# Changing What's Possible - S.2, Ep.8 - Transcript

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catheters, carina, products, people, design, intermittent, spinal cord injury, disability, neurogenic bladder, users, life, mentioned, reusable, system, year, living, device, technology, urinalysis, bathroom

#### **SPEAKERS**

Carina Ho, Dr. Marie McNeely, Souvik Paul

Dr. Marie McNeely 00:01

Hello, and welcome to Changing What's Possible: The Disability Innovation Podcast brought to you by Cerebral Palsy Alliance Research Foundation or CPARF. I'm your host, Dr. Marie McNeely. And this season, we are excited to bring you extraordinary stories about how disability technology and innovation come together. And today we are joined by our guests Souvik Paul and Carina Ho. Listeners, Souvik is CEO and Founder of Aurie, a startup company in our 2023 Remarkable US accelerator program. And he'll be talking more about already in the first half of the episode. And in the second half, you'll hear from Carina who who has had a spinal cord injury and we'll talk more about her experiences and how products from Aurie could help her and many others. So I'm looking forward to learning more about Aurie today. Souvik thank you so much for joining us. How are you?

- Souvik Paul 00:50
  I'm good. Thanks for having me.
- Dr. Marie McNeely 00:52

  Well, we are excited to learn more from you today. Can you start by t

Well, we are excited to learn more from you today. Can you start by telling us more about yourself?

Souvik Paul 00:57

So I am an Indian American man, brown hair, brown eyes, brown skin. I am 33. I'm trained as an industrial designer with previous experience in finance working on Wall Street. And I am currently the CEO and founder of Aurie.

Dr. Marie McNeely 01:13

Fantastic so Souvik, what actually motivated you to found your company Aurie, and how did you get started on this adventure?

Souvik Paul 01:19

The story really dates back to when I was in my mid 20s, I had just gotten my first promotion at my first job and decided that I needed to leave finance before it had me for good. And I decided to go to graduate school to learn industrial design. And the idea that I had back then was that the design of physical products was one way of changing the world. And that's obviously like a very bold statement and trust a 20 something year old to believe that they could be part of that change. But that was ultimately like what motivated me to apply to design school and throw my hat in the ring, so to speak. And two weeks before grad school started, I got a phone call it was from Carina's older sister, Darlin. And she basically told me that while their family was on a road trip, there had been an accident, and that I needed to fly to California right away. That moment was really my introduction to the world of disability. Because as I found out my partner's middle sister, Carina sustained a spinal cord injury in a car accident. So I spent those two weeks prior to grad school really just in and out of the ER just coping with the rest of the family in the wake of this car accident. And at some point, I had to decide, do I go back to graduate school, which felt like a really, really selfish decision at the time, or do I stay in California and try to help out? And ultimately, I did decide to go to graduate school. But I resolved them that if design could really help paint people's worlds, then it should be able to intervene in this moment. And so I decided to focus my graduate thesis on this idea of exploring how design can be used as a methodology to help improve the lives of people living with spinal cord injuries and other disabilities. So spent the two years in graduate school focused my thesis on exactly that problem, and then ended up graduating working at Johnson and Johnson. And then while I was at Johnson and Johnson, that was really my education in terms of how medical devices get designed and made. And along the way, I realized that if I wanted to translate any of the ideas from my graduate thesis to reality, and see them have an impact on the world, I would have to kind of drop out of J&J and try to do it myself. And that was five years ago in 2018. So I've been working on Aurie ever since.

Dr. Marie McNeely 03:45

And I know that helping somebody you care about can be a huge motivator. And it sounds like that was the case in your story here. So let's talk a little bit more about Aurie, what's Aurie's mission, Souvik?

Souvik Paul 03:56

Our mission is to design medical products and services with and not for the disabled community. So I realized how like my story sounds, oh, like so selfless, so great. And it's not really like that at all. I think that especially when it comes to human centered design, it's really important as a designer to not take on the savior mentality. I'm not saving anyone. The ideas behind Aurie's first product, which is a reusable, no touch catheter system really stem from the experiences of people who have to use products like intermittent catheters every single day.

And without that key insight, our company, our product wouldn't exist. And it's a big part of our mission as an organization to really champion the perspective of the end users whose health and quality of life we're trying to help improve with our products and services.

