocardiograms annually, including fetal and transesophageal studies. With a focus on accuracy, innovation and education, we deliver high-quality imaging for some of the most complex and high-acuity pediatric heart patients in the world.

Our team includes nationally recognized leaders in pediatric cardiac imaging as well as a dedicated quality specialist. Our commitment to continual improvement is reflected in our quality improvement initiatives. We recently published our approach to error tracking and mitigation, and our team consistently presents research and quality improvement work at national conferences, helping set the standard for pediatric cardiac imaging across the nation.

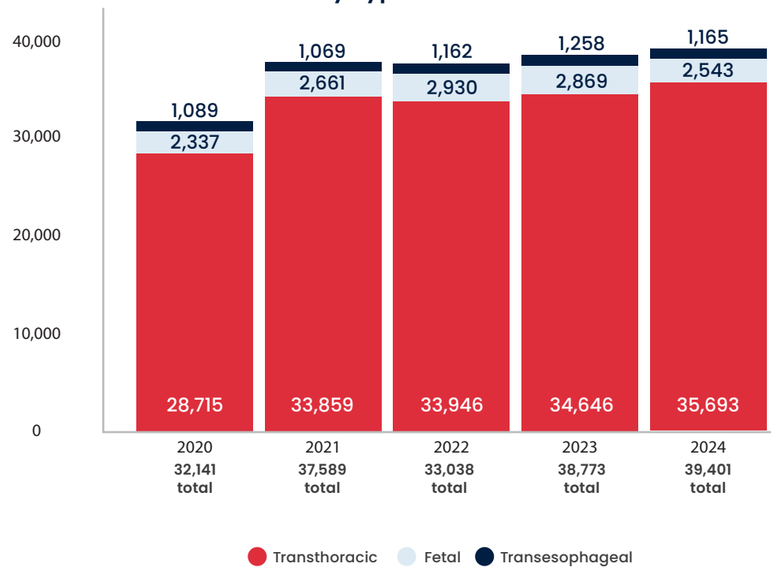
From routine diagnosis to the most specialized evaluations, our lab incorporates cutting-edge technology, including 3D echocardiography, deformation imaging, virtual reality for surgical modeling and disease-specific imaging protocols standardized across the program.

Our imaging specialists collaborate with other disciplines at our center as well as participate and lead multi-center research efforts to potentially improve the outcomes of an increasingly complex patient population.

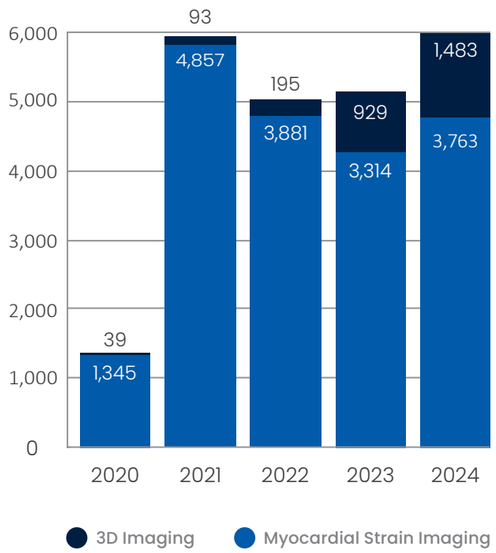
Our imaging supports the full range of pediatric heart care — from outpatient diagnosis to intraoperative imaging and chemotherapy-related cardiac monitoring. For patients undergoing chemotherapy, we provide advanced screening with tools such as 3D ejection fraction and strain imaging to detect subtle changes early and reliably.

With a dedicated educator, a full-time imaging quality specialist and a culture of continuous learning, Texas Children's is not just delivering images — we're delivering insight, innovation and impact.

