



# Heart to Heart Global Cardiac Care

*Measurably Expanding Access Since 1989*

SITE: NATIONAL CHILDREN'S HOSPITAL (HNN)  
LOCATION: SAN JOSE, COSTA RICA  
COLLABORATION LAUNCHED: 2021

OCTOBER 9–13, 2022  
MARCH 8–22, 2023  
CARDIAC TRAINING MISSIONS 3 & 4



**Valentina** Four-year-old Valentina was born with an uncommon form of congenital heart disease called Ebstein anomaly. In order for her to survive, she would need a rare open heart operation – one not currently performed in Costa Rica. Luckily, Heart to Heart and the Mayo Clinic were able to collaborate to bring Valentina to the U.S. for pro bono treatment. Today there are more than 250 babies and children born with heart defects in Costa Rica waiting for life-saving cardiac care.

## GROWING NUMBER OF CHILDREN IN NEED OF HEART CARE IN COSTA RICA

Since last year, the number of children in need of life-saving heart procedures at our pediatric partner site in Costa Rica has grown – there are now more than 250 children waiting for life-saving heart procedures; 120 of them require open heart surgery. Each family on the waiting list desperately waits to hear from their child's cardiologist because they know that a phone call could mean the possibility of a normal life for their child. It is a call some families will never receive.

Heart to Heart remains determined to reach as many Costa Rican children as possible. Our community is made up of a strong network of compassionate volunteers with a wide breadth of experience, skills, and resources. Our program model is rooted in the strategic transfer of knowledge to partner site

colleagues abroad. Over the last year, more than a dozen Heart to Heart volunteers provided over 350 hours of highly tailored teaching and training to our colleagues at Costa Rica's National Children's Hospital (Hospital Nacional de Niños, HNN). We set out to utilize every resource available to us in order to maximize the number of high-level teaching and training opportunities and to reach more children on their waiting list. To this end, Heart to Heart conducted two on-the-ground missions in San Jose; sponsored five of our Costa Rican colleagues to participate in unique U.S.-based educational programs; and brought three Costa Rican children to the U.S. for pro bono treatment. We are happy to share with you herein highlights of our program activities since our last report.



**In the operating room** Over the last year, we have conducted two cardiac training missions at our partner site, HNN. On-the-ground missions enable us to provide tailored clinical skills training as well as one-on-one mentoring of department heads. Shown here: Heart to Heart volunteer Michele Harris (front) works with her Costa Rican counterparts in the operating room. Ms. Harris has nearly 40 years of experience as a surgical technician!

## On-the-Ground Training Missions: October 2022 and March 2023

In October 2022, a small team of Heart to Heartniks returned to our pediatric partner site in San Jose, Costa Rica. On the ground, Heart to Heart and HNN clinicians worked side by side to perform physical exams and echocardiograms to jointly confirm diagnoses for 32 children. In addition to this hands-on clinical skills training, longtime volunteer Frank Cetta, MD led a review of dozens of complex patient cases and discussed findings in a group setting. Dr. Cetta also presented three formal lectures focused on atrioventricular valve anatomy and physiology, percutaneous pulmonary valve placement, and coronary artery anomalies. We were especially grateful to welcome back seasoned team member Eric Egger, RN to work closely with the nursing staff in the pediatric intensive care unit (PICU) to provide critical care to babies and children each day, as we gain a deeper understanding of how the unit functions.

During the mission, the Heart to Heart-HNN team began a preliminary patient selection process to identify candidates for open heart or catheter-based procedures to be performed jointly on Heart to Heart's next training mission. Thirteen-year-old Rebeca was one patient recommended to undergo urgent intervention (read more about this brave girl on page 5).

In March 2023, during our fourth cardiac training mission, Heart to Heart medical volunteers and Costa Rican colleagues worked closely and tirelessly with the shared goal of increasing the center's capacity and advancing complexity of care at all levels: from diagnostic examinations, to surgical and catheter-based procedures, to recovery in the intensive

care unit. (Learn more about catheter-based procedures on page 3.) Over the course of two weeks, the joint team performed six open heart surgeries and four interventional catheterizations – **saving the lives of ten children!** Together Heart to Heart and HNN specialists reviewed 43 patient cases in great detail to confirm diagnoses and establish the best course of treatment for each child. In the PICU, we provided critical care for 11 children postoperatively.

