

CARDIOVASCULAR PROGRAM

2020 Annual Report

Children's®
MINNESOTA


Children's
MINNESOTA
Cardiovascular
Intensive Care Unit
THANKS FOR SOCIAL DISTANCING
please stay 6 feet
from others

TABLE OF CONTENTS

Welcome 5

Meet the Team 6

Children's Minnesota Overview 8

Children's Minnesota Pediatric Cardiovascular Program 10

Cardiovascular Surgery 14

Cardiovascular Intensive Care Unit 16

Cardiovascular Anesthesiology 20

Interventional Cardiology 22

Electrophysiology 23

Children's Minnesota Heart Failure and Heart Transplant Program 25

Fetal Cardiology 26

Advanced Cardiac Imaging 28

Multispecialty Cardiovascular Services 30

Children's Minnesota Research 32

Hypoplastic Left Heart Syndrome (HLHS) Consortium 33

Partners in a Healthier Future 34

Locations and Contact Us 36


With more than 30 years of service to families and children of the Upper Midwest, we're the region's largest pediatric cardiac program providing comprehensive care from before birth to adulthood.

WELCOME

Dear colleague,

We're proud to introduce you to the pediatric cardiovascular program at Children's Minnesota. With more than 30 years of service to families and children of the Upper Midwest, we're the region's largest cardiac program providing comprehensive care from before birth to adulthood.

Our collective vision to offer the highest quality, kid-friendly and family-centered care is what makes our cardiovascular program successful. In 2009, we expanded our program with the opening of the Edward J. Phillips Cardiovascular Care Center (CVCC), which is home to our pediatric cardiovascular intensive care unit (CVICU), inpatient care services, operating rooms and cardiac catheterization labs. In 2018, we began our heart failure and transplant program — a final step in building the full breadth of heart care services. Our comprehensive services allow children to receive complete cardiac care in a single location, from a team they know and trust.

We're committed to partnering with you and being your trusted source for expert guidance. We are dedicated to providing top-quality care and superior clinical outcomes, and we're proud to share our program achievements with you.

Sincerely,

David Gremmels, MD
Chief of Cardiology

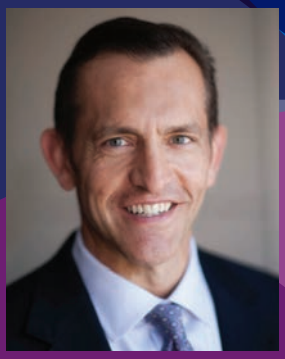
David Overman, MD
Chief of Cardiovascular Surgery

David Dassenko, MD
Medical Director, Cardiovascular Care Center, CVICU

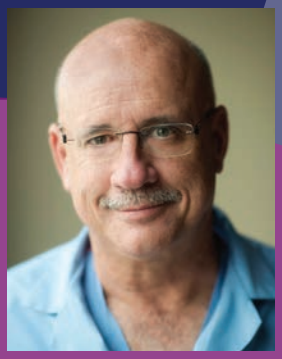
MEET THE TEAM



David M. Overman, MD
Chief of Cardiovascular Surgery



David B. Gremmels, MD
Chief of Cardiology



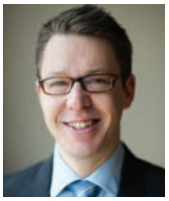
David A. Dassenko, MD
Medical Director, Cardiovascular Care Center

Children's Minnesota and Children's Heart Clinic Team

CARDIOLOGY



Daniel Beissel, MD
Pediatric Cardiology



Christopher Carter, MD
Medical Director, Electrophysiology



Bradford Chu, MD
Medical Director, Echocardiography Program
Pediatric Cardiology, Fetal Cardiology



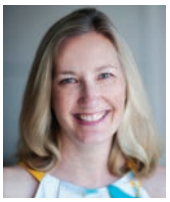
Erik Edens, MD, PhD
Medical Director, Heart Failure and Transplant



David Gremmels, MD
Chief, Cardiology



B. Kelly Han, MD
Medical Director, Advanced Cardiac Imaging



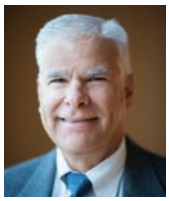
Christine Hills, MD
Medical Director, Outreach, Fetal Cardiology



Lisa Howley, MD
Medical Director, Fetal Cardiology



Joanna Lowisz, DO
Pediatric Cardiology, Fetal Cardiology



Rodrigo Rios, MD
Pediatric Cardiology, Fetal Cardiology



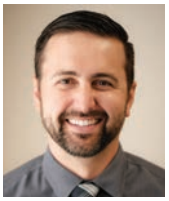
Rodrigo Rios IV, MD
Interventional Cardiology



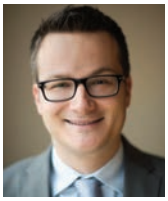
Andrew Schneider, MD
Electrophysiology



Charles Shepard, MD
Pediatric Cardiology, Advanced Cardiac Imaging



Ian Thomas, MD
Pediatric Cardiology



Marko Vezmar, MD
Medical Director, Interventional Cardiology

SURGERY



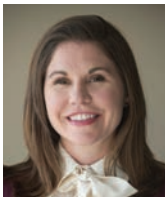
Robroy MacIver, MD
Director, Heart Failure and Transplant



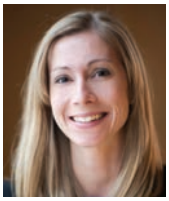
Francis Moga, MD
Associate Chief, Cardiovascular Surgery



David Overman, MD
Chief, Cardiovascular Surgery



Jennifer Frost, PA-C



Leah Zupancich, PA-C

ANESTHESIOLOGY

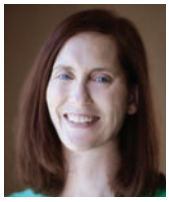


David Dassenko, MD
Medical Director, Cardiovascular Care Center, CVICU

INTENSIVISTS



Kendra Gram, MD
Associate Medical Director, CVCC



Kristine Hendrickson, MD



Marnie Huntley, MD



Erica Molitor-Kirsch, MD



Niyati Patel, MD



Shashi Raj, MD



Kelly Rood, MD



Kimberly Watkins, MD

ADVANCED PRACTITIONERS



Jocelyn Berbee, MS, RN, CNP



Brittany Jackson, APRN



Beth Johnson, PNP



Stephanie Karides, APRN



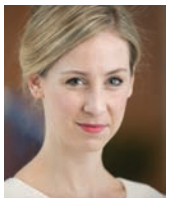
Andrea Lueck, APRN, CNP



Amy Lund, APRN, CPNP



Steven McDonald, APRN, CNP



Gretchen McGuire, APRN, CNP



Nathan Neis, DNP, ACNP



Heidi Shafland, APRN, CNP



Holly Thompson, APRN, CNP



Elizabeth Wagner, APRN, CPNP
Director, Cardiovascular Services



Amy Weiler, APRN, CNP

Not pictured
Kaitlin Colbone, PA-C

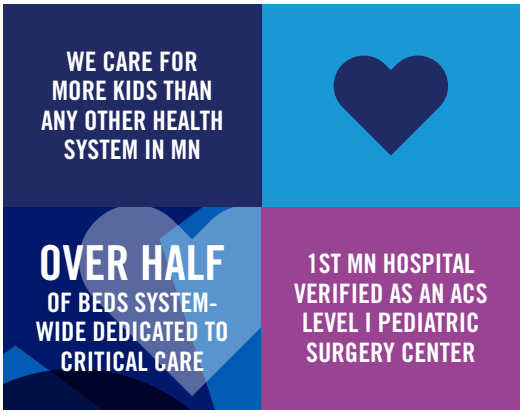
CHILDREN'S MINNESOTA OVERVIEW



Children's Minnesota St. Paul Campus



Children's Minnesota Minneapolis Campus



> We champion the health needs of children and families. We are committed to improving children's health by providing the highest-quality, family-centered care, advanced through research and education.
>
> **Children's Minnesota mission statement**