Dr. Marie McNeely 04:50

Certainly, and you mentioned this catheter system specifically, I know you're currently developing this reusable smart catheter system. So but can you describe what this product looks like? And maybe how it works.

Souvik Paul 05:01

First, it might be helpful to provide a brief overview on exactly what intermittent catheters are. When your typical person thinks of a catheter, they think of a tube that's inserted into your body that basically like passively drains urine into a bag of some kind. And that is a type of catheter, it's called an indwelling, or Foley catheter. But when someone needs to use catheters in order to urinate for an extended period of time, usually they'll use what are known as intermittent catheters. So if you imagine a plastic straw with holes at either end you're not too far off the mark in terms of what an intermittent catheter is. And the way these devices are used is, when someone needs to go to the restroom to urinate, they bring a catheter with them, they insert it into their body, they allow urine to train out of the body into a toilet or some kind of container, then they actually remove that catheter and throw it out. And typically people use between four and six of the single use intermittent catheter today.

Souvik Paul 05:57

Now what the problem is that we're trying to solve is that with the standard types of catheters that are available for 70% of the user market, urinary tract infections are incredibly common, and UTIs, for this particular part of the population tend to be more severe tend to last longer and just have many more negative impacts on quality of life than the UTIs that we might typically think of. And in fact, these UTIs go on to be a leading cause of death for people living with spinal cord injuries. And with the standard catheters that 70% of people get the annual UTI risk is around 50%, with most people experiencing between one or two UTIs. And over the course of a lifetime of using intermittent catheters, this becomes a really serious health problem. Now on the other hand, there are safer catheters called no touch catheters that basically prevent contact contamination during insertion. And these have been shown in clinical literature to reduce infection rates by 30%, which is pretty significant. The problem is that they're four times as expensive as standard catheters, so less than 7% of people get access to them. And what we are doing at Aurie is we've built a reusable, no touch catheter system that allows people to safely and automatically reuse their catheters while they're on the go, so that we can afford to sell those catheters at the same price as the standard one. And in doing so we're hoping to increase access to this potentially life-saving technology. So in terms of what our product looks like, and how it works, there are three parts, we have designed our own no touch catheter. So basically, when someone goes to insert that catheter into their body, at no point, are they touching the catheter itself, it just goes directly into their body. The second component of it is a portable catheter disinfector. So this is a device that is battery powered, that automatically cleans, disinfect and lubricates catheters within 30 minutes with the help of

fresh water from the test. And the third component of the system, which are prepackaged cleaning supplies. So these are basically detergents, hydrogen peroxide, and lubricant. And it's all contained in a compact footprint so that users don't have to really think about it. And the cleaning supply pod is good for a single day's worth of use.

Dr. Marie McNeely 08:20

Excellent. And you mentioned this straw analogy. And I think that really helps us envision how the product works. But what is it made of? Or what does it look like from a size or texture standpoint?

Souvik Paul 08:30

So the device itself, like if you imagine a laptop, and you're holding it in front of view, so the landscape and you kind of cut it in half, that's half the width, and you made that like two inches thick, that's like basically the size of the device. So it's around 10 inches by six inches by two inches, if that gives you a good sense of how big it is.

Dr. Marie McNeely 08:52

Excellent. And what is it made out is?

Souvik Paul 08:55

Well, it's a medical device. So it has the part that actually cleans and disinfects the catheters, you know, has a plastic enclosure circuit board, like an aluminum manifold to help divert fluid throughout the system. So it's a pretty, we're pretty proud of the engineering that's gone into it, because it's pretty compact for what it is actually doing to the catheter to make it safe for reuse. The catheter itself is made out of medical grade plastic that you would see in implants and other things like that.

Dr. Marie McNeely 09:22

Awesome. Then you mentioned some of the benefits when it comes to it's reusable, the cost lowering infection risks if you had to give, I guess the summary pitch of what problems this product is addressing. What would you say?

Souvik Paul 09:34

So I think the urinary tract infection risk is really the biggest pain point that we're trying to solve, just given how significant those impacts are to people who use intermittent catheter. In addition to that there is a benefit of having a reusable system in terms of the overall sustainability of intermittent catheterization, more and more people that we've spoken to who use catheters do feel a sense of guilt about how much waste goes into even just being able to

go to the bathroom, which is one of those invisible costs of living with a disability that people who don't have that disability often don't think about, and intermittent catheters are estimated to contribute over 85 million pounds of plastic waste to landfills every year. So it is a pretty significant problem in aggregate. And then finally, especially as we come out and continue to develop the product and continue to develop future versions that are more compact, I think there's going to be a pretty significant lifestyle benefit in terms of adopting the system.

