

**Dr. Thrush:** one of the benefits of this program what allows us to be a leader in the field is our expertise. we have been doing transplants, heart transplants in this program for over 30 years.

**Maggie McKay (Host):** There are a lot of unexpected challenges to parenthood, but having a child that needs a heart transplant can be unthinkable with questions and fears racing through your mind.

It can be overwhelming, but there is. Today, we're going to talk about pediatric heart transplantation with our two esteemed guests, Dr. Michael and Dr. Phillip thrush. Who's surgery team at Ann and Robert H Lurie children's hospital of Chicago leads. The region's only comprehensive pediatric heart transplant program.

And the state of Illinois only pediatric heart transplant program and ventricular assistance device or VAD program, we'll find out what the procedure entails, how a treatment plan is mapped out. Why Larry children's is a premier place to have this procedure done and more.

This is Precision, Perspectives on Children's Surgery at the Forefront of Pediatric Heart Transplantation. I'm Maggie McKay. Welcome Dr. Mongé and Dr. Thrush. It's a pleasure to have you both here.

**Michael Mongé, MD (Guest):** All right, thank you. It's a pleasure being here.

**Philip Thrush, MD (Guest):** Thank you. It's a pleasure.

**Host:** Will you please introduce yourselves?

**Dr. Thrush:** I'm Phillip Thrush. I'm the Medical Director of the Pediatric Heart Failure and Transplant Program at Ann and Robert H. Lurie Children's Hospital of Chicago.

**Dr. Mongé:** And I'm Mike Mongé. I'm the Surgical Director of the Pediatric Heart Transplant and Heart Failure Program at Lurie Children's.

**Host:** Okay, Dr. Thrush, what's your specialty and how did you get into it?

**Dr. Thrush:** I'm a pediatric cardiologist. And I specialize in heart failure and cardiomyopathy as well as pediatric heart transplant. I went into medical school thinking that I would ultimately work with children and in the process of going through all of my rotations, not only confirmed that, that's where I wanted to spend my career; but for me, the complexity and the, the physiology of, of

cardiology was a passion and a draw. And, and I don't think there's anything better than getting to take care of children that have cardiomyopathy and heart failure and, and, and need these advanced therapies.

**Host:** Dr. Mongé, you and your team lead the nation in congenital heart surgery and you push the boundaries for surgical treatment options of heart failure, rarely offered anywhere else in the world. Can you tell us about the Heart Transplantation Program at Lurie Children's, it's volumes, it's outcomes. It's mission.

**Dr. Mongé:** Sure the Heart Transplant Program at Lurie's has been around since 1987. We recently performed our 400th heart transplant. Over the last several years, our annual pediatric heart transplant volumes have been around 25 to 30 heart transplants annually. And we also have a robust ventricular assist device program bridging children to transplantation who would otherwise be too sick to undergo a heart transplant.

**Host:** Dr Thrush, what's your process like for making a treatment plan for a patient who needs a heart transplant?

**Dr. Thrush:** It's a pretty extensive process. It involves a medical evaluation of the child. One, to make sure that a transplant is the right option for the child and not some other surgical or medical therapy that, that may delay needing a transplant. Once we determine that a transplant's the, the necessary process, then the process of going through a thorough evaluation to make sure that not only will a child have a successful outcome, but that a family is well-informed and well-supported through that process. And so for our team, we have a large team with multiple sub-specialties and we rely on our colleagues here at Lurie Children's and other medical subspecialties to help us evaluate all the organ systems of the patient and child.

So, they go through this extensive evaluation that includes lab work and medical testing so that we can know not only that a child will do well after transplant, but we know then how best to take care of them after their transplant to have that successful outcome.

**Host:** And Dr. Mongé, who or where do you turn when you have questions about a case?

**Dr. Mongé:** So, in addition to colleagues within the institute we also partner with the Action Collaborative Network, which is a nationwide network of other pediatric heart failure programs that rely on each other to share their experience and outcomes with more difficult cases. In addition, we also frequently access

the literature and, and reach out to other institutions and other experts in the field to help talk through challenging patients.