Children's Minnesota is one of the largest freestanding pediatric health systems in the United States and the only health system in Minnesota to provide care exclusively to children — from before birth through early adulthood. An independent and not-for-profit system since 1924, Children's Minnesota serves the Upper Midwest at two freestanding hospitals, 12 primary care clinics, and six rehabilitation and nine specialty care sites.

At Children's Minnesota, we bring together more experts across more specialties than any other hospital system in the Midwest. As the region's largest pediatric program, we partner every day with clinicians across the Midwest to bring world-class care to the most amazing people on earth.

Trusted, nationally recognized care

Children's Minnesota is regularly recognized and awarded nationally for excellence in care, quality, innovation and industry leadership.

- In 2018, we were the first and only hospital in Minnesota verified as a Children's Surgery Center by the American College of Surgeons — the highest distinction for health systems that perform complex surgical procedures in newborns, children and teens.
- We earned Magnet® recognition from the American Nurses Credentialing Center — the most prestigious distinction a health organization can receive in nursing excellence and high-quality patient care.
- We're consistently ranked among the top hospitals by *U.S. News & World Report.*

TOP DOCTOR
Mpls St Paul
mspmag.com



THE COMMITTEE ON TRAUMA
VERIFIED TRAUMA CENTER



AMERICAN COLLEGE OF SURGEONS • QUALITY IMPROVEMENT PROGRAM
Children's Surgery Verification™
VERIFIED CENTER

MAGNET RECOGNIZED
AMERICAN NURSES CREDENTIALING CENTER

Children's Minnesota

PEDIATRIC CARDIOVASCULAR PROGRAM

The Children's Minnesota cardiovascular program is the region's preeminent destination for pediatric cardiac care and heart surgery. From routine care to advanced cardiac surgeries — from before birth into adulthood — we collaborate with other clinicians to care for children with all forms of congenital and acquired cardiac diseases. At Children's Minnesota and the Children's Heart Clinic, we're experts in diagnosing and treating all types of pediatric heart disease.

We provide on-site cardiovascular care at Children's Minnesota Minneapolis campus and 11 Children's Heart Clinic locations. Our team offers expert consultations and is available to partner with you 24/7. Our comprehensive services include:

- General cardiology
- Cardiovascular surgery
- Cardiovascular intensive care
- Cardiovascular anesthesiology
- Interventional cardiology
- Heart failure and heart transplant
- Advanced cardiac imaging
- Fetal cardiology
- Adult congenital heart disease care

Our multidisciplinary team approach means our patients can see several experts during one clinic visit, and we can advance their care plan collaboratively. Our multispecialty clinics include:

- Adult congenital clinic
- Fetal diagnosis and treatment at the Midwest Fetal Care Center
- Heart failure clinic
- Lipid clinic
- Neurodevelopmental follow-up clinic
- Velocardiofacial (VCF) syndrome clinic

On average, we annually perform:

425+
heart surgeries

400+
cardiac catheterizations

15,500+
EKGs (including interpretations)

12,000+
echocardiograms (including interpretations)

1,200+
fetal heart scans



Commitment to transparency and improving patient outcomes

We participate in a variety of outcome-tracking databases and registries to share our outcomes and collaborate with other organizations to enhance patient care, including:

- The Society of Thoracic Surgeons Congenital Heart Surgery Database (STS CHSD)
- Congenital Cardiac Anesthesia Society (CCAS) module within the STS CHSD
- Improving Pediatric and Adult Congenital Treatment (IMPACT) registry
- National Pediatric Cardiology Quality Improvement Collaborative (NPC-QIC)
- Cardiac Neurodevelopmental Outcome Collaborative (CNOC)
- Pediatric Cardiac Critical Care Consortium (PC4)
- Pediatric Acute Care Cardiology Collaborative (PAC3)
- Congenital Cardiovascular Interventional Study Consortium (CCISC) – CRISP
- Pediatric Heart Transplant Study (PHTS)

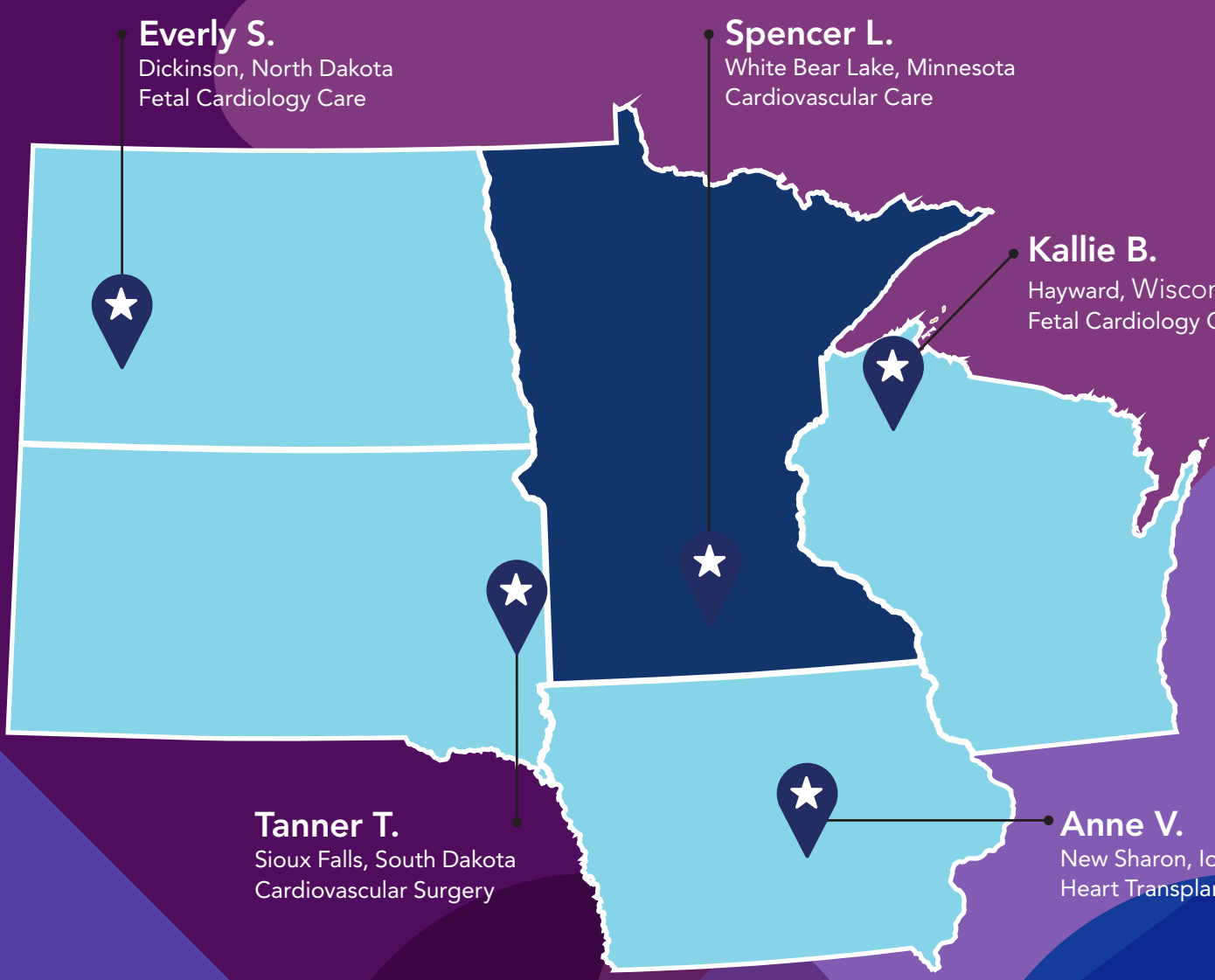
Mayo Clinic – Children's Minnesota Cardiovascular Collaborative