Because today, the way that people plan for their day when they use intermittent catheters is think about when and where am I going to catheterize and how many supplies do I need to bring with me? And one of our goals with the system is to give users basically everything that they need to be able to switch their plans at a moment's notice. And to have that freedom, flexibility and spontaneity in their daily life. Now, that might take us some time to get to as with all physical product development and technology development, you have to go through this iterative product development process. But that's what we're shooting for at the end.

Dr. Marie McNeely 11:07

Absolutely. And can you give us some insight into at what stage are you at with this iterative process?

Souvik Paul 11:12

So we are about to lock down the design for our initial FDA submission. So as you could probably imagine, the FDA process is a long one, that's for good reason. Just to be completely clear about that, right? With people's health, you need to make sure that what you're doing doesn't put anyone at risk. But basically, we are getting ready to finalize our design and do the extensive testing that's necessary for a successful FDA approval of our device. And we're planning to submit to the FDA by the end of this year, and hopefully be in market sometime next year.

Dr. Marie McNeely 11:48

That is so exciting. So I think you talked about some of the benefits, who do you think could benefit from using your products, this catheter system, maybe specifically?

Souvik Paul 11:56

I think, definitely people who have conditions known as urinary retention, or neurogenic bladder. Some of the biggest user populations who use intermittent catheters on an ongoing basis include people living with spinal cord injury, spina bifida, multiple sclerosis. And then there are several other reasons why someone might need to use an intermittent catheter for an extended period of time.

Dr. Marie McNeely 12:19

Certainly, and I love earlier when you mentioned that you were designing with people with

disabilities, not for people with disabilities. And I'd love to dig into that a little bit deeper. So like, how did you incorporate feedback or perspectives from people with disabilities in designing your products?

## Souvik Paul 12:33

Well, the specific type of design that I've been trained in at School of Visual Arts is human-centered design. And what that is, is basically an analytical and strategic framework for utilizing design as a methodology to solve problems. At its very core. It starts with user interviews and identifying unmet needs, in whatever the field of inquiry is that you're interested in. And for me, that was designed for spinal cord injury and disability. And so actually the initial idea for the product and it's morphed quite a bit, since the initial conversations about it came from a phone call that I had with Carina during my second year in grad school, when I was talking about my thesis, and was one of those moments where exactly like, super simple. Carina literally said, like, you know, what would be really helpful is like a way that I could safely reuse my catheters. And that is sort of where it started. Since then, we've made it a point to reach out to users in surveys in one on one interviews, which we've conducted over 100 of we've also done human factor studies where we put prototypes into users hands and ask them to interact with them and give us feedback. I would say at this point, we've reached out to over 300 individuals who use intermittent catheters in order to get feedback on how to better design the device and make it more usable in everyday context.

### Dr. Marie McNeely 13:54

I think that's so awesome. I think having those conversations is so important for addressing the real world problems that people are having not these problems that you may assume that people have. So was there anything that maybe surprised you, in these conversations you were having with potential users?

## Souvik Paul 14:10

A rule of thumb per user research is you keep doing interviews until you stop hearing new things. And after over 100 interviews with people about how they use catheters, the only thing I can conclude is that we've heard 100 different ways of using catheters, and all the people that we've spoken to were incredibly open with us, which I really appreciate because it really helps in a development process like this. But we've heard people say that they reuse their catheters all the time and store them rolled up in their socks because they have a non apparent disability and don't want to clue anyone else into the fact that they use catheters. We've talked to people who feel like they can't leave the house for more than four hours at a time because they want to structure their day around catheterization because it's such a big pain point for them. So we've really heard a tremendous range in terms of how people currently use catheters, why they use them, what issues they currently have with them and how they managed to adapt their life to needing to categorize every four to six hours.

#### Dr. Marie McNeely 15:09

Absolutely, I think that's so important to just have that deep understanding of what people are

using now and how they're using it. So in designing your product, how does the Aurie catheter system differ from other products that are available on the market?

