

**Season 1 – Episode 1 – Dr. Heather Ross
Transcript**

BTB

Welcome to Behind the Breakthrough the podcast all about ground breaking medical research and the people behind it at Toronto's University Health Network, Canada's largest research and teaching hospital. I'm your host Christian Côté and our guest today is Dr. Heather Ross division head of cardiology at Sinai Health System and UHN's Peter Munk Cardiac Centre and director of the Ted Rogers Centre for Heart Research at the PMCC. Dr. Ross is pioneering research of artificial intelligence to improve the lives of patients suffering heart failure. She'll join us in a minute. But first here's the backstory on Dr. Heather Ross.

Caring and determined. That's Heather Ross from a young age growing up in Montreal she would bring home sick animals to try and fix them. And one time, when her family dog was ill her mom brought her into the vet's exam room to observe. When they left Heather declared. That's what I'm going to be when I grow up. Her mom said oh? And Heather shot back. Yes! - the doctor.

And then there's another moment. At age 26 Heather was at her grandmother's bedside as she lay dying of heart failure and held her hand as she passed away. For the UBC med school student her mission from that moment on was crystal clear. Improve the outcomes and quality of life for patients with heart failure. Dr. Heather Ross cardiologist at UHN Peter Munk Cardiac Centre, welcome to Behind the Breakthrough.

DR. HEATHER ROSS

Pleasure to be here.

BTB

Heather what are we talking about when we say heart failure?

DR. HEATHER ROSS

So heart failure is best described as the inability of the heart to pump adequately to meet the needs of the body. So traditionally patients will feel fatigue shortness of breath. They may have swelling in their ankles or around their belly. Things that we take for granted in day to day activities will cause problems or it just won't be able to they won't have the energy or they'll be quite symptomatic incredibly impactful disease on quality of life.

BTB

OK so how do we treat patients with heart failure what have been the options for you as a clinician up to now?

DR. HEATHER ROSS

So heart failure is an epidemic in Canada they're more than a million Canadians with heart failure and by the time you're 40 you have a 1 in 5 lifetime risk. This is an

impactful disease both in terms of personal cost to patients and caregivers but also in terms of the financial cost of treating heart failure. So there are many different causes of heart failure the commerce clause in Canada remains coronary artery disease and the next commonest cause is idiopathic which in my mind means we just haven't found the reason yet which is what we hope some of this discovery science will do.

BTB

Idiopathic as in random?

DR. HEATHER ROSS

As in we don't know we just, idiopathic. But we can see heart failure from cardio toxic drugs that are given in cancer treatments and treatments of other inflammatory conditions. Alcohol some of the drugs like cocaine can cause heart failure. We can see it from conditions related to genetic disorders are heritable cardiomyopathy these including cardiomyopathy is like hypertrophic cardiomyopathy where the heart muscle gets very thick. We can see it from alveolar disease which is very common in developing countries from hyper tension which is an incredibly common problem. There are aspects of diabetes that can lead people to the development of heart failure so it's a major risk factor. So the first question we ask is why because some of the treatments are somewhat tailored to the why? Then the next question is, Well what am I going to do about it? And what I'm going to do about it stems around drug therapy or pharmacological therapy, device therapy and then lifestyle modification. So, I tend to say to patients it's what I need to do which is to make sure you're on the best medication and what you need to do as we engage in this partnership in your care. So, from the patient's perspective we want them to exercise 150 minutes a week. We want them to stop smoking. We want alcohol minimization. If they're obese we look for weight loss plans. We engage in cardiac rehabilitation. We do still recommend salt restriction. That's one of the questions of our time that we have to answer, whether that is a benefit? And we have a large study being led from Alberta international study on that question.

So that's sort of what the patient needs to do and keep track of their symptoms and get engaged and match self care. And then from our side we have to make sure that they're on the best medication these guideline directed medications that have come out of large clinical trials and then certain patients will benefit from specialized devices or pacemakers defibrillators or resynchronization pacemakers. And then the minority of patients who have advanced heart failure might benefit from a transplant or a mechanical heart. So, I ask why and what can I do. And then the third question is what does it mean for me? And that is the question that develops into the whole area of prognosis which is what we're really hoping to make inroads in.

