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Stephen Calabria: From the Mount Sinai Health System in New York City, this is Road to Resilience, a podcast about facing adversity. I'm your host, Stephen Calabria, Mount Sinai's Director of Podcasting. On this episode, we welcome Dinushika Mohottige, MD.

Dr. Mohottige is an assistant professor in the Institute for Health Equity Research in the Barbara T. Murphy Division of Nephrology at the Icahn School of Medicine at Mount Sinai. As a leading researcher into kidney disease, Dr. Mohottige has spearheaded numerous studies into kidney health disparities.

She recently was approved for a grant investigating how environmental and community factors may accelerate kidney risk and how those risks may be mitigated while reducing burdens on patients, communities, and taxpayers.

Her research and her mission to improve kidney health nationwide is a case study in scientific and personal resilience. We're honored to have Dr. Dinushika Mohottige on the show.

Dinushika [00:01:00] Mohottige, welcome to Road to Resilience.

Dinushika Mohottige: Thank you so much for having me.

Stephen Calabria: Could you walk us through what it is you do as a nephrologist here in Mount Sinai?

Dinushika Mohottige: Yes, I have the honor of taking care of people with kidney disease and many of us who are nephrologists or kidney specialists think of kidney care as a family endeavor.

So, often taking care of people with kidney disease also means getting to know their caregivers and their family members as well. I take care of patients at the Bronx Veterans Administration, where many of us here at Mount Sinai are fortunate to spend time.

I'm really honored to be able to take care of veterans and grateful that Mount Sinai has this longstanding relationship with the James J. Peters VA in the Bronx.

And what I do is take care of people with all different stages of kidney disease. So that includes people who are post-transplant, people who have a new, for instance, diagnosis of acute kidney [00:02:00] injury, people on dialysis.

And then people with certain abnormalities that don't necessarily mean they have kidney disease yet. For instance, someone with kidney stones. So we do the full breath of that for adults.

Stephen Calabria: If you would, walk us through your journey into nephrology and what drew you to this field of medicine.

Dinushika Mohottige: I am a child of a nephrologist, and while I, like many children said that I was never gonna do what my parent did, it's my mom.

In this case I did eventually come to realize that there is really no more fulfilling career in my mind that blends the ability to take care of a person through a longitudinal disease process that kidney disease often is, and have the opportunity to be part of such meaningful research.

And the truth is, when I was young, my, my mom was actually a nephrology fellow at Harlem Hospital in the late [00:03:00] 1980s. And sometimes when she didn't have childcare on the weekends, I would go and sit in a workroom.

And sometimes I was aware that the majority of people that she was seeing on dialysis were black and brown people. And it stayed with me from those days. This does not make sense and this is also not okay.

That theme of who is disproportionately impacted by kidney disease in the United States and that theme followed me even as we moved. We moved to Eastern Kentucky.

She had a practice there where sort of the face of who was impacted by kidney disease was different, but similar in the sense that there seemed to be so much preventable disease among people who were working really hard, but exposed to things in the environment, for instance, that might have influenced their kidney disease.

So by the time I got to college and was thinking about what to do with my [00:04:00] life, I didn't think about applying medical school. I was a public policy major, did public health school, was thinking about a career in HIV and aids, and then at some point realized I wanted to be able to make a difference

even when politics policy changes can get in the way of the best things for Americans.

And that was when I decided I wanna be able to take care of people and I want to go to medical school. In medical school, I fell in love with all of the people who were teaching nephrology saw that this was a field ripe for researchers who wanna fix this crisis of chronic kidney disease and disparities in kidney disease, and here I am now.

Stephen Calabria: What are some of the biggest kidney related issues Americans typically face?

Dinushika Mohottige: So this is a silent chronic disease. Chronic kidney disease impacts nearly 35 and a half to 37 million Americans. [00:05:00]

Unfortunately, many of those people probably eight in 10, are not even aware that they have some stage early stage of chronic kidney disease, and that is because the symptoms of chronic kidney disease can be so silent for quite some time.

The most common cause of chronic kidney disease in the United States, however, this is important to know, they are hypertension or high blood pressure, diabetes or high blood sugar.