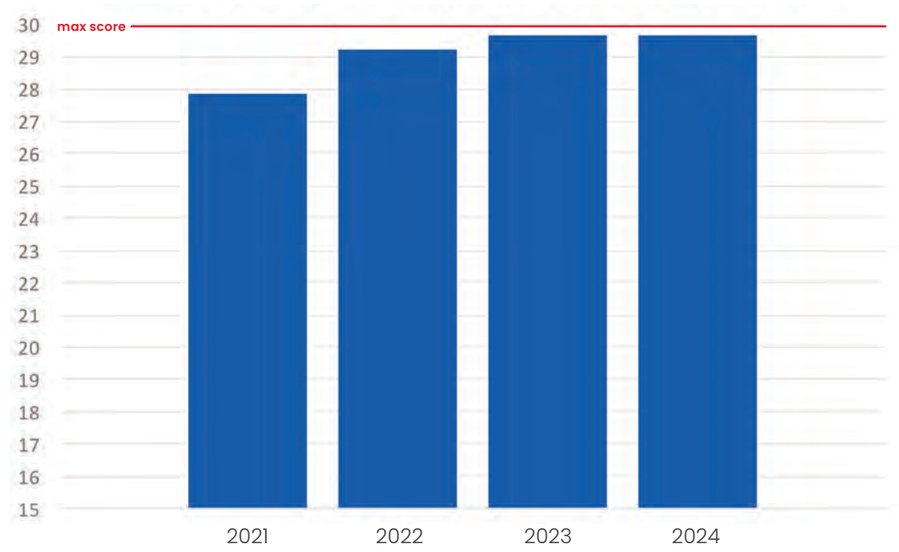
Echo Volume By Type Per Calendar Year



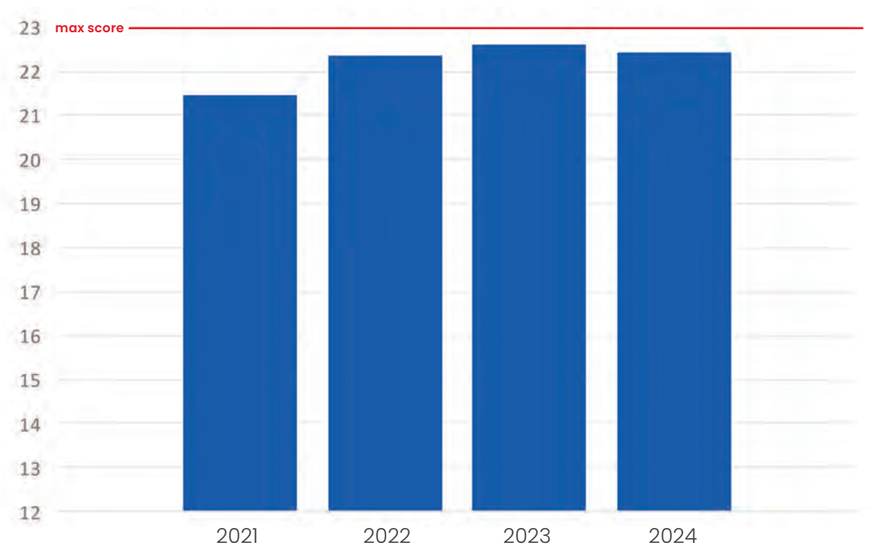
Advanced Imaging Volume By Type Per Calendar Year



Average Quarterly Echo Completeness Scores: 2021-2024



Average Quarterly Echo Quality Scores: 2021-2024



Cardiovascular Anesthesia

Our program provides expert care for children and adults with congenital heart disease undergoing heart surgery, catheterization and interventional procedures, as well as diagnostic imaging studies. Our team's singular focus on patients with heart disease of all ages ensures every patient benefits from specialized expertise from pre-op preparation through post-op recovery, providing anesthesia to over 3,500 cases annually.

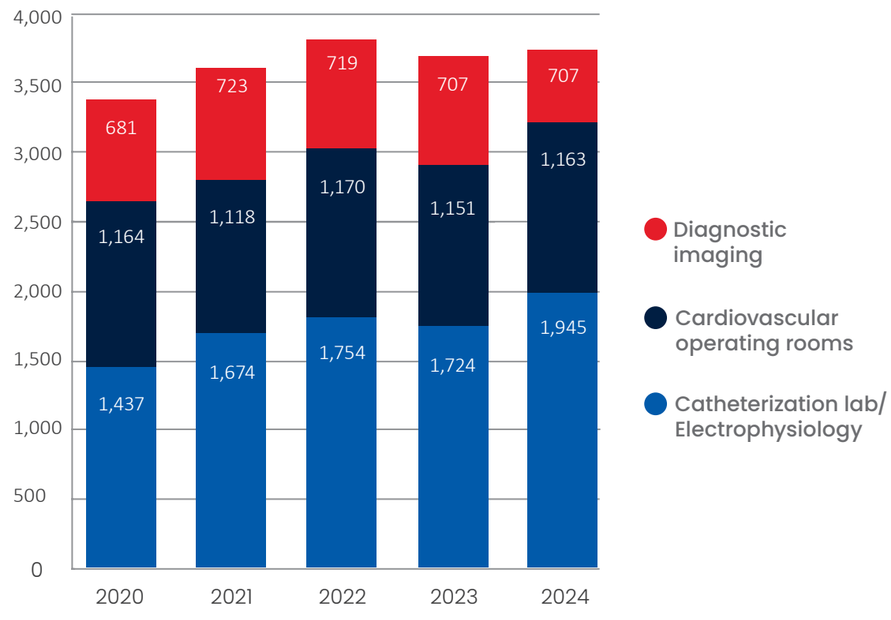
We're home to one of the largest and most advanced pediatric cardiac anesthesia teams in the country, including anesthesiologists with dual training in pediatric and adult congenital cardiac care, as well as 7 dedicated cardiac CRNAs — a unique team structure among children's hospitals. Our team leads the field nationally, with a strong history of leadership in the Congenital Cardiac Anesthesia Society.

