The Lead in Peds

Transcript: Season 2, Episode 1 – Beyond Survival: Redefining Cardiac Rehab to Improve Quality of Life

Host: Nathan Kuppermann, MD, MPH

Guests: Pascal Amedro, MD, PhD

Dr. Nathan Kuppermann (00:00):

Research and pediatric medicine has transformed what's possible. Children born with heart disease, cancer, and other serious conditions are surviving at rates that once seemed out of reach. But survival doesn't always mean children stay active, fully participate in daily life, or have great quality of life. Many kids struggle with fatigue, fear of what will happen if they exercise too hard, and other anxieties long after their initial treatment ends.

(00:29):

Welcome to the Lead in Peds, the podcast where we highlight the breakthroughs driving pediatric research and clinical care. I'm your host Dr. Nate Kuppermann, Chief Academic Officer and Chair of Pediatrics at Children's National Hospital in Washington, DC. Today's guest believes that surviving a childhood disease is only the beginning. Dr. Pascal Amedro is a groundbreaking pediatric cardiologist and internationally recognized researcher who is reframing cardiac rehabilitation as medicine. He uses exercise capacity to understand how children actually live, not just how they survive. Pascal, welcome to the show. Really great to have you.

Dr. Pascal Amedro (01:10):

Thank you for inviting me.

Dr. Nathan Kuppermann (01:11):

So before we get into the details and the science, I just want to reach out also as a transplant. That is, I arrived here in DC about a year and a half ago, but just from California. There was some culture change, but no language change. You've recently arrived from France. How has it been so far and what's been your biggest surprise of being here in DC?

Dr. Pascal Amedro (01:34):

It's been great, really. I enjoy a lot. Well, I'm not completely new. I was here for the first time actually in the States when I was 16. I was an exchange student here. I dreamt to ever come back. The first time I came here I had to adapt to everything, and now I'm coming here to build something. It's very new and original, and I'm very enthusiastic about it.

Dr. Nathan Kuppermann (01:58):

You'll tell our audience, but you're trained actually as both a pediatric cardiologist and as adult cardiologist. How did you go from that training into the world of exercise physiology in general? Tell us a little bit about that path.

Dr. Pascal Amedro (02:15):

Actually it's a little bit randomly I was studying public health, and I was at the same time being trained in fetal cardiology. In fetal cardiology at that point, when I was a fellow, a lot of parents were asking my mentors, "Since my child is going to survive, which is amazing, thanks to medical advance, what is my child's quality of life is going to be?" That was many years ago, and my mentors sometimes were struggling and sharing those questions about quality of life.

(02:50):

I said maybe I should train a little bit in the public health system about patient-reported outcomes, so I actually did a PhD in a lab where there were experts in patient-reported outcomes. At the time were in cardiology, patient-reported outcomes were not considered very scientific. In the meantime, in my hospital we had an adult CPET lab. I said, "This is interesting." Exercise physiology didn't exist in pediatrics. My very first publication is the correlation between exercise capacity and quality of life, so that's how it started.

Dr. Nathan Kuppermann (03:29):

Why don't you just explain to the listeners CPET?

Dr. Pascal Amedro (03:32):

Yeah, so CPET means cardiopulmonary exercise test, and usually you measure something called VO2 max. The athletes know that VO2 is maximum oxygen uptake, and it's a number expressed in milliliter per kilo per minute. That relates the overall health status usually. It's something very important. It wasn't really used before in pediatrics, but now a lot of pediatricians use this value to determine the physical capacity of a child.

Dr. Nathan Kuppermann (04:10):

One thing I forgot to comment, it's interesting you were talking about patient-reported outcomes in cardiology when you were doing this, when you were trained earlier in your career. But you were way ahead of the field because even in the United States patient-centered outcomes in medicine in general, they really didn't come to be until the last decade or two, much less in pediatric cardiology. You were well ahead of your time, certainly here in the United States, where now actually we do a lot of research with very patient-centered, patient-oriented outcomes. But you were doing that along ago.