**Host:** And Dr. Thrush, how do you plan for a heart transplant procedure? Because I presume it can be difficult to plan too far ahead, given the scarcity of available organs. Is that right?

**Dr. Thrush:** Well, it's actually extremely challenging to plan for a procedure that you can't schedule ahead of time. And so, you know, we evaluate the patients and we put a plan in place that is the best plan that we can determine ahead of time. And then we have to continue to reassess that plan while a child waits for a transplant.

And some of these children may wait for three or four months and some of them may wait for nine to 12 months or more. And so it becomes really important for both the medical and the surgical team to reassess that problem as we go through the wait list period, to decide do we need to change what we're doing to help get that child to a transplant and through the transplant. And then once an organ becomes available, then we can fine tune that plan. And we can kind of tweak the peri-operative management based on the specific factors that are going to be related to that donor for that patient.

**Host:** And Dr. Mongé, does your approach to pediatric heart transplants differ from others in some ways? If so, how and why is Lurie Children's the premier place to have this procedure?

**Dr. Mongé:** I think Lurie Children's is the premier place for multiple reasons. One is multidisciplinary collaborative effort that our group approaches each patient with, in addition to the individualized approach to each patient, as Dr. Thrush had mentioned. So, we have experts in multiple disciplines coming together to determine a care plan for each patient. In addition we have expertise in, in supporting these patients with both complex operations while waiting for transplant and ventricular assist, implanting ventricular assist devices. So through the experience we've gained over the last 30 years we have one of the busiest transplant programs in the country. And so with that experience, we've been able to build on that to continue to innovate and, and push the boundaries for to give these families hope.

**Host:** Dr. Mongé, what does the surgery for a heart transplant look like? How long does it take? How big is the team in the OR? What's the worst thing that can go wrong? And how often does that happen?

**Dr. Mongé:** So the average operating time for a pediatric heart transplant is

approximately 10 hours. And that varies depending on the complexity of the underlying anatomy and physiology that the patient has coming into the operating room. There's a large team of people involved in each heart transplant up to over 40 people, but within the operating room itself, there's several nurses, several cardiac anesthesiologists, a heart or a perfusionist who manages the heart lung machine or cardiopulmonary bypass machine that allows us to explant the heart and put in the new heart. In addition to several surgeons and then a team that has traveled to the donor institution to procure the heart as well.

So approximately 10 people in the operating room. Many things can go wrong during a heart transplant. Fortunately with proper planning and expertise that is somewhat unexpected. But they're given that these children are coming in off and had had multiple prior operations and also coming in with complex anatomy and physiology from their underlying congenital heart disease.

There, there can be several events that could happen. But fortunately with the, the team that we've put together here, it's a rare encounter where a heart transplant is not successful. And I think over the last year, we've had a hundred percent survival at, at 30 days post-transplant which really speaks to the surgical team that's taking care of these complex patients.

**Host:** That's amazing. What about the logistics for transporting the organ?

**Dr. Mongé:** With regards to logistics, there is frequent communication between the donor team and the and the recipient team with regards to travel times both on the ground and in the air and then any anticipated events that may delay the organ arriving at the anticipated time. But in general, we try to have the new heart in and beating within four hours of it coming out from the risk being explanted from the recipient.

**Host:** Wow. That's amazing. Dr. Thrush, tell us about how this procedure corrects the conditions that we're talking about.

**Dr. Thrush:** Well, I think it depends on the underlying reason that a child needs a heart transplant. So there, there are a handful of indications for a transplant. The most common one in the pediatric world is something called dilated cardiomyopathy. So, left ventricle typically becomes in that situation becomes enlarged. It's dilated it doesn't squeeze very well. And so if that happens, the heart isn't able to pump blood around to the body. And when the body doesn't get the blood flow that it needs, it basically can't do the things that it should. And that may manifest as heart failure symptoms, trouble breathing and shortness of breath.