Our approach doesn't end in the OR. We collaborate across disciplines to develop and implement enhanced recovery protocols, including early extubation, multimodal pain management and regional anesthesia techniques that reduce discomfort and accelerate healing.

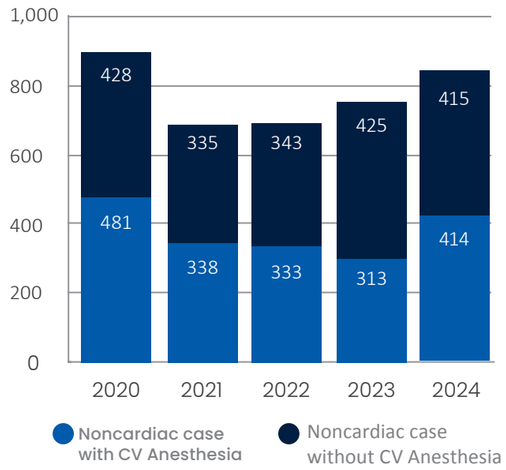
Innovation is central to our work. We're studying the use of EXPAREL, a long-acting local anesthetic, and we've invented tools that aid in training and enhance efficiency, such as RediStik®, a wearable simulation trainer for placing peripheral IVs, port lines and central venous catheters. Our team actively implements algorithms to improve postoperative coagulation management, reducing bleeding risks and enhancing outcomes year after year.

Through education, research and a culture of precision and compassion, Texas Children's cardiovascular anesthesiologists aren't just keeping patients safe in the OR — they're shaping the future of care.

CV Anesthesia Case Volume By Type Per Calendar Year



CHD Patient Volume Undergoing Noncardiac Procedures with CV Anesthesia Team



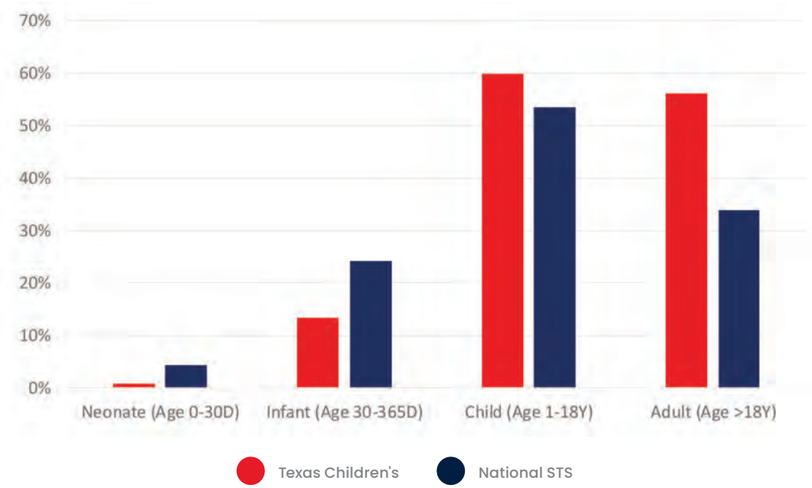
On average, our CV anesthesia team is involved in 49% of non cardiac cases for our heart center patient population.