Dr. Pascal Amedro (04:46):

Yeah, I was talking to my patients and also talking to experts in patient-reported outcomes who were mainly researchers but who were struggling to implement those questionnaires into real-life pediatric follow up. They taught me how to make it something very scientific. Actually, as a pediatric cardiologist I validated for the first time an American quality of questionnaire into French. When I was young I thought it was just translation. Well, validated questionnaire is much more than translation. It's actually probably the most difficult article I ever had to write, so it's called psychometric validation. It's very difficult. I was trained in my PhD lab and then working at the same time on exercise physiology, but they were so close. At that time I didn't

know I was doing something very meaningful. I was just interesting in doing that. I was strongly supported by patient advocacy organizations, too. They gave me scholarship to do this line of research also.

Dr. Nathan Kuppermann (05:53):

Yeah, that's really important as you know for folks that are patient-centered outcomes, having stakeholder groups that represent patients and their families and whatnot. But again, we've discovered that in the United States in the last couple of decades, and you were doing that really quite early for peds cardiology.

(06:13):

One of the things that I just also wanted to question, I remember when you gave the grand rounds, when you received your endowed professorship, you were talking about you had set up a cardiopulmonary exercise little lab in the hospital library there. Tell me a little bit about that. Remind me, and what were you trying to study and do at that?

Dr. Pascal Amedro (06:36):

Well, at that point I was young and space is always an issue in hospitals. You know that, so at that time, every department has had its own little library with many medical books, but the era of internet was the moment where those libraries weren't really useless. There was this little room, so I actually stole the room to put my [inaudible 00:07:02] and all the CPET equipment. People were just looking and me like, okay, children not biking.

(07:10):

That's how I started. But actually now it's one of the biggest CPET lab in Europe, and we've actually validated reference values from a cohort of 1,200 healthy children. It's an international study with the US, Germany, France, et cetera. We started small, but now it's a huge CPET lab. We're going to replicate this in the States, too.

Dr. Nathan Kuppermann (07:33):

Right, and you moved out of the library there?

Dr. Pascal Amedro (07:35):

Yeah, yeah. It gave me something much bigger afterwards, yeah. At that time we were actually as pediatric cardiologists, usually we also take care of adult congenital patients. It was a CPET lab with both children and adults, so after a while we would say, "No, we need two labs different in different spaces."

Dr. Nathan Kuppermann (07:55):

Was there a particular patient event or interaction that made you realize that survival is not all that we're looking at when we treat patients, particularly in your field in cardiology? Circling back to your identifying that this is a really important way to study outcomes, but how did you get there? Was there an event that led you to that?

Dr. Pascal Amedro (08:19):

I really realized it was a very important issue when I was talking actually to my young adult patients. All my ideas came from adult congenital heart disease. I said, "Okay, there's a new generation coming of young children. We know that they lose physical capacity, that their VO2 max decreases too fast, even though there's congenital heart disease has been completely repaired. We need to do something so that now it's not a matter of survival." Most of them survive. It's an amazing positive thing, but we to build something more preventive. Preventive cardiology did exist in adult cardiology, general cardiology. Did not exist in pediatrics. I said, "Let's try to find a program that fits children."

Dr. Nathan Kuppermann (09:11):

Following with that same line of thinking, when a child clears that hurdle of the first major hurdle of treating the disease, there's obviously a sense of relief. But you realize that there was something more beyond that. Tell me how you got there.

Dr. Pascal Amedro (09:34):

Well, it started since I was studying exercise physiology, I was interested in the concept of physical deconditioning. There was a lot of literature about this concept in adult cardiology. Physical deconditioning is, we call it the vicious circle of physical deconditioning. It starts with a chronic disease. You might be actually completely healed from this disease, but you've lost a little bit of muscles of respiratory function of motivation, and you do a little less exercise. That comes from could be an adult cancer, it could be any chronic disease in the adult population, and then you do less exercise. You take the elevator in terms of taking the steps, and you do a little bit less sports, et cetera.