Additionally, Heart to Heart cardiologists Frank Cetta and William Border presented a variety of lectures on advanced topics. Dr. Cetta presented on double outlet right ventricle and cardiac masses (tumors), while Dr. Border shared his expertise on echo assessment of pulmonary hypertension in children with Eisenmenger Syndrome and the use of global longitudinal strain in childhood cancer survivors.

## Collaborating in the Cath Lab

A thriving cardiac catheterization laboratory (cath lab) is an integral part of an established children's heart program. In the last 20 years, pediatric cardiologists in the U.S. have been able to save more and more children's lives using interventional catheterization procedures to repair heart defects. Many heart conditions which required open heart surgery just a decade ago are now being treated in the cath lab. At our partner site in Costa Rica, where so many children are in desperate need of heart care, expanding this alternative pathway for treatment



**Our patient families** (Left) Pavel holds his two-month-old baby boy, Enzo, in the PICU. Enzo was born with a rare and complex life-threatening heart defect; timely open heart surgery was critical to his survival. (Right) Seven-year-old Ezequiel and his grandmother one day before his open heart surgery, the Ross procedure. In 2022, Heart to Heart held a master class on the Ross procedure in Costa Rica.

represents an excellent opportunity to increase annual patient volume and reach more children on the waiting list. Moreover, children who undergo catheter-based procedures require significantly less recovery time in the PICU. Because PICU resources in Costa Rica are extremely limited, it is vital to conserve intensive care resources as much as possible.

Costa Rica's population relies on an overburdened national public healthcare system: HNN's heart program is chronically lacking PICU bed space. In order to save as many children as possible, patients whose conditions do not require prolonged postoperative intensive care are given higher priority. As a result, those children who do require longer postoperative stays in the PICU often must wait. In March 2023, Heart to Heart and HNN specialists jointly treated children in the cath lab for the first time, marking an important step forward in our collaboration. A higher volume of children undergoing catheter-based procedures will allow for more PICU beds to remain open for children who require the more invasive alternative, open heart surgery. By maximizing all available resources, we maximize the number of children being saved annually.

## About Cardiac Catheterizations

There are two types of cardiac catheterizations, diagnostic and therapeutic. Diagnostic catheterizations are performed to find or confirm type and severity of heart disease, while therapeutic catheterizations, commonly referred to as interventional catheterizations, are used to repair or correct a heart condition. (Both are also called catheter-based procedures.) Doctors

*“There are only 27 PICU beds for all of the children in the entire country – freeing up PICU beds quickly at HNN can mean the difference between performing an additional open heart surgery or having to postpone one.”*

– ALBINA POPOVA  
EXECUTIVE DIRECTOR  
HEART TO HEART

### What is an interventional catheterization?

An interventional catheterization is a minimally invasive procedure by which specialists insert a catheter (a long narrow tube), often through the femoral artery, into the body in order to reach the area that needs repair. In cardiac medicine, interventional catheterizations can be used to treat a number of pathologies, such as ASD and VSD closures, stent placements, and valve placements and replacements.

classify interventional catheterizations as minimally invasive: instead of making a chest incision and opening the heart, cardiac specialists thread a straw-sized tube through a patient's femoral artery and/or vein and into the heart, whereupon they can then perform the necessary repair.



**In the cath lab** Because there are so few PICU beds in the country, efficient use of ICU resources is key to maximizing the number of children with CHD who can be saved annually. Advancing and expanding treatment in the HNN cath lab will help decrease the number of children waiting for open heart surgery – and maximize the number of ICU beds available for other patients. Shown here: Heart to Heart volunteer Holly Bauser-Heaton, MD (center) employs the Flip Technique with colleagues Carlos Mas, MD (left) and Rafael Gutierrez, MD (right) while performing a PDA stent placement. Pediatric cardiology fellow Natalia Retana, MD observes.

*“We are always open to learning new ways to do things and, in this case, we found that this technique is much easier and much more favorable for our patients.”*

– CARLOS MAS, MD  
PEDIATRIC CARDIOLOGIST  
NATIONAL CHILDREN’S HOSPITAL (HNN)

## The Innovative Flip Technique

Heart to Heart pediatric cardiologist Holly Bauser-Heaton stole the show with her exciting demonstration of the Flip Technique – the first time it has ever been used in Costa Rica! The hallmark of the Flip Technique is the reorientation (the “flipping”) of the patient on the catheterization table. For certain procedures, placing the patient’s head at the foot of the table makes it easier for cardiologists to insert the catheter from an optimal entry point, resulting in smoother access to the heart and reduced risk for the patient. This subtle change allows for cardiac interventionists to work more efficiently and quickly, which is key to ensuring patient safety. Dr. Bauser-Heaton and her Costa Rican colleagues (see photo above) placed a PDA stent in the heart of a one-month-old baby with

ductal-dependent pulmonary blood flow, a highly complex procedure. Using the novel technique, the joint cath lab team performed the catheterization safely and successfully!