Extubation in OR by Procedure (%)
From July 2020 - June 2024

Procedure	Texas Children's Hospital	National STS
Fontan	90.6%	62.2%
VSD	43.0%	38.1%

Stat Category	Texas Children's Hospital	National STS
Stat Category 1	44.4%	36.0%
Stat Category 2	16.8%	18.8%
Stat Category 3	7.7%	10.0%
Stat Category 4	5.6%	5.8%
Stat Category 5	0.9%	1.8%

Extubation in OR by Age (%)
From July 2020 - June 2024



Inpatient Care

We provide leading inpatient care through a collaborative, multidisciplinary model that delivers the right level of care at the right time for patients ranging from neonates to adults with congenital heart disease. We operate the largest inpatient cardiac unit in the U.S., including the Cardiac Intensive Care Unit (CICU), the nation's first dedicated Heart Failure ICU, the Cardiac Patient Care Unit (CPCU) for intermediate care and a specialized ACHD unit for adult patients. Patients have access to cardiac-trained PT, OT, speech therapists, nutritionists and child life services — including music therapy and play space, even in high-acuity areas.

Our inpatient units rank among the lowest code rates nationally, with length of stay metrics that remain competitive despite our high-acuity population.

For newborns with congenital heart disease — more than 80% of whom are diagnosed prenatally — our neonatal cardiac team delivers highly tailored care, with support for family-centered services like postpartum lodging, lactation consulting and emotional health resources. ACHD patients are cared for in a 16-bed variable acuity unit designed to offer ICU-level, stepdown and observational care in a single setting, with mental health support and cardiac-trained adult specialists.

Whether recovering from surgery, awaiting transplant or managing complex care needs, every patient at Texas Children's receives care designed for healing — medically, developmentally and emotionally.

Inpatient Care By The Numbers

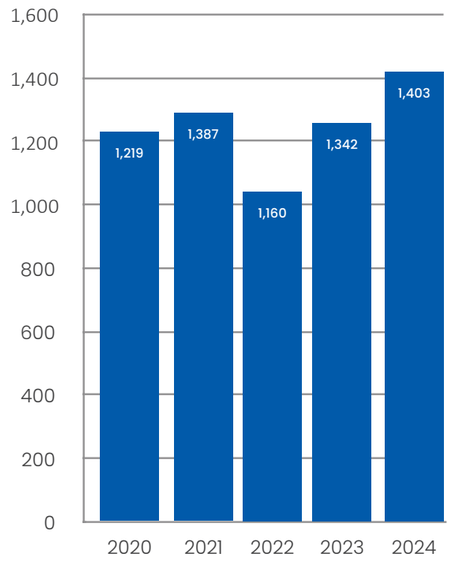
1,100+
CICU admissions annually

1,700+
CPCU admissions annually

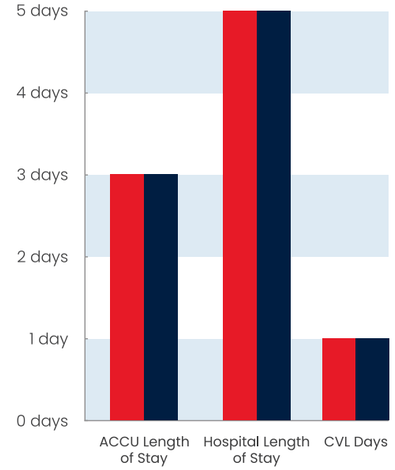
30+
Cardiac Intensivists

40+
ACGME Cardiology Fellows

Cardiac ICU Admissions per Calendar Year



CPCU Length of Stay



Meets benchmark length of stay amount
49 centers participating in PAC3

Median LOS from October 2023-2024: 3 Days

Source: Pediatric Acute Care Collaborative

ECMO Program at Texas Children's

Texas Children's is home to one of the highest-volume and most advanced ECMO programs in the world. With over 120 ECMO runs in 2024 — 70% within the Heart Center — we continue to deliver lifesaving support to critically ill patients from neonates to adults, achieving survival outcomes that exceed both national and international benchmarks.

Our team routinely supports long-duration ECMO runs, including one of the longest recorded: 381 days for a child awaiting heart transplant. We also pioneered ambulatory ECMO as a bridge to lung transplantation — allowing patients to regain strength while awaiting surgery.

More than **83%** of our Heart Center nurses have **2+ years** of experience

Nursing

Our nurses are at the heart of everything we do, combining deep clinical expertise with compassionate care that supports both patients and families through the most challenging medical journeys.

Texas Children's is proud to be an eight-time Magnet-designated hospital, the highest national recognition for nursing excellence. This demonstrates Texas Children's ongoing commitment to excellent inpatient care with a focus on strong nursing teams leading to positive patient outcomes.