And then heart disease or cardiovascular disease. There are several other factors that can contribute, but these chronic diseases all contribute to a milieu in which the body's kidney function is impacted by all of these factors.

Stephen Calabria: And so at the very end of that process, let's say someone is diagnosed with kidney disease and that progresses to end stage renal disease, what does that typically look like?

Dinushika Mohottige: Yes. End stage renal disease or end stage kidney [00:06:00] failure means that often a person cannot maintain the balance of nutrients in their body, fluid balance, et cetera.

And so this becomes a time when we need to replace a person's kidney function, and that can be done in a number of different ways.

Unfortunately, even though the best option for people is to have a kidney transplant, meaning a kidney that is either from a deceased or a living donor,

those tend to last the longest, operate the best, provide the best sort of quality of life.

There is a supply-demand mismatch, and so we have a number of people whose replacement therapy option is hemodialysis or some other dialysis modality. There is dialysis that one can do at home as well. Peritoneal dialysis, and home hemodialysis.

But for many Americans, it's still going to a dialysis center three times a week, often three and a half to four hours at a time, [00:07:00] sometimes more in a dialysis center that allows them to get a lifesaving therapy that is replacing their kidney function for their kidney function because their kidney function has essentially failed.

Stephen Calabria: A lot of older patients who face that sort of end stage renal disease, I imagine a transplant isn't often even possible because of comorbidities, because of their advanced age. Is that right?

Dinushika Mohottige: Yes, this is unfortunately true and the the practice around transplantation is highly variable. I'm not a transplant nephrologist, but I can say different centers have different thresholds in terms of, age.

I think one important thing for the public to recognize and for general nephrologists like myself to recognize is. It's not our job to tell a person no. And so my practices with my patients, I don't think of a biologic age cut.

I don't think of an age cutoff per se. I make sure I [00:08:00] have that conversation with a person. And then if they are even, let's say 75, 80, there are some centers who will still think about that.

Referring them, but you're absolutely right about the contribution of comorbidities that might make it unsafe for some older adults who have other chronic conditions to actually safely get a kidney transplant. You're absolutely right.

Stephen Calabria: Like what?

Dinushika Mohottige: So heart failure where there's not an option for heart transplant. Severe non intervenable for example cardiovascular disease. Severe infections that cannot be treated readily, right, would put a pause on something like kidney transplant.

Certain types of cancers, but not all cancers. So those sorts of things. Significant peripheral vascular disease. If a surgeon feels that the vessels in a person wouldn't be able to supply a new organ. All of these things are some possibilities.

Stephen Calabria: So to prevent that from happening, to prevent things [00:09:00] from getting that far, if someone in say their thirties, forties, fifties, wants to make sure their kidneys are functioning well later in life, what are some things they should be doing?

Dinushika Mohottige: I so appreciate that question because I wish that every kidney doctor in the country could shout out to the American public, please ask your clinician, Hey, what is my kidney function?

Because the truth of a matter is, it is such a critical organ, and yet we rarely have a conversation about what a person's kidney function is.

I think the most important thing to be empowered to do as a patient is to ask your clinician, what is my kidney function, which can be assessed using a blood test, usually something called serum creatinine or cystatin C, as well as a simple urine test to assess whether you have protein and or blood or other abnormalities in the urine.

Stephen Calabria: Now just on a day-to-day level, [00:10:00] if someone in their thirties, perhaps even with a family history of kidney trouble, wanted to head off some of the problem that they would otherwise be seeing down the road, I assume they should be drinking plenty of alcohol, eating lots of really fatty foods. That's what I assume you would counsel. Is that correct?

Dinushika Mohottige: You have all the secrets to success.

So the truth of the matter is, I think some of the best things that we can do to prevent kidney disease are really focus on avoiding those two big contributors that I mentioned at the beginning, high blood pressure, high blood sugar.

Managing your sort of metabolic state ensuring that you're eating healthy, nutritious foods that are lower in salt, avoiding obesity, critical, avoiding smoking, avoiding excess alcohol, ideally, also critical.