(10:21):

This vicious circle is very asymptomatic for a long time. My question was, does it occur early in children? Actually it did, and it's even more asymptomatic. If you have a congenital heart disease, you are repaired when you neonate. Well statistically, when you're 12 years old, that's the mean age, you start to decrease progressively your VO2 max, your exercise capacity or aerobic fitness. But you don't know about it, the family doesn't know about it, no one knows about it. And then many years later, when you are 30 or 40, even with the very simple congenital disease like a hole between two ventricles, which is called VSD, ventricle septal defect, this is a very simple congenital disease, adults who are in the fourth of their decades of age have a very strong physical deconditioning, high cardiovascular risk.

(11:21):

I said, "Okay, let's start something preventive when they're younger," so that's what I built this program that is a preventive cardiology program when they're young. That was the concept of my research.

Dr. Nathan Kuppermann (11:37):

Tell us a little bit about the measures to measure these conditions. It sounds like traditional measures were not really good, and you talk about VO2. Why don't you explain also our listeners about what is VO2 and the other measures that you use that identify this deconditioning that traditional measures have not been able to?

Dr. Pascal Amedro (12:00):

Yeah, so let's make it simple. If you take a male teenager, the normal VO2 is 47 per milliliter, per kilo per minute. That's the normal value. If you lose 3.5 milliliter of this value, which is a very small number, statistically you have a higher risk of morbidity and mortality when you're an adult. That's the threshold value.

(12:27):

And then there's another second number that is very important. It is the moment when you're doing an exercise test and when the exercise becomes unpleasant, when you have shortness of breath. This is very subjective. If you want to measure this physical deconditioning objectively, that's what we call the first ventilatory threshold. You measure it on the curve directly on the equipment you're using to do a CPET to an exercise test. This first ventilatory threshold, if it occurs too early during your exercise test, it means that you probably have physical deconditioning. Usually we use this value to actually prescribe exercise when someone has an important physical deconditioning.

Dr. Nathan Kuppermann (13:17):

So then for my next question is, again you're a pediatric cardiologist and adult cardiologist, but the tools that you're using and the things that you're measuring, you realize at some point that this can extend beyond cardiology to the evaluation assessment of children with other chronic diseases. How did you get from cardiology to those other diseases, and where are we in that?

Dr. Pascal Amedro (13:43):

Actually, my colleagues reached out to me. They said, "Your program is amazing. It's a preventive cardiology program." We call it QUALI-REHAB, rehab for rehabilitation and quality for quality of life. My friends from oncology first reached out to me and they said, "There's a lot of literature in the adult cancer population." Where for instance, if you do rehab after breast cancer, the mortality decreases. They were saying maybe you should evaluate those children in the childhood survivor population and do CPET, which I did. I did for all the other diseases: asthma, sickle cell, cystic fibrosis.

(14:25):

That was very funny because we thought we had prejudice. We were wrong about what we thought the results were going to be. For instance, we thought the CHD, the congenital

population was going to be the worst one. Not at all. Only 20% of my cohort of children with CHD had physical deconditioning. It's almost 40 to 50% in the childhood cancer survivor population, even though they had no cardiac problem and they were in cancer remission. We just finished a study in the chronic kidney disease. It's almost 100% of them. It's a never-ending story.

Dr. Nathan Kuppermann (15:02):

Yeah, It's funny actually, and I have to tell you Pascal, and I'm sure I've mentioned this to you, I was so excited when I heard that you were coming here because I have a good friend in California. She's an exercise physiologist. I've introduced you to her. She doesn't have formal scientific training like you do, but she runs an organization that's called Cancer Champions. Her whole thing is working with adults either who have cancer or recovered for cancer around exercise because, I mean, it's really very powerful.