Nurses at Texas Children's don't just provide care — they create community, promote healing and elevate every step of the cardiac journey.

More than **450** inpatient cardiac nurses throughout our units of the Heart Center:

- **Clinics**
- **CICU**
- **Cath labs**
- **Step-down units**
- **Operating rooms**

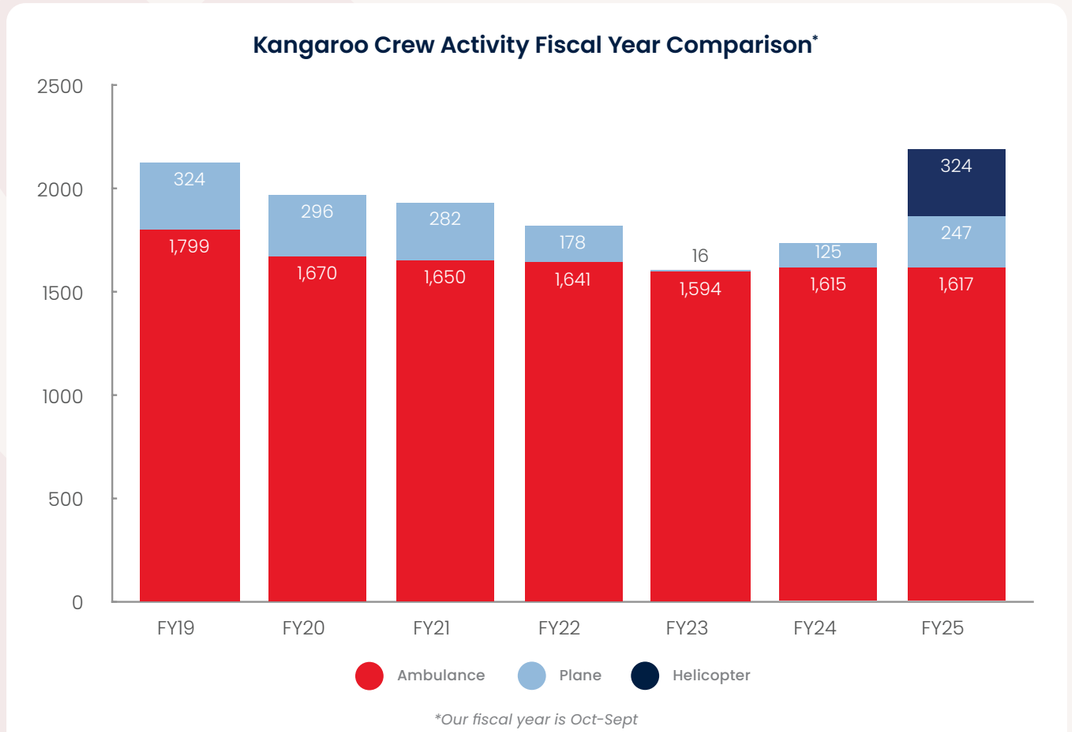
CICU Turnover Rate *for 2024*

Texas Children's	National Average
6%	22%

The Difference at Texas Children's

Across all levels of care, cardiac nurses at Texas Children's provide specialized support, including bedside care, coordination with multiple specialties, patient and parent education and follow-up support. From managing long-term chronic illness to preparing families for surgery and recovery, the nursing team is focused on caring for the whole patient and family.

The nursing team at Texas Children's Hospital has led the development of innovative programs to support patients and patient families on their care journey. For the family expecting their newborn with congenital heart disease (CHD) to be admitted to the Intensive Care Unit after delivery, a unique prenatal class was developed to offer education focused on CHD-specific topics. The nursing team also guided the design of the Parent Pause peer support group - A family-led initiative that includes food, therapy dogs, and is free from providers – recently developed as a space for parents to feel free to share their experiences.



Kangaroo Crew® Transport Team

When a patient is too sick to wait, Texas Children's Kangaroo Crew® delivers world-class care — right where it's needed most. For more than 20 years, this specialized transport team has brought critically ill babies, high risk obstetrics, children and adults with congenital heart disease to Texas Children's from across the U.S., Central America and beyond. Whether the call comes from down the road or across borders, our team is ready — 24/7, 365 days a year.

From neonates on ECMO to ACHD patients on VAD devices, no patient has ever been turned away due to acuity.