### Souvik Paul 15:22

So everything on the market today is single use only. And actually, this was a change that happened relatively recently, up until 2008, Medicare would only cover a limited number of intermittent catheters a month. And the expectation was that people would clean them out themselves, by boiling them or microwaving them or washing them out with soap and water. In 2008, the rules changed and Medicare started to cover 200 single use catheters a month for people who use intermittent catheters. Now, because of that the entire industry shifted towards this practice of using single use catheters. But recently, studies have shown that if you control the reuse method, it's actually not more dangerous to reuse your catheters. And there was a recent paper that was published that showed when you look at the actual healthcare statistics and data, there wasn't a meaningful decrease in UTI episodes in the US writ large after this transition to single use catheters when you looked at the health care costs and coverage episodes of people who use intermittent catheters. And so the situation that we're in right now is an interesting one, because you have these technologies that, as I mentioned earlier, have been shown to reduce infection rates, but they're just too expensive for more than 7% of the population to get coverage for them. And so that's sort of where our approach comes in, where we are implementing reuse as a way to make this safer technology affordable, and there isn't another catheter on the market that is safely reusable, or that pairs with technology the way that ours does in order to democratize access to this potentially life saving technology.

### Dr. Marie McNeely 17:04

Very cool. And I think Souvik, in the context of technology, when people hear that advice, kind of quote, unquote, pairs with something, their mind may immediately go to like a Bluetooth speaker or their earbuds. So can you explain this a little more?

## Souvik Paul 17:17

By pairs with, I just meant, our catheter can only be used with our cleaning and disinfection device. And that's for a multitude of reasons, FDA concerns, making sure that it's safe for the user, etc,

## Dr. Marie McNeely 17:29

Ah, that makes sense. So only your catheters can be used with your catheter cleaning and disinfecting system. It's not like someone can just get the cleaning part and put any catheter in that part of the device for cleaning. And I know that your products have potential for big impacts for a lot of people, Souvik, and you mentioned, you're at this stage now where you're starting to work on the FDA approval, which is an exciting time for the company. So what is your vision for the future of Aurie?

## Souvik Paul 17:54

The way that I like to put it is, I think, every year 10s, if not hundreds of millions of dollars are allocated towards lofty research goals like finding a cure for spinal cord injury, or multiple sclerosis or spina bifida. And those are incredibly important things that of course, we could devote energy and resources to as a society. But our perspective at Aurie is that you can't only focus on a cure. Because if you do that, then you leave behind hundreds of 1000s, if not millions of people who currently live with those conditions today who have to use products that make them sick at an alarming rate. The tendency is to believe like why would you redesign an intermittent catheter if the cure for spinal cord injury is just around the corner? And I think having worked in health care and medical devices for basically the last six or seven years, I know from experience that things aren't that simple. So our vision for Aurie is to kind of be the missing link in the ecosystem where we partner with people living with disabilities to understand where are their shortcomings in the current products that they rely on and to utilize the benefit and wisdom of lived experience to redesign those products to make an impact on quality of life. And overall health today.

- Dr. Marie McNeely 19:11
  - That is phenomenal. And I know you mentioned you're focusing at first on this catheter system, do you have your eye on other products for sort of the next step?
- Souvik Paul 19:19

We do, but we can't get ahead of ourselves or put the cart before the horse. We are pretty focused in on developing as good a product as we can bring that to market and iterating on that design. We've been fortunate to get several research grants to partner with universities like Texas a&m University and Binghamton University in order to develop sensor enabled versions of our product. So we're really excited about that product pipeline as well.

- Dr. Marie McNeely 19:46
  So what will the sensors allow you to do?
- Souvik Paul 19:48

Well, today, the way the typical physician looks at urine is they use a tool called a urinalysis. And it basically looks at different biomarkers to understand And what's happening with the urine? Is there an active infection or not, et cetera, et cetera. The issue with this is the urinalysis helps predict infection in someone who would traditionally be called healthy. But for someone who uses intermittent catheters regularly, urinalysis is actually not that predictive because you can't judge someone's health by that standard if they're using urinary catheters. And so the idea with the sensors are, the urinalysis, as a single snapshot in a single moment in time may not be predictive of infection. But if you gather those same data points every single time someone catheterarises, four to six times a day, and you start plotting them, can you start to detect deviations away from that person's individualized baseline? And could those

deviations be utilized to make preventative decisions around health care and things like antibiotic utilization so that you're not necessarily prescribing antibiotics prophylactically, but you are utilizing that person's urinary data to make an educated decision about when they should make behavioral changes, or use antibiotics in order to stave off an infection. This is all stuff that is currently in development, there's a lot of effort that will need to go into proving out the application before it could be used as a truly predictive tool. But that's one of the cool and novel things that having a reusable system can help a lot because it would never make sense economically or otherwise, to integrate sensors into a single use product.