In 2020, we announced the Mayo Clinic – Children's Minnesota Cardiovascular Collaborative. It's one of the largest and strongest pediatric cardiovascular collaborations in the country, building on each organization's shared passion for children and bringing together the complementary strengths of both programs. We are proud to build on our long-standing relationship with Mayo Clinic.

MINNESOTA & BEYOND

Children's Minnesota is one of the largest pediatric health systems in the United States and the only health system in Minnesota to provide care exclusively to children — from before birth through young adulthood. We care for kids from across the Upper Midwest, drawing patients from not just Minnesota but also Wisconsin, Iowa, North Dakota, South Dakota and beyond.

Families across the Upper Midwest count on Children's Minnesota for heart care expertise. These are just a few of our patients:




FIRE

Cardiovascular Surgery



The cardiovascular surgery team provides individualized surgical care to patients with all forms of congenital heart disease. With three board-certified congenital cardiac surgeons, we perform the most pediatric cardiac procedures in Minnesota — more than 425 heart surgeries annually — and provide surgical care to patients from the five-state region and beyond.

We're committed to national quality initiatives to ensure the very best care for children. In fact, we were one of the first pediatric cardiovascular surgery programs in the nation to voluntarily share surgical outcomes publicly through The Society of Thoracic Surgeons (STS) Congenital Heart Surgery Database (CHSD), the largest database tracking outcomes for congenital cardiac conditions in the world. It serves as a quality improvement benchmark and compares our outcomes to national data.

Within the database, congenital heart surgeries are assigned a STAT score of 1 through 5 according to their mortality risk. The first category includes procedures with the lowest mortality rates, such as ventricular septal defect (VSD) closures, and category 5 includes complex surgeries with the highest mortality rates, such as the Norwood procedure.

Among the leading U.S. pediatric hospitals that submit data to the Pediatric Health Information System (PHIS) — a large, national comparative database — Children's Minnesota ranks in the top 20 in the nation in pediatric cardiac surgery volumes and treatment outcomes.

ON AVERAGE WE PERFORM

425+

pediatric cardiovascular surgeries each year

STAT SCORE

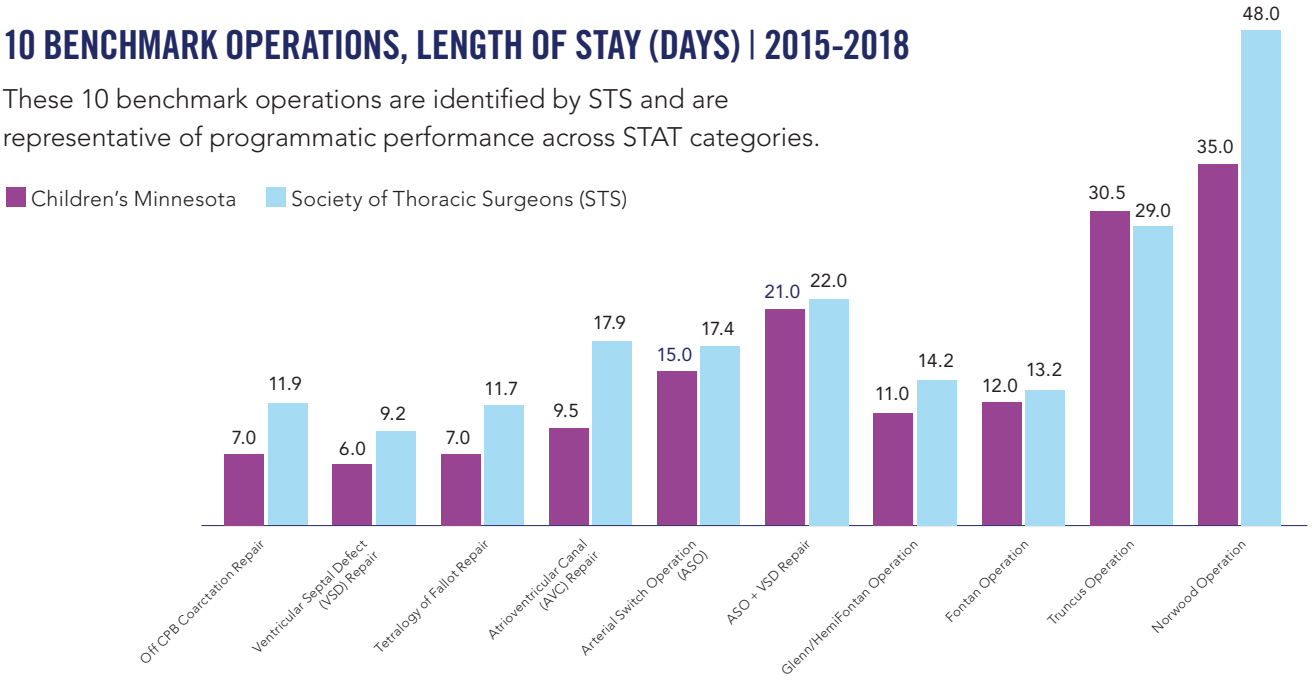
SURVIVAL RATES BY STAT CATEGORY JANUARY 2015-DECEMBER 2018

We participate in the STS Public Reporting Initiative. We began when only 20% of programs chose to do so nationally. Data for 2019 will be available in late 2021.

	CHILDREN'S MINNESOTA Number of cases	CHILDREN'S MINNESOTA Survival	STS Survival
1	338	100%	99.6%
2	421	98.3%	98.5%
3	165	96.9%	97.9%
4	218	88.8%	92.8%
5	64	81.5%	85.1%

10 BENCHMARK OPERATIONS, LENGTH OF STAY (DAYS) | 2015-2018

These 10 benchmark operations are identified by STS and are representative of programmatic performance across STAT categories.