Our team can be customized to include ICU-trained nurses, respiratory therapists, ECMO specialists, intensivists, maternal care nurses, or surgeons, depending on the specific needs of each case. Our fleet expanded in 2024, including the launch of our helicopter program and the addition of the PC-24, a high-speed, all-weather jet — to significantly enhance our ability to provide faster, safer, and more adaptable transports.

Care begins the moment you call us and continues with real-time communication to ensure the receiving team is fully prepped. As our crew often says: "We don't just move patients. We bring the hospital to them."

Extending Our Mission

Malawi

A dedicated team is stationed in Malawi to combat rheumatic fever and congenital heart disease, becoming a model for in-country cardiac care in one of the world's most underserved regions

Our partnership in Mexico City has helped drive mortality rates down to just 5% (from 19%) – approaching U.S. benchmarks.

Partnerships in Monterrey, Mexico, Brazil and Guatemala follow this same model of transformative collaboration.

Global Care

Our commitment to healing hearts knows no boundaries. For more than a decade, we've dedicated our expertise to building sustainable cardiac care programs across the globe, empowering regions to deliver world-class care for children with congenital and acquired heart disease.

Through our global health initiatives, we collaborate with international partners to establish centers of excellence in low- and middle-income countries. Our model is built on mentorship and sustainability, with teams working side by side for 10+ years in some cases — conducting training, weekly virtual consultations and hands-on visits to elevate local standards of care.

In addition to clinical partnerships, the Heart Center leads academic initiatives that bring global knowledge to the forefront. We host the International Heart Center Symposium and monthly Heart Center international webinars to share best practices and new research with providers around the world. Participation in Cardiology Across Continents, a case-based learning series, and the Spanish and Portuguese translation of the Texas Children's Handbook of Congenital Heart Diseases further extend our educational reach.

Through innovation, partnership and a deep commitment to global health, we're building stronger cardiac programs worldwide, one community at a time.

Community Outreach

Our commitment to exceptional patient care extends far beyond the walls of our hospital. Our team is passionately engaged in community outreach efforts, lending their expertise and support to local and global initiatives that raise awareness, educate families and enhance cardiac care. From participating in community health walks with the Marfan Foundation and the Williams Syndrome Society to volunteering at local food banks and speaking at international conferences and local health events, our physicians and care teams are dedicated to advancing heart health at every opportunity.

These efforts are just a glimpse into how our team goes above and beyond — transforming lives, one heartbeat at a time.

Project ADAM®

Project ADAM (Automated Defibrillators in Adam's Memory) aims to prevent sudden cardiac arrest in children and adolescents through education and implementation of lifesaving programs. Project ADAM helps schools nationwide implement programs to make automated external defibrillators (AEDs) readily available by preparing schools for a cardiac emergency through emergency response plans, staff CPR and AED training, student CPR education and sudden cardiac arrest awareness education.

Camp Pump It Up

Camp Pump It Up is a free, medically supervised camp for children with congenital and acquired heart disease hosted by Texas Children's. It provides children aged 8–12 the ability to attend an overnight weekend camp where their physical and emotional health are supported through peer-to-peer connection and a variety of engaging and enjoyable activities. Camp Pump It Up takes place annually at Camp For All in Burton, TX.

Books@Heart

Books@Heart is an early childhood reading program, focused on improving cognitive development and parent–child bonding for the youngest infants in our Heart Center. Every infant admitted to the Heart Center under 1 year old is eligible for the program. The structure mimics the outpatient pediatrician's schedule, when these babies would otherwise have received anticipatory guidance about reading. Babies receive books at birth or at their first admission to the Heart Center, and then at ages 2 months, 4 months, 6 months, 9 months and 12 months.

Recognition and Quality

Accolades

Excellence isn't just a goal, it's the standard. Our commitment to delivering the highest level of cardiac care for patients of all ages is reflected in the many accolades we receive each year. These awards are a testament to the skill, compassion and innovative spirit of our multidisciplinary teams, as well as the trust placed in us by patients and families from around the world.

No. 1 Children's Hospital in Texas

We're honored and humbled to be consistently ranked No. 1 in Texas and among the best children's hospitals in the nation by U.S. News & World Report.

No. 1 Heart Center in the nation

This recognition, awarded for 9 consecutive years, underscores our multidisciplinary team's commitment to providing unparalleled care at every point of the treatment continuum to achieve the best possible outcomes for each patient.

Magnet Designation

Achieved for the eighth consecutive time, this designation recognizes excellence in nursing care. This prestigious honor reflects our commitment to high-quality patient outcomes, nurse satisfaction and a culture of safety.