BTB

So just curious as a patient is it beneficial the earlier I notice issues to come and see someone like yourself?

DR. HEATHER ROSS

Seeking help is incredibly important. Seeking help is incredibly important and we know we've data that the number of visits before the actual diagnosis is made goes up in men and women in Ontario as they get to the place where the diagnosis is made. So, they are coming in but the diagnosis isn't being made because people don't have a heightened awareness so they might diagnose them with a cold or with asthma because they don't have an awareness that heart failure can affect a 32 year old woman. Right. So that's one of the things that we have to do is with this awareness concept is making sure that people understand how common heart failure is. It is just a disease of the elderly it is an incredibly common problem. Five percent of the Canadian population has a problem with their heart function, and they don't know it.

BTB

And does early intervention in terms of recognizing these signs helped turn it around?

DR. HEATHER ROSS

There is evidence that in certain situations yes early drug therapy can help remodel the heart back to normal which is what we'll see on your part as a patient.

BTB

As long as your doing your part as the patient...

DR. HEATHER ROSS

Ya everybody has to. This is a true partnership. You want to give the right patient the right treatment at the right time and this is a phrase that has been used often and it's critical and again it's you know if you're talking about patient centred care and I'm the patient I would like you to be able to tell me what is my risk what is my risk of having a side effect from that drug or having a bad outcome. How much is that drug or treatment and a benefit me. What does it mean to me. Right. That is really one of the driving forces and I think paternalism in medicine has changed and, and as physicians we recognize that the patient is at the absolute core of what we're doing. We are in a different era now. We have an enormous amount of data on information data and information on patients that we never actually had before. So that's one huge change that's happened. The second huge change is we now have the capacity to store data in ways that we didn't and we just think back about how much a thumb drive cost 15 years ago and think now too we're talking petabytes which is so many zeros that you know it's hard to even think about how much space that is and we have the capacity to store it and then really the critical piece is we now have the compute power or the analytics engines to ask the questions. So, we want to say that there has been an evolution and a transformation in how we're approaching looking at individuals with disease not just heart failure. That's my area but obviously this is also being done very well in areas like cancer.

BTB

So you have nicely set up for me to bring us towards your research and the confluence of being able to take all that data and ask the questions because of artificial intelligence.

But I want to ask you artificial intelligence when it first began to emerge. What was your first understanding of it?

DR. HEATHER ROSS

Well I think I think anybody who's a movie fan thinks of artificial intelligence and they think of the terminator, right?

BTB

I don't know if I think of that?

DR. HEATHER ROSS

That's probably one of the single biggest I thought of the single biggest movies where we have this automatic intelligence that is completely independent of any human interaction supervision or interference. And that is one form of A.I. including self-driving cars would be the current most obvious example of that.

You have to remember that artificial intelligence represents a number of different areas in the area that we're really talking about is more augmented or assisted which is how do we use machine learning which is a form of artificial intelligence to look for connections and associations in a vast amount of data that just exceeds the human mind. So, in medicine for years we've been reductionist and Descartes was one of the ones who started that and we've always tried to simplify things to what is the one thing I need to know to tell the patient what's the one test or the one number that will tell me how to manage the patient and patients can't be distilled down to one thing. Patients are very complex, the human body is very complex. We had to do that because we just didn't have the capacity to do it any other way, and that's one of the changes that's happened. So now instead of being reductionist what we want to do is embrace complexity and that is one of the big things that this type of machine learning allows us to do.

BTB

It's the speed I imagine then?

DR. HEATHER ROSS

The speed is enormous. So, we go back to one of the first early forms of machine learning that we did was a mathematical rules based algorithm. And if this then that flow algorithm to manage patients with heart failure we call it MEDLEY and it is a remote patient monitoring application that lives on the patient's phone, the algorithm lives on the patient's phone. It's personalized to the patient and the treatment aspect of it is based on how we manage patients in clinic. And it was a PHD Dr. Emily Seto now at University of Toronto it was her PHD and we've been working on that rules based algorithm for years and refining it. The next step for us is actually to take those simple three physiologic measurements that we use and the symptoms but add other aspects of the patient's information that we have at hand, laboratory data that we have at hand, imaging data and create a medley A.I. or an artificial intelligence algorithm for medley. And a mathematical or early A.I. algorithm which is what we use now. There's no way

you can do if this then that when you're looking at more than 100 parameters and that's what I mean by the complexity. So, in general most of us can put a bunch of numbers in our head and we're seeing a patient and we're we get to where we think their outcome is. But this is the ability to put thousands of numbers into a system and try to refine that.