Cardiovascular Intensive Care Unit



The Edward J. Philips Cardiovascular Care Center (CVCC) in Minneapolis is the center of all pediatric inpatient cardiovascular care. A single floor houses a cardiovascular operating room, a hybrid cardiovascular operating room, a cardiac catheterization lab, and private, family-centered patient rooms. Patients are admitted and discharged within a single unit that includes 34 dedicated cardiac intensive care beds.

Over the last decade, the Children's Minnesota cardiovascular team and our clinical capabilities — including ventricular assist device and heart failure and heart transplantation programs — have expanded significantly. The daily patient census has grown from an average of 14 patients in 2010 to nearly 24 patients in 2020, and patient acuity and complexity have also increased.

A team approach for exceptional care

As our census has grown, we've put a two-team intensivist model in place to ensure a proper team-to-patient ratio and offer safer, more efficient care. This staffing model — which includes a nurse practitioner, a cardiologist, a surgeon and an intensivist on each team — is a model used by the highest volume, most advanced units in the country.

Every morning, our team performs bedside rounds to review each patient's health status and develop a care plan for the day. This intensive, team approach means patients get the attention they need:

- Staff physicians have advanced experience and training to diagnose and treat children's cardiovascular problems.
- Pediatric cardiovascular intensivists offer 24/7 coverage in the hospital.
- Skilled cardiac nurse practitioners (NPs) — a unique aspect of our program — and highly trained CVICU nurses offer expert care for complex cardiac patients.

Quality initiatives

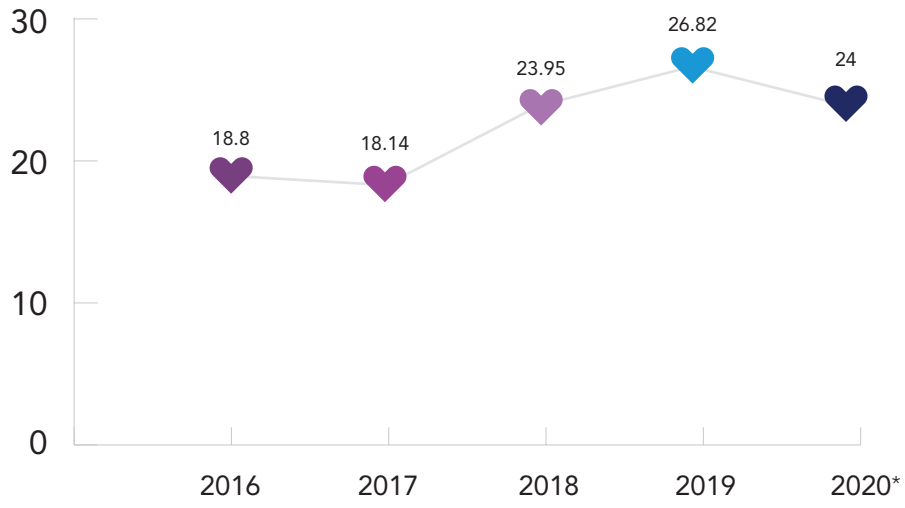
We're always looking at our data to improve our care.

- Acute kidney injury prevention (AKI)
- Central line-associated bloodstream infection (CLABSI) prevention
- Diversity and inclusion
- Early extubation after cardiac surgery
- Ventilator-associated infections (VAI)

To help evaluate our outcomes, we participate in Pediatric Cardiac Critical Care Consortium (PC4) and Pediatric Acute Care Cardiology Collaborative (PAC3) national databases.

CVCC AVERAGE DAILY CENSUS

Our strong screening procedures have kept our unit free of COVID-19, ensuring the safety of our patients.



*COVID-19 state mandate-impacted case volumes.

.6

SURGICAL SITE INFECTIONS

per 100 cardiac procedures

IN 2020

1

CLABSI

RATE PER

1,000 central line days

Cardiovascular Intensive Care Unit



Extracorporeal membrane oxygenation (ECMO)

The ECMO program at Children's Minnesota is one of the largest neonatal and pediatric ECMO providers in the region. To date, we've completed more than 775 ECMO runs, and the number continues to grow each year — we provide around 6,000 hours annually. We have a lower complication rate than the national average, and our five-year survival rate is above the national average.

Our cardiovascular intensive care and surgical teams and CVICU NPs are all experienced and credentialed in ECMO. Each patient is cared for by an ECMO specialist and a bedside nurse to ensure safety. As a participating member of the Twin Cities ECMO Consortium — a group of area hospitals that provide ECMO to adults and children — we've prepared for how to handle a sudden increase in ECMO need. We've met extensively during the current pandemic to provide guidelines for resource utilization for critically ill patients.



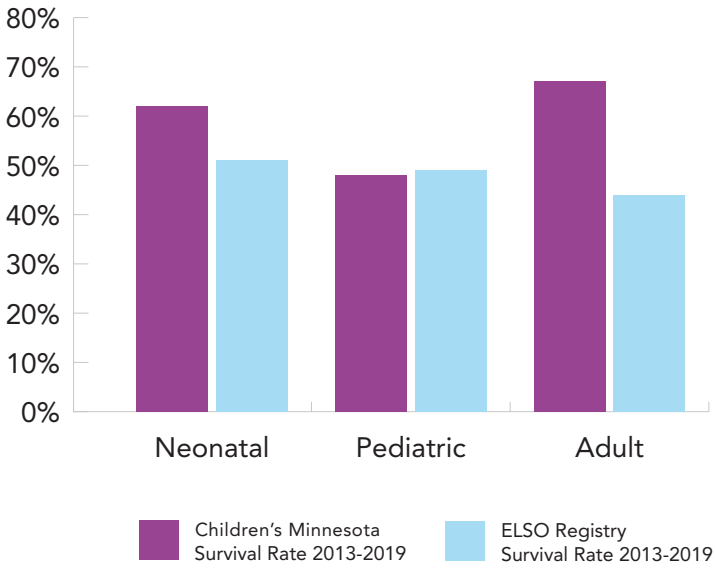
On-site pediatric simulation center and team training

Steps away from the CVICU is the Michael and Judith Wright Family Pediatric Simulation Center, which features a replica of a Children's Minnesota intensive care unit room. It provides a safe, realistic environment to train and practice high-risk procedures and increase team communication, coordination and skills through real-time hospital scenarios.

The center's state-of-the-art control room allows technicians to run three simulations at once. In the debriefing room, groups can review video playback, discuss what went well, and analyze opportunities for change and improvement.