ELSO Platinum Center of Excellence

First achieved in 2021, now renewed for 2025–2028. This is the highest level of recognition given by ELSO, highlighting our ECMO program's exceptional quality, innovative approaches and survival outcomes that surpass national and international benchmarks.

Quality Benchmarking and Partnerships

We collaborate extensively with national registries across benchmarking, compliance, research and quality improvement programs. Through these partnerships, we compare performance metrics, ensure regulatory compliance, contribute to research initiatives and drive quality enhancement efforts.

- American College of Cardiology National Cardiovascular Data Registry
- Congenital Cardiac Anesthesia Society Database (STS-CCAS)
- Congenital Cardiac Catheterization Project on Outcomes (C3PO)
- Congenital Heart Surgeons' Society Center for Research and Quality
- Extracorporeal Life Support Organization (ELSO) Registry
- National Cardiovascular Data Registry Improving Pediatric and Adult Congenital Treatment (IMPACT Registry)
- National Pediatric Cardiology Quality Improvement Collaborative (NPC-QIC)
- Pediatric Acute Care Cardiology Collaborative (PAC3)
- Pediatric Cardiac Critical Care Consortium (PC4) Registry
- Pediatric Heart Transplant Society (PHTS) Registry
- Pedimacs Registry
- The Society of Thoracic Surgeons National Database Registry

Residencies, Fellowships and Instructorships

Residency Programs

The Baylor Pediatric Residency Program is one of the largest Accreditation Council for Graduate Medical Education (ACGME)-accredited programs in the country, with 2 main training sites: Texas Children's and the Harris Health system. We offer 4 core pediatrics programs, all of which require a cardiology rotation:

- Categorical Pediatrics
- Global Health
- Primary Care LEAD
- Pediatric Physician Scientist Program

Most of the combined programs, including Medicine-Pediatrics, Pediatrics-Medical Genetics, Child Neurology and Neurodevelopmental Disabilities, also include a cardiology rotation. We also offer electives in Pediatric Cardiology in which residents help fellows and attendings provide cardiology consultations to the remainder of the hospital.

Fellowship Opportunities

In partnership with Baylor College of Medicine, the Heart Center team is devoted to providing unparalleled education and unique research opportunities for future clinical leaders in pediatric and adult congenital heart disease. Housed in the largest medical center in the world, the Heart Center at Texas Children's affords our fellows the opportunity to perform more procedures, examine more patients and conduct more research compared to other programs.

We offer a wide variety of fellowship opportunities including:

- Pediatric Cardiology
- Pediatric Cardiology Subspecialty Programs
- Pediatric Cardiovascular Anesthesiology
- Congenital Cardiac Surgery
- Pediatric Critical Care Medicine

Instructorship Programs

In addition to a traditional 3-year fellowship program in pediatric critical care medicine, we offer the following one year instructorship programs for eligible candidates in the following subspecialties:

- Adult Congenital Heart Disease Intensive Care
- Cardiac Intensive Care

Learn more

To learn more about our residency and fellowship opportunities, visit
texaschildrens.org/health-professionals/education-and-training/fellowships-and-residencies

Contact Us

Your patient deserves the best care. Visit **texaschildrens.org/heart** to explore our programs and services or contact our team to learn more about how we can make a difference. To find our nearest location in Houston or Austin, visit **texaschildrens.org/departments/cardiology/locations.**

To reach our scheduling line and make an appointment, contact us at **832-824-9322**.

Referrals

To refer a patient to Texas Children's Heart Center, visit **texaschildrens.org/refer**.

For questions about referrals, email **providerconnect@texaschildrens.org** or call **832-824-2273**.

To refer a patient to Texas Children's Fetal Center, visit **women.texaschildrens.org/fetalreferral**.

Candidates are carefully evaluated and accepted for maternal-fetal surgery on a case-by-case basis. Please call **832-822-2229** to discuss the eligibility of your patient(s) or to discuss any questions you may have.

Second Opinions

We recognize that some cardiac cases can be intricate and multifaceted, and the decisions we make can profoundly influence the lives of young patients and their families. Our specialized Second Opinion Program offers a second perspective and expert guidance. We guarantee a 48-hour turnaround time for inpatient cases.

To request a second opinion for your patient, call **832-822-7335** to initiate the process and data collection.

Texas Children's Hospital®

texaschildrens.org/heartoutcomes