BTB

It just seems so overwhelming. Was there a moment for you that you kind of had this aha moment of how you could not manipulate but I guess utilize artificial intelligence and its potential in your research?

DR. HEATHER ROSS

Yeah, so my favorite, and so Dr. Cedric Manlhiot who is our computational lead for our cardiovascular Data Management Center my favorite slide of his is he shows visa fraud accuracy.

BTB

Sorry?

DR. HEATHER ROSS

Visa the credit card. Yeah it's fraud accuracy and you know the accuracy on visa fraud and the pace at which it is detecting your Visa cards use and whether or not fraud is happening is that 99.99 and whatever extra nines accuracy and this issue about how we prognosticate or determine what a person's outcome is and heart failure has been based on tools that have an accuracy of Point seven five to about Point eight.

So one of our first *aha* moments was when we created this data lake or this environment where all of the information flowed and now we have more than a billion data points in that data lake. So that's the size the size of which it's grown to. But when we were creating it we found a whole lot of legacy information that had been used during exercise testing and we do a formal type of exercise test called a cardiopulmonary study. And the patient is hooked up to a machine which looks at their oxygen and their carbon dioxide and makes it clear guidance on what their prognosis is and the one number that we look which is your maximum oxygen consumption which is your body's exercise performance or your VO2 Max has been considered the one number that we would use to predict need for transplant. A pretty big decision, right?

BTB

Right.

DR. HEATHER ROSS

So what we found on the legacy computer was the information that generated that one number but we also found literally thousands of data points on patients because the data was being captured on every breath. So, somebody might be on the exercise machine for 18 minutes and that gets summated into one number but in actual fact on every breath data points were being created but not used. So we used feed forward neural net analysis which is a machine learning approach and in just adding the breath

by breath data we were able to significantly improve the accuracy of that one exercise test over the single number the VO₂ in terms of predicting risk of death, need for transponder a mechanical heart and that's just on one test. So it starts to make you imagine that if I could take now that algorithm and add in the other clinical data that we have, biomarker data that we have imaging and we're not talking about the imaging reports we're talking about the pixelated data from the images. This is this is a totally different level of data. As well as our goal in this next 12 to 18 months more genomic data from the DNA fingerprint. We think that we can refine that predictive accuracy. And wouldn't it be nice to be a patient coming in and have me be better able to say this is what I think your risk is and therefore it is now that we need to be thinking about these advanced treatments like transplant or mechanical heart.

BTB

When did this treasure trove become when did you find it?

DR. HEATHER ROSS

Just in the last twelve months. So this has been a, this has been a funds we no funds what. Sorry audience I know. I think it's fun but that might be just because of my why just enormous interest in trying to answer these riddles. But so, so we were trying to get information into the data lake and when we started the data lake weren't certain it could be done. So we started with six completely disparate databases within the Peter Munk Cardiac Centre we now know that there are 58 different databases that house patient information including obviously the electronic medical record. So we started as this pilot project with six completely disparate databases and then tried to see if we could create architecture code to hook into the database basis and actually flow it into one data system. And so when we first did that it was very akin to the Matrix and I can't I can't even tell you how exciting the day was when we're staring at the computer and we can see the data actually flowing in which is you know it's remarkable right. And then from there we saw my God like look at all of the data that's actually hosted here none of which has been reported on because none of it was used to generate the traditional report, right? Which is a standardised appropriate guideline report which is your VO₂.

But the rest of the information was there but not being used. And that's what we unlocked. And then we thought well we've unlocked all this data we should see if it actually performs better and that's when we did the study. We had a young awesome masters engineer Jason Hurd who's now a medical school in Newfoundland who did that project with Cedric.

BTB

So, I'm trying to wrap my head around all this. All this data that it sounds like you would just scratch the surface as a clinician but now because of A.I. you're allowed to mine it and harvest it or harness it. What are you finding?