But one thing that I think we don't talk enough about is certain over the counter medications that if you have chronic kidney disease, even at early [00:11:00] stages, you should be a bit cautious with.

And that includes nonsteroidal anti-inflammatory drugs, such as ibuprofen, et cetera, which in high doses can really accelerate kidney disease risk and even increase the risk of high blood pressure, et cetera.

Stephen Calabria: And let's talk about hydration for a moment. How important would that be?

Dinushika Mohottige: So this is a complicated question for the nephrologist because it really depends on your degree of kidney function.

A lot of people with advanced kidney disease really because they're not able to make as much urine we do advise that fluids are actually restricted because otherwise that fluid just accumulates and part of what dialysis does is remove that fluid. I tell folks who are not in that state, drink to thirst.

The kidneys are this incredibly brilliant organ that are much smarter than any nephrologist in the country. And so we have all of these incredible mechanisms to really modulate salt, [00:12:00] water, balance, et cetera.

And so thirst, if you have a thirst mechanism, drinking to thirst is ideal. Avoiding significant dehydration, or what we call volume depletion when it's hot, et cetera, is also important.

Stephen Calabria: Moving on to your research, you've been looking at how certain types of algorithms affect kidney care. Could you first explain what that means?

Dinushika Mohottige: Yes. So the way that we estimate a person's kidney function is based on clinical algorithms that brilliant scientists have put together to essentially use that serum creatinine, that blood test that I mentioned before as well as some other variables to essentially estimate what your kidney function is.

And for many years in the United States, prior to 2021, that kidney function equation that was used incorporated a variable that suggested people who are [00:13:00] African American or Black have essentially a different or higher estimated kidney function than all the rest of the population.

Now, this was not based in any mal intent, but these were clinical algorithms that were designed, as many are, to take into account again, variables such as race, sex, and their implications on muscle mass.

And so for many years until 2021, this equation had a sort of a different estimation for black adults versus all other adults, based on a hypothesis that black adults have different muscle mass.

That hypothesis was fatally and is fatally flawed and, and non-scientific. There is nothing biologic about race.

So thanks to the incredible advocacy of many patients, many medical students, many community members, many [00:14:00] policymakers and scientists after identifying the harm of underestimating kidney disease in a population that is actually disproportionately impacted by kidney disease, there was a new algorithm that was designed, that is race-free for kidney function estimation.

And again I wanna acknowledge all of the many years of work and contributions from sociologists and historians that went into allowing that movement to occur.

In 2021, it was announced for most US labs, again, that we should be using a race free algorithm to estimate kidney function. This spurred a movement for other algorithms that still use race.

For instance until recently, lung function testing had a similar race coefficient. So it spurred a bigger movement.

But what is I think most important is that due to advocacy and recognizing the harm caused to Black Americans, individuals racialized as Black, [00:15:00] the transplant organizations in the United States put into place a critical restorative policy that actually gave lost kidney transplant wait list time to Black individuals who again, had an overestimated kidney function for all those years and couldn't be placed on the wait list.

And so this has been one of the most monumental decisions in US history, to do this. And to date. Over 9,000 or nearly 9,000 Black Americans have gotten time back on the wait list since the implementation of this policy.

Stephen Calabria: Where did those erroneous algorithms even come from and how did they sneak through when we know now in retrospect that they are so deeply flawed?

Dinushika Mohottige: Yes, a great question. I think this question actually makes me think about how we develop any sort of algorithms or even test, for example, medications.

When [00:16:00] we don't have diverse cohorts of people from whom to derive algorithms, we can make very faulty conclusions, right? And so the first sets of humans. That were part of studies to help us derive these algorithms, it's primarily cohorts of primarily men and largely racially and, genetically homogenous populations.

It was actually an effort to, I think, initially expand the cohort of people from which these algorithms were derived, that there was a signal that Black individuals who were part of the initial cohorts that created the race-based equation.

They had a different serum creatinine on average than their white counterparts. But this is where we have to again, start to disentangle race from all of these other factors that influence our muscle mass, right?