Dr. Bauser-Heaton played an instrumental role in pioneering and developing this cutting-edge approach. Heart to Heart and HNN team members alike felt fortunate to benefit from her expertise firsthand as she introduced and implemented this technique with our Costa Rican colleagues. At the time of this writing, just months after our mission, our HNN colleagues have already successfully employed the Flip Technique independently on two newborn babies. This transfer of knowledge has already translated to life-saving action!

## Scholar Exchange at the Mayo Clinic

Heart to Heart’s program model is designed to be malleable so that we can meet our partner site colleagues where they are along their journey to delivering excellent comprehensive heart care. Once we have gauged a partner site team’s level of expertise, together we can better tailor a strategy to advance and expand their program. One component of our program model is called *Scholar Exchange & Continuing Education*. This component is critically important because it allows us to handcraft a unique

educational opportunity in response to a specific need. Since we last reported, Heart to Heart has been thrilled to provide five Costa Rican physicians with exceptional *Scholar Exchange* opportunities. Among them was an HNN team leader, Carlos Mas, MD, who was able to travel to the U.S. to observe a complex catheter-based valve placement on 13-year-old Costa Rican patient, Rebeca.

During our October 2022 mission in Costa Rica, doctors Cetta and Mas jointly performed an echo exam on Rebeca and, after reviewing her case in detail, determined that she was an ideal candidate for percutaneous pulmonary valve placement via catheterization at Dr. Cetta's home institution, the Mayo Clinic. Dr. Cetta recognized an opportunity to save a child's life and organize a master class for his colleague Dr. Mas. Thanks to a longstanding relationship with the Mayo Clinic international charity program, Heart to Heart staff and volunteers quickly mobilized to arrange for Dr. Mas and Rebeca to travel to the Mayo Clinic, where she would receive pro bono care and he would have the opportunity to observe and learn firsthand from the Mayo clinicians providing her care. In March 2023, Dr. Mas observed the procedure in its entirety: the placement of a transcatheter pulmonary valve in Rebeca's heart and the closure of two atrial septal defects (ASDs) – her chest remained closed throughout the procedure.

Making the best of such an incredible opportunity, Dr. Mas spent a full work week observing intricate interventional catheter-based procedures, including a PDA stent placement via umbilical artery and a complex coarctation repair utilizing a new graft. Throughout his stay, Dr. Mas also observed the Mayo Clinic's world-class cardiac team putting their best practices into action each day. With experiential learning opportunities like this one, the HNN team becomes increasingly better equipped to utilize their resources to provide life-saving heart care for newly diagnosed patients as well as for patients like Rebeca on Costa Rica's waiting list.

## Rebeca's Story

Rebeca lives with her parents and younger sister in Heredia, Costa Rica. She was born with a form of congenital heart disease (CHD) known as pulmonary atresia with intact ventricular septum (PA/IVS), meaning that her heart was missing the pulmonary valve – a critical part of the heart which enables blood to flow to the lungs for oxygenation. A strong student and avid reader, Rebeca is active in her church's youth reading group and loves the Harry Potter series. In her spare time, Rebeca enjoys creating art through macramé, painting, and drawing as a way of sharing her feelings and expressing herself. These hobbies have been especially important to her, since due to her heart condition, she has never been able to participate in sports.



**Rebeca – back to school!** Born with CHD, Rebeca was never able to play sports and her worsening symptoms even kept her out of school. Thanks to Heart to Heart's generous supporters and the Mayo Clinic, Rebeca received life-saving care in the U.S. Once back in Costa Rica, she was able to re-enroll in school and exercise without limitations.

When our volunteers met Rebeca in October 2022, she had already undergone multiple interventions, including open heart surgery, to alleviate symptoms. The first of these procedures was performed at HNN when she was only six days old. A few months before Heart to Heart's training mission, Rebeca's cardiologist had recommended her for open heart surgery in order to have a bioprosthetic valve placed in the pulmonary position. Unfortunately, the surgery could not be scheduled right away, so she was added to the national waiting list. As time passed, Rebeca's symptoms worsened, and her parents became increasingly alarmed. They were diligent about checking her oxygen saturation levels and soon realized that the stress from schoolwork – and even light exercise like walking – were causing her blood oxygen levels to decrease.