DR. HEATHER ROSS

Well I think we're just starting. We really are starting, and I think one of the challenges a little bit is actually our imagination which maybe isn't the right term for a researcher to

say but it is actually true. So, when you start to think about what we can find. You say to yourself what are the what are the burning questions. And there are a number of them obviously for us. One of the critical pieces has been always around predicting outcome and that just comes from me witnessing heart failure and my dad died from heart failure a week and a half ago

BTB

I'm so sorry to hear that.

DR. HEATHER ROSS

So, you know it's it is the drive to want to answer that question about risk and benefit incredibly personal but also very professional for all the years that I've been in the field.

So that is my personal goal but then the other questions start popping up, why is it that one person who gets a heart attack goes down path A? And another person with a heart attack in the same area for the same age. On the surface looks exactly the same gets the same treatment and goes down path B. Why is it? What is it? What makes those two people go down a different path despite the fact that on the surface they look the same and the treatment was the same?

This is the other piece that A.I. will do for us which is around discovery. So what I've been talking around about prognosis is using information that's available that we know about to predict prognosis. When we talk about discovery it's unmasking what we don't know. So if we can have enough people that look the same and go down path A after a heart attack and people that look the same and go down path B after a heart attack then we can start to understand at a genetic level, Genomics. At a protein level, Proteomics. At a metabolic level in terms of what's happening to their metabolism which is called metabolomic and we can start to look at the differences in those and the complexity of not just one gene that might be dictating a path for a patient but interplay between different genes and environment. Then we're going to be able to discover what it is. That discovery may allow us to find new avenues for treatment or for management. So, one of the biggest opportunities for A.I. will be in the space of discovery.

BTB

It's fascinating. I'm thinking OK you know in healthcare we always talk about translational research. Taking what you discover in the lab or in theory and convert it into something tangible for the patient. So are you able to paint a picture of what A.I. in heart failure research could look like down the road?

DR. HEATHER ROSS

So I think the first thing that's going to happen in the clinical environment are these prediction models with improved accuracy and the way that we want to translate those more broadly is to create decision tools. So take the learnings from the Peter Munk Cardiac Centre in the Ted Rogers Centre for Heart Research that's created an algorithm based on all the information that we have that is dramatically improved predictive accuracy. Bundle that and say that if I'm in Thunder Bay the information goes into the

algorithm it is in the palm of the physician's hand and real time in front of the patient about what the risk is for that patient. So that type of prediction process will help us personalize the treatment better for the patient. When we get to understanding the genetics and how it drives disease and drug development according to that that's precision medicine, that's a little further away for us. That's been happening in cancer already where they are looking at a person's genetics and the chemotherapy that they determine is based on the genetics. That's precision medicine and we've been behind in cardiovascular medicine but we are making it clear inroads into that area and I think that that's coming but the thing that's going to happen first I think is more around being able to personalized care. Being able to be better at predictive modeling. Putting those tools in the clinician and in fact in the patient's hands, so the patient understands what's actually happening and using that technology more for monitoring and managing disease. I think that is that that's coming in in months to years. While I think the precision medicine is a little further afield but is still coming.

BTB

And essentially then with the ability to process vast amounts of data what does that give you as a clinician when you're in the room with the patient?

DR. HEATHER ROSS

Well it means that when I'm saying to the patient you know you have heart failure and in general now what I say to the patient is you have heart failure, this is a terrible disease. The average life expectancy after diagnosis is two point one years. And I'm using that based on large data that may not be relevant to the individual patient or broken down to their gender their disease their age and their treatment. And instead what I'm gonna be able to come to and say to the patient is you have heart failure. We know with this drug for your age gender and disease, this is your likely outcome, right. I'm gonna be able to predict better. Tell young moms the likelihood that they will see their kids graduate from high school. Right. These are all things that have we have to be able to do a better job. And I think that's the piece that's going to come sooner.

BTB

What's the challenge then to this vision or this dream?