(15:32):

I was wondering here at Children's do we have something like that? Then I heard that you were coming and it was really great to see all the programs that you're conducting outside of cardiology. I think I mentioned to you, and some of the listeners will probably be aware of this, but this friend of mine, she mostly works with cancer patients and cancer survivors, but she has a client with sickle cell disease. She works very closely with hematologists. I think they're at Mass General where this person is followed, but she helped her become the first person with sickle cell disease to run a marathon. They ran the New York Marathon. It was in People Magazine, but just highlighting the power of what you're doing and how it extends beyond cardiology and not just adults, to children as well. It seems like things always come second to children, right? We figure things out in adults and then it comes to children. But I love having the pediatrician's lead.

Dr. Pascal Amedro (16:33):

Yeah, and actually we always think it's more difficult in pediatrics. Doing both, it's actually easier to run those trials in children. The family is supporting the program. Usually the other colleagues from oncology or other specialty really support those programs, and the risks are extremely non-existent in children. I would be very comfortable in promoting my QUALI-REHAB program in a child with a sickle cell.

Dr. Nathan Kuppermann (17:03):

It's interesting you said something that I have been a strong advocate for my career. When you hear in the United States, we write for NIH grants and whatnot, historically they've considered children as a vulnerable population. I understand because people that don't work with children, they think they're delicate and fragile. The problem is then they don't want to fund grants because they say, "Oh, children, they're too delicate."

(17:27):

But we need everyone to get over that because of course we have to do the same, even more studies in children than we do in adults. Again, with the appropriate guardrails and using patient advocacy and whatnot. But it's been something that we've had to overcome here in the United

States for funders, that they consider children of a vulnerable population. When we consider them, "Wait, no, no, we can't improve their lives unless we study these conditions and figure out ways to make them better."

Dr. Pascal Amedro (17:55):

Yeah, I fully agree, and we have the same issues in Europe. Actually, a lot of things. This is a big surprise for me. I thought I was going to discover a very different environment or rules or microscopically. It's the same. Between Europe and here, I would say really doing research there or here or most, we struggled for the same things and we find solutions mostly the same way.

Dr. Nathan Kuppermann (18:20):

You've talked about in the past about the three pillars of your program. Do you want to just describe what those are to us?

Dr. Pascal Amedro (18:28):

Yeah, so it comes from the fact that usually people think that cardiac rehabilitation is only exercise training. It's extremely important, but it's not enough. I looked at what the adult cardiology studies showed, and in adult heart failure, they mostly rely on three pillars: exercise training, patient education, and mental health support. I said, "Okay, let's not reinvent the wheel." If the randomized controlled trials in adult cardiology are positive when you use those three pillars, let's try to adapt that to pediatrics. Cardiac rehabilitation in adult population, it's the best drug. It's the highest level of evidence. Why wouldn't it be the same in pediatrics?

(19:15):

Unfortunately, we're not going to use mortality as an outcome as the adult population would do, but we have quality of life, which is a serious relevant outcome. That's what I did. I kept the idea of the three pillars. I transformed that. I adapted it to pediatrics, but I used another primary outcome. My primary outcome was quality of life, and the secondary outcome was VO2 max, and the third outcome was mental health.

(19:41):

That's actually the most difficult part for me. I'm not a mental health specialist, so I collaborate with neuropsychologists, psychologists and they help me build, tailor the mental health support component of QUALI-REHAB for different populations. We have different trials depending on the population and patient education. It's fundamental. I just recruited an advanced practice nurse here in Children's National. She's going to improve this specific section on patient education. We started with a few people with us in the team, and now we have a huge international team to improve patient education, digital health, digital platform. This is extremely important, and specifically I tested a patient education. Randomized controlled trial just to test this component and just this component also improves quality of life.

Dr. Nathan Kuppermann (20:36):

I want to highlight one thing for our listeners of what you're talking about. Besides the great work that you are doing yourself, it's really the magic of collaboration. I say this all the time. Around my research table, I'm a pediatric emergency physician by training. It's not seven pediatric emergency physicians sitting around the table. It's me and then there's a basic scientist and a knowledge translation person and a patient advocate and an IT person.