Dr. Marie McNeely 21:30

Absolutely. Well, I think this is a really exciting direction as well. And you and the team at Aurie are doing amazing work Souvik. So if our listeners want to learn more about you and more about Aurie, where should they go? Or how should they do it?

Souvik Paul 21:43

We do have a website up. It's more of a landing page. But we're working on relaunching it, the URL is www.livewithaurie.com.

Dr. Marie McNeely 21:59

Fantastic. Well, listeners, definitely check out this website, keep an eye on the amazing work that the team at Aurie is doing. And Souvik, we really appreciate you joining us to share your insights and your experiences with our listeners today.

Souvik Paul 22:11

Thanks for having me. I really appreciate it.

Dr. Marie McNeely 22:13

It's been a pleasure to chat with you. And I'm looking forward to welcoming our next guest on the show as well listeners. I'm excited to introduce you all now to Carina Ho, who will be providing perspectives from her lived experience. So Carina, welcome to the show today. And thank you so much for joining us. How are you?

Carina Ho 22:30

I'm good. Thank you for having me.

Dr. Marie McNeely 22:32

Well, thank you so much for being here. So to start off with, can you tell our listeners a little bit more about yourself?

Carina Ho 22:38

I am based in the Bay Area. I sustained a spinal cord injury eight years ago in a car accident as Souvik said. So since then, I've been really committed to disability inclusion. So that's actually a lot of the work I do.

Dr. Marie McNeely 22:52

Oh, very interesting. And if you're comfortable talking about it, Carina, can you tell us a little bit more about your spinal cord injury in detail?

Carina Ho 22:59

Yeah, so I have a complete spinal cord injury at the T3 level, if you don't know what that means that is essentially around my chest line. So below my chest, I don't have any function or sensation.

Dr. Marie McNeely 23:11

Certainly, and I understand you were involved in a car accident, as you mentioned, which I know is a traumatic experience. And then there's a lot of rehabilitation that comes afterwards. So what was this rehabilitation process like for you?

Carina Ho 23:22

It was a pretty overwhelming process, as you could probably imagine, it entailed just retraining my body to function with paralysis. So a lot of that was developing strength. But just relevant to what we're talking about today, a lot of that was also navigating a newly acquired neurogenic bladder. Souvik kind of mentioned a lot of what goes into that, but it's introducing the usage of catheters, keeping them clean, making sure you understand the signals that your body's telling you when you have to go because you no longer experience the same sort of sensations as you do pre injury. So just learning to read all those and know how to really just navigate bathrooms in a whole new way.

Dr. Marie McNeely 24:02

Absolutely. And I think one of the unique things about the disability community that we've mentioned previously on the show is you can join it at any time in your life. And I think this is it sounds like the case for you. So how has this injury changed your life?

Carina Ho 24:14

I would say changed pretty much every single aspect of it. I was injured at age 27. So before that I knew nothing of having a disability, I was a healthy, non disabled person living a pretty active life. So when you have that privilege, you never really have to think about anything like access or navigating the needs of your body, you sort of just have kind of built in autonomy, and it's great. It makes things really easy. So when you're suddenly presented with kind of being at your body's whim, it really changes because it kind of dictates your life. Souvik mentioned some people can only leave the house for four hours at a time. Luckily, I am not one of those people, but I definitely feel a lot of anxiety if I'm not near for example, an accessible bathroom. So a lot of planning And a lot of awareness goes into your everyday life just managing your basic bodily functions.

Carina Ho 24:22

Absolutely. Have you been able to continue working and kind of doing some of the things that you were passionate about?