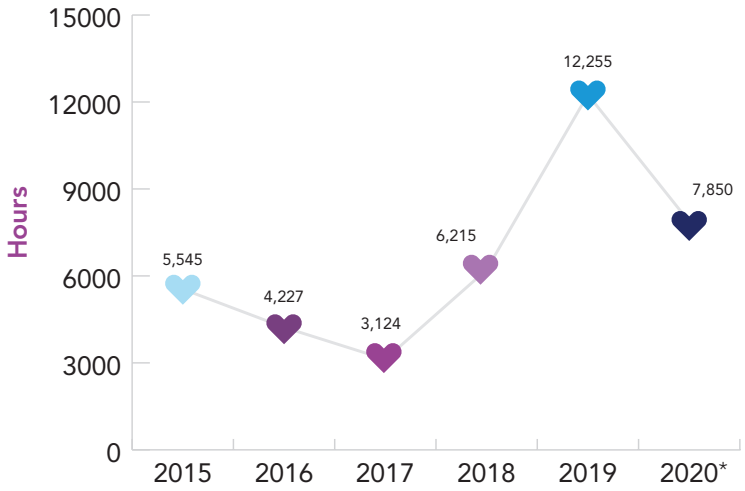
SSH
Society for Simulation in Healthcare
Accredited Program
Teaching/Education and Systems Integration

ECMO SURVIVAL TO DISCHARGE CARDIAC



Our advanced ECMO experience and highly trained providers have allowed us to surpass the Extracorporeal Life Support Organization (ELSO) registry's survival rates for neonatal and adult cardiac patients receiving ECMO. ELSO, an international consortium of health care providers, maintains a registry of ECMO use in active ELSO centers.

CHILDREN'S MINNESOTA ECMO HOURS – CARDIAC PATIENTS



*COVID-19 state mandate-impacted case volumes.

Improvements in ECMO technology and patient management have reduced complications, allowing patients to remain on ECMO for longer periods. These enhancements, along with a better understanding of respiratory diseases, have allowed us to keep some patients — mainly those with primary respiratory illnesses — on ECMO for many weeks, giving their lungs time to recover.

> We are continuously improving care by training our teams frequently on complex procedures. Simulations let teams improve how they function and communicate during high-stress situations in a low-risk setting.
> – Dr. David Dassenko

Cardiovascular Intensive Care Unit

Cardiovascular Anesthesiology



The Children's Minnesota pediatric cardiac anesthesia team specializes in caring for children with congenital heart disease. For more than 40 years, our expert team has cared for infants, children, teens and adults with various forms of congenital and acquired heart disease.

Our anesthesiologists and nurse anesthetists have advanced training in cardiovascular anesthesia. We care for children before, during and after cardiac procedures — including cardiac surgery, interventional cardiology and electrophysiology procedures. Our team also works with patients with congenital heart disease who need surgery unrelated to heart disease.

We specialize in keeping children comfortable using the latest, safest medicines. All our operating rooms share the same design and equipment, allowing us to provide care seamlessly in all procedure locations.


enova
illumination

Interventional Cardiology

Children's Minnesota cardiologists specialize in providing safe, effective diagnostic and interventional catheterization and electrophysiology (EP) procedures for newborns, children, adolescents and young adults.

Our two state-of-the-art catheterization labs are built to operating room specifications. They're among only a few in the five-state region and offer the highest image quality — including 3D rotational angiography (RTA) and fusion modality, which allows us to import CT scan images into angiograms for enhanced imaging during procedures. One lab is a hybrid room that enables cardiologists, cardiac surgeons and interventional cardiologists to work together on less-invasive surgeries and rare or complex cases.

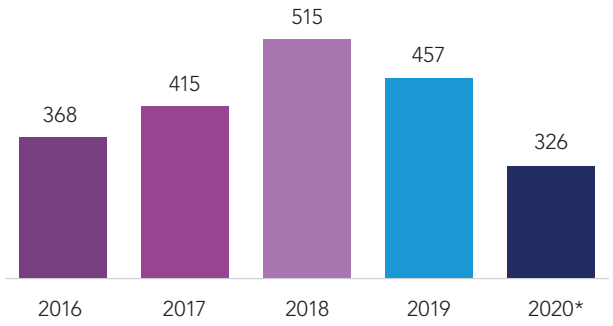
Our team includes two board-certified interventional cardiologists and a designated nurse practitioner specializing in interventional cardiology. We see more than 400 cases a year and offer a full range of procedures. And, because we specialize in children's care, we take extra precautions to keep kids safe. **Our imaging equipment reduces radiation doses by up to 50% compared with other catheterization equipment.**

Commitment to exceptional patient care

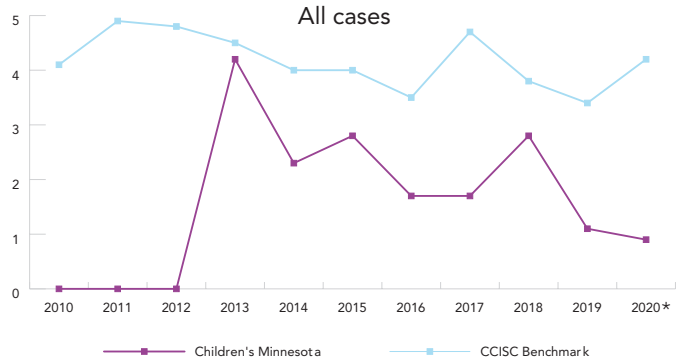
We participate in two national quality registries to measure our outcomes against national benchmarks, including the NCDR® IMPACT™ Registry, part of the American College of Cardiology and Congenital Cardiovascular Interventional Study Consortium (CCISC) – CRISP.

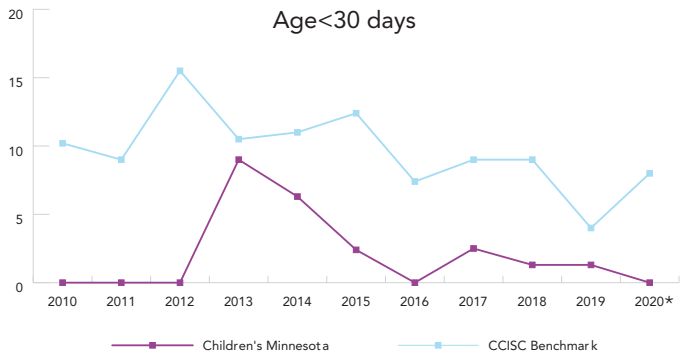
The 2019 (Q4) - 2020 (Q3) IMPACT report, which included 120 centers' outcomes, demonstrated our patient care excellence. **We had no adverse events in diagnostic catheterization** and a 100% success rate in procedures treating atrial septal defect and valve disease. Additionally, our lab's radiation dose was at the 99th percentile and statistically better than almost all other institutions, further demonstrating our commitment to safety.

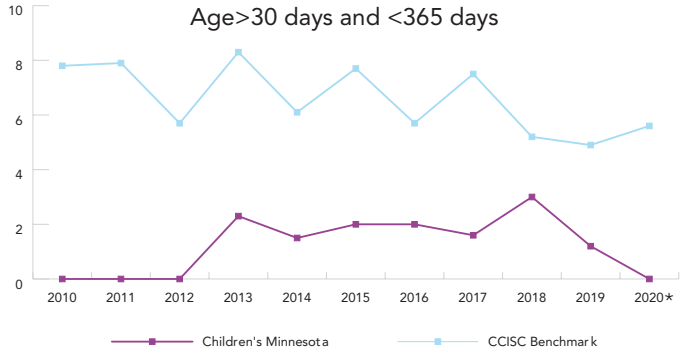
CATH LAB PROCEDURES



CARDIAC CATHETERIZATION SERIOUS ADVERSE EVENTS (SAE)







*COVID-19 state mandate-impacted case volumes.