Worried for their daughter, Rebeca's parents decided to take her out of school until she could undergo surgery. But time went on and Rebeca remained on the waiting list. Four months later, Rebeca's cardiologist asked the family to bring her in for an echo exam so that visiting Heart to Heart specialists could consult on her case. This echo exam would result in a change of fate for Rebeca and her family. With the shared goal of getting Rebeca the care she needed as soon as



**Magnificent Mayo** (Left photo) Sarah, born with coarctation of the aorta, and Valentina, born with Ebstein anomaly play together cheerfully in Rochester, MN. The Mayo Clinic generously provided pro bono treatment for both of these young girls. Valentina was operated on by the world’s leading specialist in the surgical repair of Ebstein anomaly, Joseph Dearani, MD. (Right photo) We are extremely grateful to the Mayo Clinic for their collaboration with Heart to Heart, which not only saves lives, but also allows for unique educational opportunities for our medical colleagues abroad. Costa Rican pediatric intensive care physicians, Jorge Gonzalez (left) and Maria Jose Soto (right) observe in the Mayo ICU with Heart to Heart volunteer, Eric Egler, RN.

possible, a team of people from HNN, Heart to Heart, and the Mayo Clinic coordinated efforts to enable her to travel to the U.S. to undergo a minimally invasive valve placement via interventional catheterization. For the cardiology team at HNN, this would present an important opportunity for Dr. Mas to learn about performing this procedure firsthand by observing in the Mayo cath lab.

Rebeca underwent her interventional procedure in the U.S. in March 2023 – nine months after being placed on Costa Rica’s waiting list. Thankfully, her procedure went smoothly and, in fact, she was discharged from the hospital the same day, without having to be admitted to the ICU. After just a weeklong outpatient stay in Minnesota, Rebeca and her family flew home to Costa Rica, where she has since returned to school and can now exercise without worry!

## Lifelong Learning

The field of cardiac medicine is constantly evolving; and as such, specialists in the field commit to lifelong learning throughout their careers. Heart to Heart is always excited to exchange ideas with our partners and support their continuing education efforts. In addition to sponsoring Dr. Mas to observe at the Mayo Clinic, Heart to Heart had the opportunity to

sponsor four other Costa Rican physicians to partake in valuable learning opportunities in the ever-advancing field of pediatric cardiac medicine.

In June 2023, Maria Jose Soto, MD, pediatric intensivist from HNN traveled with four-year-old Valentina and her mother to the Mayo Clinic. Similarly, Jorge Gonzalez, MD accompanied six-year-old Sarah and her parents. Both intensive care doctors from the HNN team benefited from the opportunity to exchange ideas with and learn from Mayo Clinic specialists about a variety of topics, including but not limited to ECMO, central venous catheter infection prevention techniques, and postoperative management of patients born with Ebstein anomaly.

In addition, two HNN pediatric cardiologists remotely attended the 2022 Pediatric and Adult Congenital Cardiology Review Course hosted by the Children’s Hospital of Los Angeles and Mayo Clinic’s School of Continuous Professional Development. This six-day course covers key aspects of medical care for patients with CHD – from diagnosis, to treatment, to postoperative recovery. Upon completion, doctors Jose Castro and Flory Varela-Bulgarelli wrote that “the entire course has been helpful not just for us but for our colleagues. We would absolutely recommend it to colleagues at our home institution and in fact, we already have.”



**What lies ahead?** Our collaboration with the pediatric cardiac team at HNN, our partner site in Costa Rica, began immediately prior to the outbreak of the Covid-19 pandemic. Thankfully, we were able to resume our on-the-ground program work in November 2021. Together, we are now reassessing the status of the program in order to update our shared vision and strategic plan to advance and expand cardiac care for the children of Costa Rica.

*“The experience was magnificent in every sense. I thank you very much for the opportunity. We had a great amount of support from the whole Heart to Heart team and all of the Mayo Clinic personnel were very kind – they gave us the opportunity to observe and participate in multiple activities. I am very grateful for the whole experience, it was awesome!”*

– MARIA JOSE SOTO, MD  
PEDIATRIC INTENSIVIST  
NATIONAL CHILDREN’S HOSPITAL (HNN)

## **Next Steps: Addressing the Waiting List while Building Capacity**

As you may recall, our collaboration with the team at HNN began not long before the Covid-19 pandemic struck. We were very disappointed to have to put on hiatus the most personal aspect of our work, our on-the-ground mentoring and side-by-side clinical work. And we were particularly concerned for our Costa Rican colleagues in the ICU, knowing that Covid-19 was wreaking havoc on intensive care units all over the world.