(21:04):

People looking at things with different lenses with different areas of expertise, that's where the magic really happens, right? From what you've described in your team and your collaboration, that's what you've really put together. It's great when you bring somebody in that has some expertise that you didn't have. You think, "Oh my God, that would be great for my program."

Dr. Pascal Amedro (21:27):

Yes, that's exactly the vision I have, too. Sometimes collaborations start just randomly because you meet a colleague at the cafeteria, and then from a small talk it becomes a huge two million grant. That's actually some of my trials started with a neuropsychologist. She said, "I'm doing the same thing for neurocognitive problems. You're doing physical, let's build something." And now it's called QUALI-NEUROREHAB. That's exactly how it starts.

Dr. Nathan Kuppermann (21:57):

Tell me a little bit about the QUALI-REHAB program that you started and get the listeners...

Dr. Pascal Amedro (22:05):

I started, actually, to be honest, before COVID, I won a European grant before COVID, so it's this preventive cardiac rehab program with those three pillars we mentioned before. Originally enrolled teenagers and young adults in this trial with congenital heart disease.

(22:23):

Everybody thought I was crazy. Everybody thought it was going to be dangerous. That was 2017. It's yesterday. We were doing the hybrid concept of my program is that we don't replace human interaction by remote or telemedicine. We add it to existing healthcare interaction with patients. For instance, we have exercise trainers who actually go to the patient's house to deliver one hour of exercise training a week, and the second session during the week is doing remotely.

(22:58):

That's the hybrid concept because at that time I was extremely interested in telemedicine because even before COVID I thought could be very good for our patients. They don't want to go to the hospital. That's why I started this concept of hybrid rehab, and it did work. The association between center-based rehab with human interaction and home-based rehab also with human interaction plus the digital platform in the remote sessions, that's... I think in English you said the chicken soup. Maybe that's one of the solution. That's the first randomized control trial in pediatrics that demonstrated a positive efficacy on the primary outcome. Of course, the primary outcome was quality of life.

Dr. Nathan Kuppermann (23:46):

Quality of life.

Dr. Pascal Amedro (23:47):

But it also improved the VO2 max. I told you previously that if you lose 3.5 milliliter, it's not a good thing. In this trial, after the three-month program, they increased by three milliliter. It's not 3.5, but it's not that bad. We're going to do better now because at that time we were cautious. We were prescribing moderate physical activity at the threshold level I told you before. Now we're doing HIIT. For those who are familiar, it's high-intensity interval training. We're actually doing this now in children with single ventricles.

Dr. Nathan Kuppermann (24:25):

Wow, amazing. Again, our listeners just want to put it out there, the randomized trial is really the gold standard that way that we study clinical interventions and stuff. What you described there was tested through randomized trial in France and other parts of Europe?

Dr. Pascal Amedro (24:43):

Yeah, so it started in France, and then now it's European program. But since I'm here, we're going to start a new randomized controlled trial in the childhood cancer survivor population, so that's on the list.

(24:55):

The ethical question I have now is am I allowed to have a control group which doesn't receive intervention? Is it ethical considering cardiac rehab is the best drug now? I repeat this, it's the best drug. We don't use enough cardiac rehab. Is it ethical to have a randomized population where the control group received no intervention? We might have to find of new ways to do research in my field.

Dr. Nathan Kuppermann (25:24):

Are the skills that children learn in QUALI-REHAB, do they sustain beyond the end of the program?

Dr. Pascal Amedro (25:33):

In the first trial, some of the outcomes were positive after 12 months. The program lasts 12 weeks or three months, but the primary outcome and the secondary outcomes were measured after one year. We took a risk doing this. It's not usual. Usually in those similar trials, a lot of colleagues measure right after the intervention, I said, "No children come once a year to the hospital. Let's take a risk and let's try to measure those outcome at one year," which is not a lot, but it's still considered long-term assessment.