DR. HEATHER ROSS

Well one of the one of the biggest challenges always is the data that you have. So a machine learning algorithm works on the data that it's given. So if the data that actually is given is from a very homogeneous cohort of people it will only be predictive for that cohort of people. And that is one of the reasons that I think we are uniquely situated in Toronto because we are the most multicultural city in the world and as a result we have every type of person and that's getting engaged and wants to be part of this. An example of that is that when we started bio banking in consenting patients to bio bank which will be a critical piece of this discovery and this journey we have the consent rates are 98 99 percent. And in short order we have now banked more than 90000 samples. So it is, it is. That gives me goose bumps it's seeing that partnership with patients who are truly engaged and not even necessarily for themselves but knowing that their

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information may make a difference for the future. And again, Toronto is just in this enormous win-win place with the technology boom. The analytics boom. Institutes like Vector we who bring massive artificial intelligence experience to the table and the multicultural nature of the city. I think I think we just have opportunity.

BTB

You're listening to Behind the Breakthrough, a podcast about ground breaking medical research - and the people behind it - at the University Health Network in Toronto, Canada's largest teaching and research hospital. I'm your host Christian Côté we're speaking with Dr. Heather Ross division head of cardiology at Sinai Health System and you a chance. Peter Munk Cardiac Centre director of the Ted Rogers Centre for Heart Research at the PMCC and a pioneer in the research of using artificial intelligence to help improve the lives of patients suffering heart failure.

Heather, we like to ask I guest about the fact that medical research takes time and for someone I know is so driven to improve patient care, do you ever get frustrated with how slow that process is?

DR. HEATHER ROSS

Yeah. I know of course we do. There's a there's an age old expression about research which is that there's good days and bad years. And I think that I think that that is one of the challenges and you just you have to remember why you're getting up in the morning you're getting up in the morning to make a difference in people's lives. And if you can keep the focus there it is a remarkable driver. The pace of research is also changing because of data and analytics and machine learning and A.I. So the actual pace of work is changing and Moore's Law predicts that beautifully which is this logarithmic rise in technology and we are seeing the same rise in in in pace of research. So, when I think back to when I started more than 25 years ago the pace of research is changing and that's really encouraging.

BTB

So what's the road like for you then to get to this point?

DR. HEATHER ROSS

I would say it's been it's been pretty awesome actually. I feel incredibly fortunate and I can't thank the Munk family and the Rogers family enough. The truth is the funds that they have provided have dramatically accelerated our ability to make inroads into these into these places and it wouldn't have been done without that philanthropic vision. Peer reviewed research is still an underfunded area. Unfortunately, in Canada and so those gifts and all the other gifts that have come with them I don't want to downplay the other philanthropic gifts that have come in because every dollar matters. But I don't think we would be where we are without their absolute visionary leadership.

BTB

I also like to ask our guests about their approach to failure because we're not taught

how to deal with failure and you see it in your research and even in your clinical practice. How do you approach that challenge?

DR. HEATHER ROSS

Well you could quote Churchill all, right. Success is not, failure is not futile. But the single most important thing about failure is obviously to learn from and I don't think anybody would be surprised by that answer. But I have....I personally use exercise as a way to have released the demons if you will. And I find that it's not a sort of a 45 minute treadmill exercise we're talking about but a six hour snowshoe in this glorious country that we have. And what happens for me is somewhere around an hour and a half into it. All of the trappings and the challenges disappear and it's like a form of meditation. And by the time it's finished I find that my mind has somehow in the process of stepping and breathing and the environment and the peace has made its way through the tangled web and often I sort failures in that way. So some of my very best ideas have come from being away from the pressure cooker and some sort of the white noise and getting out into a space where there's no competing interests with the brain so that personally for me has worked very well.

BTB

Part of your role is also mentorship, being a role model. What's your approach?

DR. HEATHER ROSS

Well I think the mentor role is critical. I've had tremendous mentors in my own life who have absolutely made the difference for me I wouldn't be here if it weren't for four mentors and those have been within and outside of medicine as well.

Mr. Ian Delaney's been a crucial mentor to me over the last decade. So I think that one of the things that a mentor does is listen, open doors, support and enable. As someone said to me, we can open the door, you still have to go through. And you recognize that some mentees will run through without looking back. Some maybe you know tip toe through some are reluctant to go through and that is their choice. But I think the mentors role is as much as able is you lead by example and open as many doors as possible to see the potential.