Now approaching our fourth year of collaboration with HNN, we are overjoyed to move forward together – and in person! – with our Costa Rican partners, feeling a renewed sense of commitment and determination. We have developed close relationships, learned and grown together, and saved lives together. Each cardiac training mission represents a new

opportunity to put to use our collective skill, effort, and vision for the good of the children and families we serve, now and for generations to come.

As we dare to dream that the pandemic is in our rearview mirror, Heart to Heart and HNN have begun to jointly reassess the status of the children’s heart program so that we can develop an updated multiyear strategic action plan with annual milestones and collaboration end goals. Heart to Heart is ready and eager to assist at every level: we want to help our partners develop the pediatric heart program that leaders in Costa Rica envision for the children of their country. Stay tuned as we work to make dreams come true! And evermore, thank you for your steadfast support.

## PROCEDURES PERFORMED

Patient exams, echo studies, and consultations (78)	56,854
Cath lab - diagnostic (1)	8,064
Cath lab - interventional (5)	213,748
Open heart surgeries (9)	822,614
Anesthesia (9)	112,113
Perfusion (8)	27,600
Intraoperative TEE studies and readings (9)	10,800
Post-op exams and readings (18)	6,912
PICU post-op care, MD (13)	225,960
RN/tech support (PICU + OR)	13,948
Professional consulting + lectures	44,250
<b>Total In-Kind Medical Services</b>	<b>\$1,542,863</b>

Data compilation as of August 31, 2023.

**84%** of total program value consisted of goods and services donated in-kind to Heart to Heart and utilized at HNN, San Jose, Costa Rica.

Heart to Heart leveraged each dollar spent **5** times in donated in-kind goods and services.

## FINANCIAL OVERVIEW

### In-Kind Support

In-kind medical services	1,542,863
Non-medical in-kind (see Expenses below)	11,781
<b>Total In-Kind Support</b>	<b>\$1,554,644</b>

### Total Program Value

Donated medical services	1,542,863
Expenses (excl. non-medical in-kind)	295,437
Non-medical in-kind donations	11,781
<b>Total Program Value</b>	<b>\$1,850,081</b>

### Expenses

Airfare, in-kind	2,506
Ground transportation, in-kind	2,300
Interpreters, in-kind	2,375
Meals, in-kind	2,000
Program supplies	4,792
Pre- and post-trip coordination and logistics	118,247
Travel	75,650
Travel insurance, in-kind	2,600
Year-round program development	96,748
<b>Total Expenses</b>	<b>\$307,218</b>

**LASTING LEGACY:** Would you like to ensure that life-saving heart care is available to children around the world? Join the Heart to Heart Legacy Society by making a legacy gift, such as by naming Heart to Heart as a beneficiary or by making a bequest in your will or trust. Your generosity will expand access to cardiac care, saving lives for generations to come. We welcome gifts in any amount. For more information, contact [josie@heart-2-heart.org](mailto:josie@heart-2-heart.org)



**Heart to Heart**  
INDIVIDUAL  
DONORS



**EDWARDS**  
LIFESCIENCES  
FOUNDATION

### HEART TO HEART COSTA RICA TEAMS

**OCTOBER 2022** *Mayo Clinic:* Dr. Frank Cetta, pediatric cardiologist; Eric Egger, PCICU nurse; *Heart to Heart:* Dr. Hernan Carcamo,\* lead medical interpreter; Lucie Everett,\* interviewer and interpreter; Albina Popova, executive director.

**MARCH 2023** *Children's Healthcare of Atlanta:* Dr. Kirk Kanter, pediatric cardiac surgeon; Dr. Holly Bauser-Heaton, pediatric cardiologist; Dr. William Border, pediatric cardiologist; Dr. Steven Tosone, pediatric cardiac anesthesiologist; Ann Marie McGoldrick, perfusionist; Michele Harris, surgical technician; Kasey Forste, PCICU nurse; *Mayo Clinic:* Dr. Frank Cetta, pediatric cardiologist; Eric Egger, PCICU nurse; *UC San Francisco Benioff Children's Hospital:* Dr. Sarah Tabbutt, pediatric cardiac intensivist; *Heart to Heart:* Dr. Hernan Carcamo,\* lead medical interpreter; Lucie Everett,\* interviewer and interpreter; Reuben Holland, photographer and videographer; Albina Popova, executive director; Shalu Saluja\*, board chair.

\*Spanish-English bilingual