Dr. Nathan Kuppermann (26:06):

Yeah, it's long term.

Dr. Pascal Amedro (26:06):

The trial is positive, so that's good for the publication. But if I have to be honest, I would like to do better. The quality of life increase was statistically significant, but it's only four points we need to do better. The VO2 max increased immediately after the intervention, but started to decrease. We need to work on past rehab, which we're doing now here in Children's. The mental health also increased, but probably could be improved more. The body mass index decreased. That was the surprise actually after 12 months that remained. What was interesting that thanks to patient education, all the questionnaires we gave them a year later about this is knowledge, patient autonomy that remained positive. That's interesting.

(26:56):

The message is we did well. Probably that was the first trial, but we're now running new trials where we want to increase the magnitude of the efficacy of this program, and we want to tailor it also. Research sometimes very strict. Now we are going to try to tailor this program based on the baseline assessment of our patients.

Dr. Nathan Kuppermann (27:19):

Just throwing it out there as an investigator, are there perhaps more brief interventions that you can do ongoing? I mean, the big intervention over this twelve-week period to sustain the effects for longer. Is that-

Dr. Pascal Amedro (27:35):

We are hesitating in what we should do. Should we have physical interaction? Should we have the children come to the hospital for regular check-in with an exercise trainer, with the nurse, et cetera? Or should we do it completely remotely? Ideally we should go to the house. That's what we should do, so we actually doing it for the exercise trainer. We're working on that, but past rehab is extremely important.

Dr. Nathan Kuppermann (28:00):

Well, let me ask you. It's a super interesting question, this issue of when is something really considered so standard that you really cannot randomize to placebo or nothing. As an aside, do you work with an ethicist, or do you consult ethicists when you're for these sorts of treatments?

Dr. Pascal Amedro (28:21):

Yeah, so I was myself member of a pediatric ethical committee in France, so that's always the questions we have. The good thing is to have a lot of money when you receive funds because the solution is once the trial is finished, the control arm that received no intervention, if you have enough money, you could give them the intervention or a light version of the intervention. That's what I'm doing now. I will probably be able to do this in Children's National because I'm very lucky to have been to received a significant fund from the Dunn family during my professorship.

Dr. Nathan Kuppermann (28:59):

By the way and I'm just going to highlight that it is, again, the power of donors. I mean, the Dunn family is really allowing you to take all what you're doing and also to a new level.

(29:11):

As we wind down, let me just ask you the [inaudible 00:29:16] of you, given your tremendous expertise and history, and we're so excited by the way you're at Children's National, what do you envision over the next five to 10 years? What would you think would be the ideal pediatric rehabilitation program for all children with serious chronic illnesses? I mean, what do you project to the future? Where are we going in terms of that?

Dr. Pascal Amedro (29:43):

Clinically, I think we need now in pediatric hospitals very big preventive teams. Prevention should not belong to subspecialties. We should have really important preventive teams with academic research, with clinical expertise, so that's the first part. The second part is public health, is how can we have those programs covered by health insurance? Currently, neither in Europe nor here am I able to build the home-based component of the program. Everybody's saying prevention is important. The health insurance has to pay that.

(30:29):

Well, that's two points. Building preventive structures, real preventive structures, big staff in pediatric hospitals across all childhood diseases. Even though I'm a pediatric cardiologist, I would be ready to abandon my first job to really work with a team of preventive people. The second thing, public health and health insurance, that's two... There are many things to do, but that's I think two very important things we need to work on.

Dr. Nathan Kuppermann (31:00):

Yeah, interesting. The last couple of questions I'm going to ask you, one that we can ignore, that we have so much digital technology around this and AI and whatnot. How do you foresee that being part of your programs moving forward? And then finally, what excites you most about programs that you'll build specifically at Children's National?