BTB

And what advice would you give young people out there. You know that young kid from Montreal who's just observed the vet helping their sick dog who is interested in medicine?

DR. HEATHER ROSS

Do it. Do it. Do it. Do it, right. It's been the best. There's nothing, nothing like it. I mean the challenges along the way, I don't give up the hope. It was my third time applying in a medical school before I got in. And so I've always thought I did okay for somebody who didn't care in the first two times applying so there is if it is what you want if it is your dream there's a way to make it happen.

BTB

What did you think the first few times you were turned down?

DR. HEATHER ROSS

Well the first time I was turned down it was it was devastating right because that's the whole vision. Everything you've been working towards and you sort of think well maybe I'm not capable maybe you know in that old expression I'm not worthy but then you think back can you say to yourself, No that is that is where I want to go. So what do I need to do. And you put you know you put your head down and you do what has to get done.

BTB

I've heard your patients talk about you because I've had the privilege of doing some stories about you. They say you know, you're passionate. Your direct. And one young woman said in a very affectionate way that you're a bad ass. Tell us about your connection to patients.

DR. HEATHER ROSS

Well the patient is the reason we're here. It really is just that simple and I think you know it's always been interesting to me to watch and I'm so thrilled to see the evolution of medicine from paternalism to patient centric care. And I would go so far as to say that I believe the patients are completely the owners of their health care and give me the incredible opportunity to interact with them to try to enable a better outcome.

So it is about them it's not about meeting lots of things that are about me but that one is not about me. And I think if you if you do that and remember that you're you know your fiduciary responsibilities to the individual in front of you and do everything you can to provide them the best and most honest information and outline their plan even when the news is not good if they know that that you have done everything you can and that's just what it is and you're open and honest about it. My experience has been patients are remarkably able to tolerate information even when it is bad information.

BTB

In your practice, part of your raison d'être I remember you saying, is to make things better and you take every opportunity to further our understanding of heart failure and heart health and certainly trekking to the ends of the earth to shout that message. Tell us about that venture of yours. Which is very much a part of your life.

DR. HEATHER ROSS

So we started to test your limits. Back in 2006 and the idea really was threefold. So when we started the program mechanical hearts were not funded by the ministry and I was seeing people die waiting for a transplant because we didn't have a solution and mechanical hearts were available and Dr. Viv Rao started the surgical program. But we didn't have funding and so the first goal was to try to raise money to pay for pumps to save lives. The second was to engage in research that is high risk and high reward not be afraid to fail. So research projects that mightn't get funded by peer review process because the risk ratio was real or because the area of research didn't necessarily fall

into a traditional biomedical bucket. And so it was to provide seed funding for research and we've done some very interesting projects around quality of life with that without funding and then the third was you know exercise is critical. Exercise is just a truly beneficial activity it improves sleep and well-being and in cognition it improves heart health and longevity and we are increasingly sedentary and obese country. And what I wanted to do was to make a point that ordinary people can do extraordinary things if given the opportunity and the training and so Test Your Limits was about putting myself in that space and putting one of my transplant recipients Dale Shippam in that space. And we've done eight trips we've been to the north and south pole and last May we cross country ski across Greenland which was epic because we had we had 100 mile an hour storm in a tent on a glacier on the top of Greenland and you know you're in your tent for a very very long time. You get to know your tent mates very well but but it was about doing that and trying to it really anything's possible if you put your mind to it.

BTB

I get that. But Heather and I'm sure this I'm not the first person - couldn't you just come up with a public service announcement.

DR. HEATHER ROSS

I mean you have to trek all over the world to shout this message out so you know some public service announcements work but the truth is people want a story. People want emotion, they want to connect. And I think that I think that that is that is the way to do it. And to try to get people to really connect and go that could be me. In fact have had lots of people say I want to come on your next trip. What does it take. And I say Well OK so it takes about 20 to 25 hours of training a week. And then when you say and I you know I dragged a tire through the entire Don Valley so I'll go drag a tire for you know three or four hours because that's what it's like to pull a sled at the at the Pole they're like OK when are you going to like Bermuda? When are you doing test your limits in Bermuda? How do I sign up for that one? Now you know it's a it's a it's I've always been interested in testing myself. That's been part of my own personal life journey and I am I am a highly competitive individual and the person I compete with is me. And so for me that's been part of the bust is the testing limits program.