It may manifest as change in organ labs like abnormal kidney labs or, or liver function. For other children who have congenital heart disease, they might be born with congenital heart disease where there's only really one good functioning ventricle. And those children go through a series of palliative surgeries to essentially gradually divide the, the blue or cyanotic blood or venous blood from the oxygen rich red blood and then rely on passive blood flow to the lungs and use that one good ventricle to pump to the body. Regardless of, of how a child gets to the point of needing a transplant, the idea behind the transplant is that you restore the heart's ability to pump to the body. So in the situation where a child has dilated cardiomyopathy, they then have this new heart that functions well and squeezes well, and is able to pump plenty of blood around the body. In the setting of congenital heart disease and while there are various different types of it, but in the variants where there is a single ventricle; you then restore a pump to the lungs. So the, the blue venous blood gets pumped to the lungs. The red oxygen rich blood that comes back to the heart gets pumped to the body. And so whatever, whatever led to those children with congenital heart disease, needing a transplant, the idea behind the transplant is that you remedy that problem, whether it was a problem with the pump, a problem with one of the surgeries that ultimately failed over time. The whole idea is to restore a good blood flow to the body.

**Host:** Dr. Mongé, what is recovery typically like for a child from a heart transplant? Do they heal faster than adults? And if so, why?

**Dr. Mongé:** So, kids are incredibly resilient and anecdotally in my experience, do heal quite a bit, quite a bit more quickly than adults in that we have two and three-year-olds who at two or three days after a heart transplant are up running up and down the unit. So, frequently a child will have the breathing tube taken out either later the same day of the heart transplant or the following day. And then from a surgical standpoint is usually fairly well recovered by five to seven days after the operation, but, then remains in the hospital for up to about a month of time for immunosuppression management by Dr. Thrush's team, in addition to biopsies and surveillance of rejection. And typically is discharged from the hospital within two to four weeks after a heart transplant.

**Maggie McKay (Host):** Dr. Thrush, what sets this program and team apart?

**Dr. Thrush:** if I look back over the last eight years here, we probably have done over 200 transplants. And, you know, the volumes seem to continue to increase every year. And I think one of the benefits of this program and what allows us to be a leader in the field is our expertise. You know, we have, we have been doing transplants, heart transplants in this program for over 30 years. And the, the risks that we are able and willing to take on as a program and be

successful at managing those high-risk transplants, I think leads the whole team to be a, a better team. And so, I'm incredibly lucky to have a team of six cardiologists that, that work with me in addition to our three surgeons and our multiple PAs and nurse practitioners and nurses. But it's that collective experience that I think allows us to be a leader in the field. It's, it's having the experience to do the transplants that other centers aren't able to do, or aren't willing to do that allows us to continue to not only do what we do, but to advance what we do.

**Host:** Wow, Dr. Mongé, how has this procedure advanced from say 10 to 20 years ago? What does the future look like.

**Dr. Mongé:** So, the actual heart transplantation has changed very little since the first heart transplant back in 1967. But I do think what has changed is our ability to support children leading up to transplantation. In addition to our ability to prevent rejection and support patients through rejection, post-transplant in, and with respect to what I initially said about a third of our patients are going into a heart transplant with a ventricular assist device or a pump, that's been surgically implanted to take over the function of the heart and maintain the health of the child's other organs, and also allow them to be up walking around and, or even potentially at home, going to school while they await a heart transplant.

So, that has really changed the management of the patients preoperatively over the last 10 to 15 years is the ability to, to support them with a pump prior to undergoing a heart transplant. And then with regards to the postoperative care, just advances in immunosuppression and our understanding of it and ability to monitor for it has, has changed and allowed us to better manage these children postoperatively.

**Maggie McKay (Host):** Thank you so much, Dr. Thrush and Dr.

Manji for your time. This was not only educational, but fascinating as well. Learn more about Lurie children's nationally ranked heart center at [Lurie children's dot org slash heart](http://Luriechildrens.org/slash/heart). Or make an appointment by calling one 800 kids doc. And if you found this podcast helpful, please share it on your social channels and check out the full podcast library for topics of interest to you.

I'm your host, Maggie McCoy.