Carina Ho 25:11

Luckily, yeah, I feel very lucky that although my injury was very traumatic, and still presents me with a lot of adversity on daily basis, I've been able to reclaim a lot of normality from my old life, that includes a full time job, a pretty robust social life. I have a lot of creative endeavors. I travel independently. So yeah, I think I've been able to really rediscover a new way of living that looks similar to my old life.

Dr. Marie McNeely 25:39

Certainly, Well, I'm glad to hear that. And I know Souvik mentioned that you were a key inspiration behind Aurie. So Carina, what has it been like for you to see all of the progress that the company has made over the years?

Carina Ho 25:49

Well, I'm really excited about it, it could potentially have a huge impact to the spinal cord injury community, as well as other communities that have neurological conditions. And I'm just very proud of Souvik.

Dr. Marie McNeely 26:02

Oh, that's wonderful. And you mentioned that some of the impacts, let's maybe dig into those a little deeper. So Carina, what are some of these impacts having lived through it yourself, that you think Aurie's products could have for users?

## Carina Ho 26:12

I think the misconception that a lot of people have of folks that are disabled is that they just willingly give up independence, autonomy, spontaneity, and there's a bit of an attitude of just deal with it and do the best you can, which to me isn't good enough, I would say no matter what age you are, if and when you acquire disability, you still want to hold on to those aspects of your life. So if you want to leave the house for more than four hours, or you want to be able to travel with your friends or your family without having to worry about always being next to a bathroom, those are things that people want to be able to hold on to. So having products that enable us to do so are really impactful because the market definitely has not addressed our needs in that way. The one time catheter market, which is what we have today, basically requires when I traveled to lug, depending on how long my trip is potentially hundreds of catheters. And that's a lot of extra stuff you need to keep track of it's like a separate suitcase. Yeah, you have to lug so much stuff. And it really meddles in kind of your way of just existing as an unhindered person in the world.

### Dr. Marie McNeely 26:22

Absolutely. And just that extra layer of planning, like you mentioned, can be a big burden. And we talked about spinal cord injury and your case, specifically, who do you think maybe thinking big picture here, Carina could benefit from using this unique catheter system that Aurie is currently developing?

## Carina Ho 27:35

I mean, I would say people like me, I'm a young person, but age doesn't really matter. But I'm an active person, I like to have a full life where I don't have to constantly be planning around my bladder needs. So I think anyone in that category, this could be just a person who wants to go work in the office and not have to work at home anymore. Or someone who loves traveling, or someone who just has a busy life. And maybe you have kids and you don't have time to always be spending time in the bathroom. I mean, I think a lot of folks out there who may have neurogenic bladder can really relate to the fact that we spend a lot of time in the bathroom. And it's really not fun because it does eat into your day.

## Dr. Marie McNeely 28:14

Absolutely. Well, I appreciate you sharing all of this, I guess, for listeners out there who may be interested who may have some of these problems themselves. If they are thinking about trying all these products in the future, what would you say to them?

## Carina Ho 28:27

Well, considering I haven't tried it myself, I don't know. I would be excited to just see the potential impact that it could have in my life.

Dr. Marie McNeely 28:36

Well, Carina, is there anything else you would like to share with listeners today about your experiences or the potential for innovation in this particular area?

Carina Ho 28:43

You know, as someone who struggles with getting regular UTIs, I use public bathrooms. I think that the way that Souvik and this company and these types of products are thinking could potentially be really revolutionary, because not only do the products serve a very specific need for this community, it also reshaped the angle which people approach serving the disabled community, which is an inclusive lens. It's a holistic lens. So it's not just how do we address your bladder needs? It's how do we improve your quality of life? So I think for anyone out there who's also thinking about innovations to really embrace that kind of lens, because not enough manufacturers and companies do approach it that way.

Dr. Marie McNeely 29:22

Absolutely. Well, Carina, I could not agree more. And we appreciate you sharing your insights and your personal story with all of us on the show today. It's been such a pleasure to chat with you.

Carina Ho 29:31

Yeah. Thank you for having me, again.

Dr. Marie McNeely 29:33

You know, well, it's been wonderful to have you with us and listeners, great to have you all here with us as well. When you have a moment, please subscribe to our show on your favorite podcast platform and to make sure you don't miss our outstanding upcoming episodes, and we look forward to connecting with you again in our next episode of Changing What's Possible.