Electrophysiology



The electrophysiology (EP) lab at Children's Minnesota is the only dedicated pediatric EP lab in the Upper Midwest. On average, our two board-certified electrophysiologists perform more than 100 ablations annually to treat heart arrhythmias. We're known for our advanced expertise.

Our technologically advanced labs use the latest equipment — including advanced 3D mapping and radiofrequency and cryoablation technology for arrhythmia treatment.

We offer comprehensive care, including:

- Electrophysiology diagnostic studies
- Advanced techniques for transvenous pacemaker and defibrillator implantation in children
- Access to a high-volume lead-extraction program
- A full range of the latest heart monitoring options, including Holter monitors, Zio patches, loop recorders and implantable recorders

The 2019 IMPACT outcomes report showed we had a

95% SUCCESS RATE

for all ablation procedures.

	EP	DEVICES
2016	66	30
2017	60	32
2018	61	34
2019	82	28
2020*	45	12

EP VOLUMES

*COVID-19 state mandate-impacted case volumes.


Children's
MINNESOTA
Heart Transplant
06-05-19

HEART FAILURE AND HEART TRANSPLANT PROGRAM

The Children's Minnesota Heart Failure and Heart Transplant (HFHT) program was launched in 2018. The addition of the HFHT services has allowed Children's Minnesota to provide the most comprehensive pediatric cardiac care to children in the region. In February 2020, the HFHT program received certification from the Centers for Medicare and Medicaid Services (CMS). Our experienced team and strong commitment to care for these patients have made this a highly successful program.

The HFHT multidisciplinary team includes medical and surgical experts in heart failure and heart transplantation, transplant nurse practitioners, pharmacists, nutritionists and social workers. Additionally, the team is supported by specialists in immunology, infectious disease and palliative care. This allows us to provide complete care to pediatric heart failure and heart transplant patients.

Since the program began, there have been 26 patients listed for transplant, 125 heart failure consults and six heart transplants. We evaluate and treat heart failure patients using the latest approaches and technology, including pediatric ventricular assist devices (VADs). These surgically implanted heart devices help the sickest patients survive until a suitable donor heart becomes available.

Our transplant outcomes are among the best, which has gained attention in the HFHT community and attracted patients from across the region. Children's Minnesota is well on its way to becoming a high-volume pediatric heart transplant center.

2018 to present:

26
patients listed for transplant

6+
transplanted patients

6
VADs

125
heart failure consults

Fetal Cardiology



The Children's Minnesota fetal cardiology program provides comprehensive care for unborn babies with congenital defects and other abnormalities affecting the cardiovascular system. Early detection of congenital heart problems saves lives and enables families to prepare for what's ahead. We offer a smooth transition from fetal to pediatric care after delivery.

We work closely with regional perinatal and pediatric cardiology providers across multiple health systems to meet the needs of families throughout the Upper Midwest region, providing:

- Diagnostic imaging
- Operative fetal cardiology monitoring
- Early fetal echocardiography
- Virtual consultation of images

Fetal cardiology research and quality initiatives

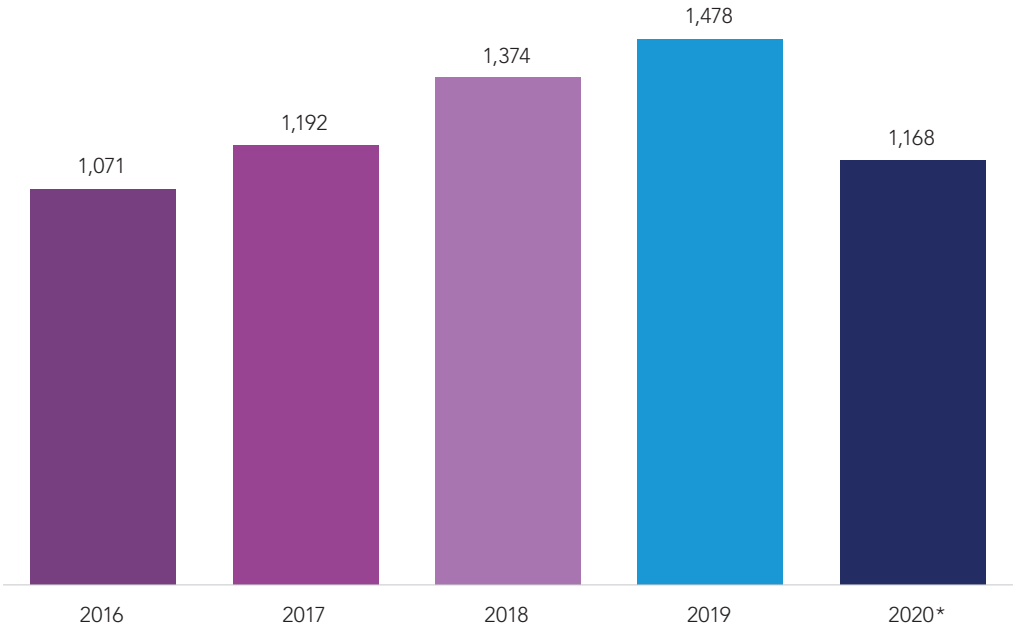
We're dedicated to collaborating with other cardiac centers and organizations to optimize patient care. This includes a partnership with Conquering CHD to make patient outcome information more accessible and understandable to families. We're also participating in two international registries to improve management for unborn babies with heart arrhythmias. Additionally, we're involved in multicenter research endeavors in areas such as heart block in unborn babies, regenerative therapy for hypoplastic left heart syndrome (HLHS) and fetal cardiovascular care.

We partner with the perinatal practices below to provide fetal cardiology services:

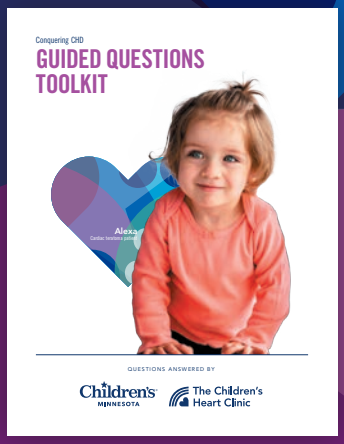
- Midwest Fetal Care Center
  Minneapolis, MN
- Minnesota Perinatal Physicians
  A service of United | St. Paul, MN
- Minnesota Perinatal Physicians
  A service of Mercy | Coon Rapids, MN
- Park Nicollet Specialty Center
  St. Louis Park, MN
- HealthPartners Fetal Clinic
  St. Paul, MN

FETAL ECHOCARDIOGRAM VOLUMES

Total number of pregnant women receiving a fetal echocardiogram



*COVID-19 state mandate-impacted case volumes.



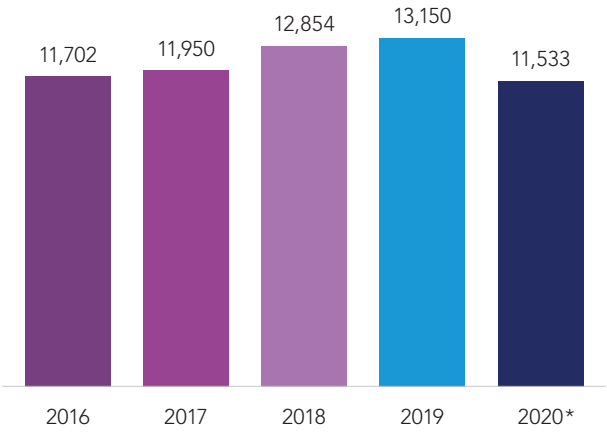
Families receive a booklet that includes program volumes and outcomes.