BTB

OK. So we can't raise this test your limits gambit of years without the Mount Vinson story.

DR. HEATHER ROSS

Knew you're going to bring that one up. So then some was the first mountain that we did and the first test your limits. It's an adventure. Yeah. So we I've been to Bolivia with one of my colleagues from Montreal to do Mount Sajama but it was the first Test Your Limits trip and we went down to climb Vinson in the Antarctic which is the tallest peak in the Antarctic. And we had a huge issues with travel delays. So the trip had been very well laid out in terms of landing and then climbing and acclimatize Asian and rust days. But we were stuck in Punta Arenas in Chile and as a result you're back into the trip is fixed and the front end got collapsed down. So when we finally got onto the continent of the

Antarctic we had a very limited window six days to do the trip. No days for climatization. And as a result on summit day I got very sick high altitude pulmonary edema and came down but unfortunately in the descending didn't improve and I got progressively sicker and it was a climber emergency. And Dale of course helped me get down the mountain that night. So it was a very close...

BTB

The patient you treated?

DR. HEATHER ROSS

....Help me now. And what was really sort of the true irony is you know I was sitting there in the tent in pulmonary edema. What do heart failure patients get? They get pulmonary edema. And so for that relatively brief moment you know hours I knew exactly what it felt like. And you want to talk about learning something that helps change your compassion around how you approach patients. Well that is a that is as real as it gets. And I would never want to see anybody experienced the feeling of drowning in your own bodily fluid which is exactly what it felt like and I only felt it for hours. We have patients who live that way. It's profound.

BTB

You didn't make the summit but in some ways you're lucky to be here.

DR. HEATHER ROSS

Yeah. Yeah, I'm very lucky to be here. I think that that is true and I you know when you and I first spoke about it I was much less composed and it's taken me 13 years to be able to tell the story and not kind of lose it a bit because it was a near-death experience for me. The crazy bit about me is six months later I did Mont Blanc without telling anybody because I wanted to know if I really had a problem with altitude or if I could keep doing Test Your Limits and the story is I can keep doing Tests Your Limits but... But no, it was it was a terrifying experience and I and I again I just say I now have some sense of what it must feel like just some small sense and that does change the approach

BTB

Are you going to keep doing them.

DR. HEATHER ROSS

Of course we are. Yeah of course we are. I had a I know I'm recovering from a bit of an ankle injury but the plan is to do Ecuador in June of next year and climb Mount Chimborazo, which to our knowledge would be a world record for transplant recipient.

BTB

How much have you raised?

DR. HEATHER ROSS

Just under three million.

BTB

Wow.

DR. HEATHER ROSS

That's been a good program.

BTB

Big picture. What's next for Dr. Heather Ross?

DR. HEATHER ROSS

I think the most important thing is that we follow through on the promise that we have made with the incredible visionary transformational gifts from the Rogers and Munk family to truly change care for patients with cardiovascular disease and for me specifically heart failure. So that is an absolute commitment to do. And one of the most important things that both Mr. Munk and Mr. Rogers brought to the table was a business minded approach something that we haven't had as much in medicine which is around having clear metrics and deliverables and timelines and adhering to it and if you're not making it understanding why and how do you adjust modify and pursue and I think we really all are on pace to do it. And the team is as driven as I am. And we feed off each other and it's it's a remarkable thing to watch. So I think what's next is hopefully to get back here in a year and tell you about some incredible secrets that we've unlocked.

BTB

We'd love to have you.

So, Dr. Heather Ross division head of cardiology at Sinai Health System and UHN Peter Munk Cardiac Centre. Thanks for speaking with us and continued success in your research.

DR. HEATHER ROSS

My pleasure. Thanks for having me today.

BTB

For more on the podcast go to our website www.behindthebreakthrough.ca and please let us know what you think. Rate the podcast where ever you're listening from. We crave the feedback.

That concludes this episode of Behind the breakthrough a podcast about ground breaking medical research and the people behind it at University Health Network in Toronto, Canada's largest teaching and research hospital. I'm your host Christian Coté. Thanks for listening.