Dr. Pascal Amedro (31:27):

For the first question, I started without any digital platform. I just used Zoom. Now we have a multidisciplinary digital platform. It's a wonderful tool. A lot of people like human interactions, but a lot of families and children prefer the remote, so we tailor. Thanks to those tool tools, we tailor the rehab. That's really helpful for patient adherence, for equity. Really, I think digital platforms have to exist in the environment of prevention.

(31:59):

Also, we have a digital platform that actually calculates everything that helps me prescribe the dose of physical activity. At the end, if we collect a lot of data, probably those tools will be able to advise us and say, "Well, considering this specific patient, this specific environment, this specific needs, VO2 max, quality of life, and disease, maybe you should prescribe this type of rehab." That's what I see in the future. The second question was about what is going to be new here in Children's National?

Dr. Nathan Kuppermann (32:35):

What are you most excited about starting up here at Children's?

Dr. Pascal Amedro (32:39):

What I like here is the possibility to work much more than I ever did before with other colleagues. In Europe I did it, but from a research perspective. Here, I have the feeling that it's going to be also in real life. I've met with mostly all the subspecialists within the short period of time. They're very enthusiastic. They're already referring patients to our CPET lab and our exercise clinic. That's the first thing.

(33:05):

The second thing is that we're going to try to do both clinical research and real life in this unit. For instance, we've built a little room. We call it the hybrid fitness room. People are going to come to the hospital in this room and people want to be remotely connected to the digital platform. Well, for the first time, so we have the room now, we have a big screen on the wall, we have all the equipment, and we hope to have a group of children. Some of them will be at the hospital, some of them will be home. We're going to test the group interaction, the group effect, because I think that's very important.

(33:44):

We're going to try to do something that I've never done. Maybe we're going to forget which disease they have. Maybe we're going to have a child with a kidney disease and a child who is in remission from cancer and a child with a congenital disease. We don't care about the disease. They have the same needs. They need the same program. That's my dream, and I think here it might be possible. When I was interviewed here, I had the feeling that hospitals are usually organized in silo. It was not really the case here. That's actually why I was interested by coming here.

Dr. Nathan Kuppermann (34:20):

Pascal, tell me, what is your vision for pediatric rehabilitation medicine, specifically here at Children's National in Washington DC?

Dr. Pascal Amedro (34:30):

Well, considering that all of my colleagues here are very enthusiastic about this program, I think we should build something very new, very original. We're working on it. Probably a CPET lab. Shouldn't be a CPET lab just for cardiologists. Probably we could run a CPET lab with the expertise from other specialists. For instance, lung specialists. They have a room in this lab.

(34:55):

I think we should probably open the space for other colleagues in the assessment. Psychologists, behavioral medicine should be part of the assessment. I think here in Children's National, I have the feeling that the fact that we're not working in silo, this is going to be possible. Same thing for the intervention. I'm a pediatric cardiologist. I have a vision of cardiac rehab. I think we could improve with this program with the help of my colleagues here, and I am sure we're going to do that.

Dr. Nathan Kuppermann (35:26):

Well, that's great. I think with that, I think it's a good place to stop. Let me just say, Dr. Pascal Amedro, first of all, thank you for joining me on the Lead in Peds. It's been really fun for me. I always learned so much stuff, and I've learned a ton from you. Thanks for all the great work you're doing. Again, I welcome you to Children's National. It's great to be your colleague there.

Dr. Pascal Amedro (35:47):

Thank you, Nate.

Dr. Nathan Kuppermann (35:48):

Thank you to Dr. Pascal Amedro for joining us today. In this episode of the Lead in Peds, we explored why survival alone is not enough and how pediatric cardiac rehabilitation can help children move beyond survival towards fuller, healthier lives. Dr. Amedro's work reminds us that cardiac rehabilitation is about more than fixing a heart. It's about restoring function, confidence, and quality of life. Thank you for listening. Be sure to subscribe and share this episode with anyone interested in how Children's National is leading the future of pediatric research, innovation, and care.