Advanced Cardiac Imaging



Children's Minnesota is a leader in congenital heart disease imaging, offering advanced capabilities such as cardiac CT, cardiac MRI and echocardiography. We have national accreditation in pediatric transthoracic echocardiography from the Intersocietal Accreditation of Echocardiography Laboratories (ICAEL), and we're accredited through the Intersocietal Accreditation Commission (IAC).



ECHOCARDIOGRAMS

*COVID-19 state mandate-impacted case volumes.

Echocardiography

We have 15 dedicated, highly trained sonographers who are board-certified or board-eligible in pediatric cardiology. In addition to Children's Minnesota, our team provides imaging and interpretation at nine surrounding hospitals. We offer echocardiography services in conjunction with cardiology consultations at every site so that patients can get complete care in a single visit.

Our imaging capabilities include:

- 3D echo
- Tissue Doppler imaging
- Fetal imaging
- Sedated imaging
- Strain imaging
- Stress echocardiography
- Transesophageal echocardiography (TEE)
- Transthoracic echocardiography (TTE)

ACCREDITED FACILITY · ECHOCARDIOGRAPHY · IAC INTERSOCIETAL ACCREDITATION COMMISSION

Cardiac CT and MRI

We perform a high volume of CT and MRI exams using the latest imaging technology — approximately 350+ scans annually.

Cardiac CT

Scans are performed in a fraction of a second or a single breath hold, eliminating the need for sedation and anesthesia for our youngest patients. Each CT scan is tailored to the patient, using the lowest radiation dose to reduce their lifetime diagnostic risk.

MRI technology

MRI scans provide our team with quantification of heart function, blood flow and myocardial tissue characterization. It's the primary modality used when an echocardiogram cannot provide the answers needed for clinical care.

In addition to clinical care, our team is actively involved in medical education, presenting at several national and international symposiums and providing cardiac CT courses throughout Minnesota in partnership with the Society of Cardiovascular Computed Tomography (SCCT). We participate in ongoing, grant-awarded research efforts to find better, safer imaging approaches and enhance care for our patients.

We are currently exploring the accuracy and cumulative risk of cardiac imaging in patients with congenital heart disease. Our imaging team is also investigating noninvasive approaches to evaluate single ventricle heart disease as an alternative to cardiac catheterization. Additionally, we're participating in the first international multimodality registry evaluating advanced cardiac imaging risk, with 15 centers enrolled.



In 2020, we performed:

167

CT scans

203

MRI exams

Multispecialty Cardiovascular Services



Photo taken before COVID-19

At Children's Minnesota, we have several collaborative, multispecialty services to support infants and adult patients with heart disease. Our team approach ensures patients get expert care and attention to promote the very best outcomes.

Neurodevelopmental clinic

We offer a cardiac neurodevelopmental follow-up clinic that provides assessment, treatment and resources to ensure kids with cardiovascular disease reach their highest potential for development, cognitive growth and quality of life.

In collaboration with our primary care colleagues, the clinic brings together a multispecialty team of pediatric experts, including cardiologists, cardiac surgeons, advance practice team members, geneticists, developmental-behavioral pediatricians, nurse practitioners, neurologists, psychologists, neuropsychologists, physical medicine and rehabilitation specialists (physiatrists, physical and occupational therapists and speech-language pathologists) and audiologists.

The clinic sees infants and children who need surgery and those at greater risk for developmental disorders and disabilities due to congenital heart conditions such as:

- Hypoplastic left heart syndrome
- Interrupted aortic arch
- Pulmonary atresia
- Tetralogy of Fallot
- Total anomalous pulmonary venous connection
- Transposition of the great arteries
- Truncus arteriosus

Adult congenital cardiac disease

Thanks to surgical and medical breakthroughs, 90% of children born with heart defects live to adulthood and beyond. We help these adult and adolescent survivors receive personalized, coordinated care using the most advanced diagnostic and therapeutic approaches available — provided by specialists who care.

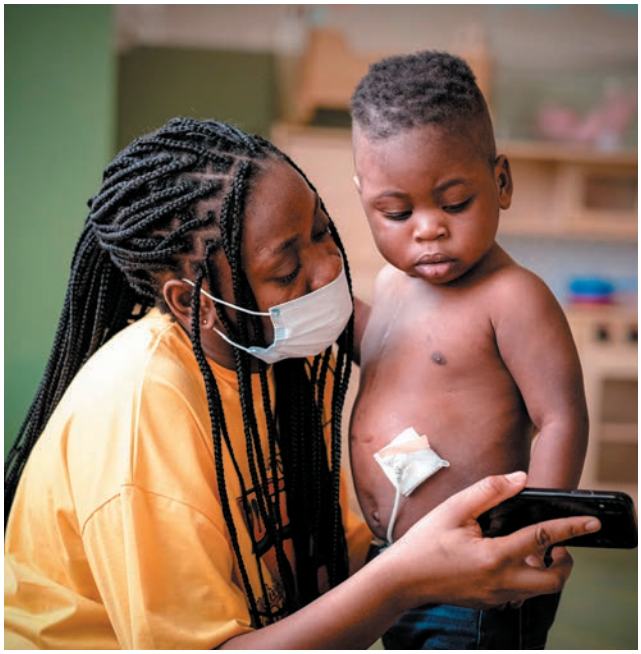
Through state-of-the-art technology, we're able to provide unmatched quality care and expertise in the full spectrum of ACHD.

We work with cardiovascular specialists and clinicians at adult systems to provide a full range of cardiology services for treating ACHD, including:

- A multidisciplinary team of physicians and clinicians who evaluate patients' entire well-being
- Outreach and education for adults as they transition from adolescence to adulthood
- Participation in research to identify best practices for adult patients with congenital heart disease

Velocardiofacial (VCF) clinic

This monthly clinic for patients with velocardiofacial syndrome — also called 22q11.2 deletion syndrome — offers multispecialty care and personal attention. It gives families the information and support they need to make informed choices. The team includes experts in cardiology, otolaryngology (ENT), endocrinology, genetics, immunology, psychology/neuropsychology, speech-language therapy and social work.



Preventive cardiology

Our preventive cardiac care services focus on finding heart problems early and preventing future cardiac disease. Our goal is to improve outcomes, address modifiable risk factors, leverage therapies, and encourage our patients and families to take part in their care.

Our multidisciplinary team of experts cares for patients with a strong family history of cardiac disease, elevated lipids, high blood pressure, obesity and other risk factors. We provide pharmacogenomic testing for children with hyperlipidemia and a monthly lipid clinic, which offers care from a pediatric cardiologist and a registered dietitian.

Children's Minnesota

RESEARCH

Children's Minnesota is engaged in many types of research, including investigator-initiated studies (led by a Children's Minnesota clinician) and externally sponsored multicenter trials, observational studies and registries. We support new and established investigators in all stages of research development, implementation and analysis. The work we do enables our investigators to explore novel ways to deliver lifesaving treatments, manage pain and symptoms, and develop new methods for preventing or treating childhood diseases.

We support kid- and family-focused research and innovations. From improving children's and teens' day-to-day quality of life to adopting cutting-edge technologies, we never stop reimagining health care. We will continue to seek better ways to serve the most amazing people on earth.

The Cardiovascular and Critical Care Research Center seeks to improve our understanding and enhance patient care and outcomes in these areas. Since its inception in 2009, the group has grown to include over 20 investigators and ongoing research projects ranging from investigator-initiated studies to sponsored multicenter clinical trials. Recent areas of research focus include pediatric cardiothoracic surgery, pediatric intensive care, cardiac catheterization, extracorporeal membrane oxygenation (ECMO), heart failure heart transplant and adult congenital heart disease.

92
peer-reviewed manuscripts

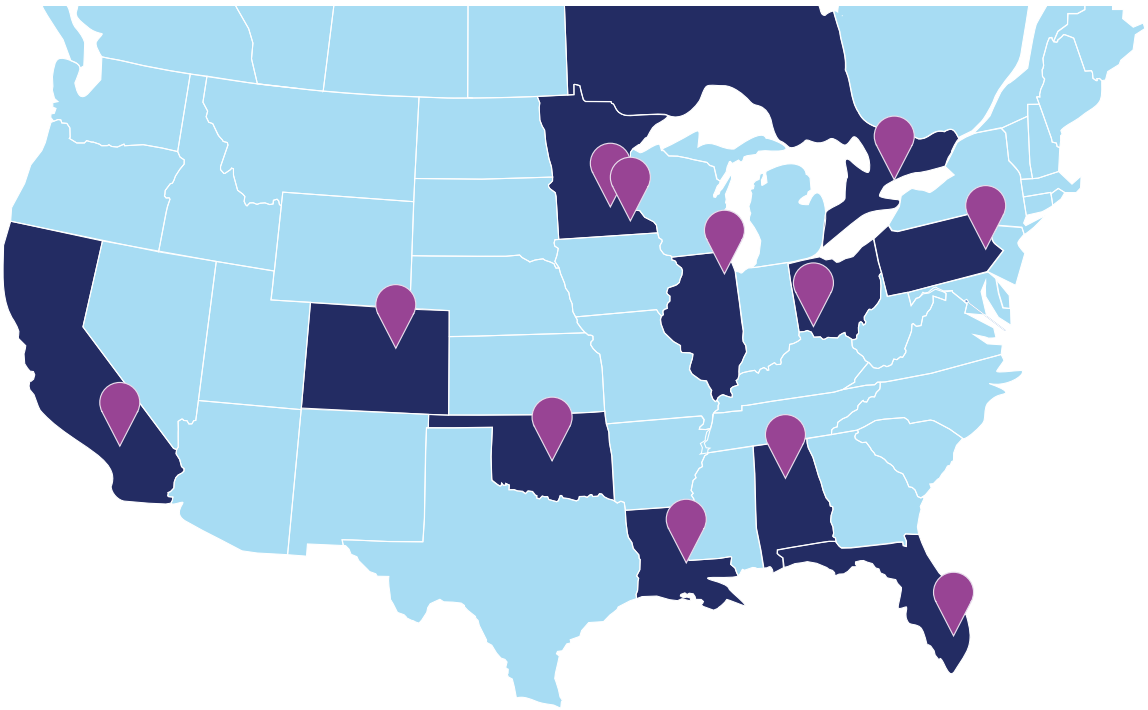
1
industry collaboration and research

5
book chapters

49
abstracts and presentations

26
current research projects

Hypoplastic Left Heart Syndrome (HLHS) Consortium



Children's Minnesota is proud to be one of 11 participants in the Todd and Karen Wanek Family Program for HLHS at Mayo Clinic, a nationwide collaboration that seeks to discover new therapies to treat HLHS. The consortium provides patients with a unique opportunity to participate in groundbreaking clinical trials and other research — regardless of their location.

The consortium has identified the highest-performing programs for HLHS nationally. These centers are the clinical sites for umbilical cord blood-derived stem cell therapy trials for patients with HLHS. The network allows HLHS researchers to pool scientific knowledge with other top cardiovascular programs around the country, reducing the time it takes to transform discoveries from the bench into promising new therapies at the bedside.

The program's mission is to support education and research on why and how heart disease develops and progresses and collaborate in developing cell-based therapies to repair heart tissue. The long-term goal is to delay or prevent heart failure in people with HLHS.

PARTNERS IN A HEALTHIER FUTURE

Our promise

We're a partner in caring for your patients with cardiovascular health needs and serve as a resource to support your decision-making. We're committed to providing a high level of service, including:

- Board-certified pediatric cardiologists available for consultation 24/7
- Same-day outpatient appointments for urgent needs
- Fast, noninvasive cardiology diagnostic test results — available within 24 hours, and emergency interpretation available 24/7
- Timely delivery of consultation notes to referring physicians after outpatient visits
- Virtual consultation of images performed off-site



Collaborating to enhance the care of children with congenital heart disease

In 2020, we announced the Mayo Clinic-Children's Minnesota Cardiovascular Collaborative. It's one of the largest and strongest pediatric cardiovascular collaborations in the country. The partnership builds on each organization's shared passion for children and combines the complementary strengths of both programs.

As part of the collaborative, physicians provide services at respective sites, expanding coverage. Our sharing of knowledge and expertise will help drive care delivery and research innovations, enhance the patient experience, and deliver the best patient outcomes.

We're proud to build on our long-standing relationship with Mayo Clinic and are dedicated to enhancing care for children with congenital heart disease.

> This collaboration enables Children's Minnesota and Mayo Clinic physicians to treat increased numbers of patients with serious or complex medical conditions, with the goal to improve outcomes for our most vulnerable patients.
>
> – Dr. David Gremmels

LOCATIONS AND CONTACT US

The pediatric cardiovascular specialists are available at our cardiovascular care center. We offer the only center in the Upper Midwest with all its pediatric services conveniently located on the same floor in a single building.



Inpatient location

Children's Minnesota – Minneapolis campus
Edward J. Phillips Cardiovascular Care Center
2525 Chicago Avenue South
Minneapolis, MN 55404

Children's Heart Clinic locations

The Children's Heart Clinic offers comprehensive cardiovascular care at 11 clinics. We deliver an expansive outpatient clinic experience to support same-day appointments for urgent needs.

To make an appointment at all locations:
612-813-8800



Fetal cardiology locations

- Midwest Fetal Care Center – Minnesota Perinatal Physicians
- Minnesota Perinatal Physicians – A service of United
- Minnesota Perinatal Physicians – A service of Mercy
- Park Nicollet Specialty Center (formerly called Meadowbrook)
- HealthPartners Fetal Clinic

THIS IS WHERE THE PEDIATRIC CARDIOLOGY EXPERTS ARE.

childrensMN.org/cardiovascular

ASK US ANYTHING.

CHILDREN'S MINNESOTA PHYSICIAN ACCESS

Call 866-755-2121

24/7 referral, admission and transport assistance