What we eat influences our muscle mass. So [00:17:00] what I eat versus what you ate, I don't know, you know what you eat, but let's say I was a vegan or vegetarian and you ate primarily meat or vice versa, that would influence our muscle mass.

Similarly, the hormones in our body, right? I am a cisgender woman. I have a certain hormonal milieu, and so that influences my muscle mass as well, how much I exercise influences my muscle mass.

And so making predictions based solely on, again, a person's race, which has no biologic meaning, or deriving information because you think that person has a certain diet or a certain socioeconomic status, can cause incredible amounts of harm.

So having very diverse heterogeneous cohorts to develop clinical algorithms is critical, point one. And then number two, remembering when we're developing these equations that inputting a coefficient [00:18:00] such as race, which has no biologic meaning, is highly problematic and can contribute to this kind of problem.

Stephen Calabria: Also for non-scientists like myself, could you walk us through what risk alleles are?

Dinushika Mohottige: Yes. Yes. So risk alleles are really just a genetic variation a variation in your genetic makeup that may contribute to specific types of disease.

And so there are some risk alleles or variations in your genes. In some people's genes that contribute to kidney disease risk as well.

Stephen Calabria: What's an example?

Dinushika Mohottige: So an example is APOL1 risk alleles. So APOL1 is a gene that with specific variations can be associated with chronic kidney disease or more rapid progression of chronic kidney disease.

Those risk alleles specifically primarily occur in people with [00:19:00] African ancestry or recent African ancestry.

And those risk alleles again, tend to occur primarily in West Africa, though individuals who don't identify as Black, for instance, Latino individuals Caribbean individuals, Native American individuals, may also have some of those risk alleles.

Why those risk alleles have developed is a more complicated question, right? And one that relates to geo evolutionary adaptations to, in this instance sleeping sickness.

But similarly, for instance sickle cell is an example of a risk allele that influences many people in the world.

For many years it was described as a race specific gene until scientists discovered that and its distribution is really a geo evolutionary adaptation to protect against malaria. And there's a lot more to say about that.

But in short, [00:20:00] a risk allele is a genetic variation that may contribute to specific diseases. And in this instance, APOL1 has some risk alleles that can contribute to chronic kidney disease and a higher risk of kidney failure.

Stephen Calabria: So from what you're saying, it sounds like race at best is a correlate, but not remotely a causal factor in all of these things.

Dinushika Mohottige: Absolutely. Absolutely. And thank you for bringing that point up.

I think I already mentioned right, that chronic kidney disease, unfortunately, kidney failure does not burden every population group equally, and that is particularly true in the United States.

So I'm gonna share this statistic. Black and African American people make up 12 to 13% of the US population, and they account for about 30 to 35, 33% of our dialysis population.

There is something wrong in that picture, right? And so [00:21:00] that trajectory of advancing in a more accelerated way to kidney failure, there is nothing biologic about race.

Some specific genetic risks are more prevalent in certain racial groups, as I've described, but it is not a race specific gene. But the second critical point is these genetic risks have never fully explained the racial disparity and the burden of kidney disease in the United States.

So I'll give you an example. Only 12 to 13% of individuals who are self-reported black or African ancestry individuals have two of those high risk APOL1 alleles. And so how about all of the other folks?

And of those people that have those two high-risk alleles, not all of them actually progress to kidney failure.

So there is a critical need for research to understand in human populations what are the factors in the environment that accelerate risk for some people with these kinds of [00:22:00] genetic risk alleles.

Stephen Calabria: Now, for the research that you are here actually to discuss with us, you were awarded a grant for that research. Is that right?

Dinushika Mohottige: That is right? Yes. From the National Institutes of Health. Yes.

Stephen Calabria: Okay. For starters, what does the process of applying for a grant even look like?

Dinushika Mohottige: So it is a, often a multi-month long process of preparation. Hundreds of pages of rigorous, evidence-based documentation of not only what the scientific question is, but why this is important, how this will impact the public's health.

What is innovative about this proposal? Who the investigators are, and what's your experience? What's your track record? How trustworthy are you based on your scientific publication record?

Who are your collaborators? And then what is the sort of status or the [00:23:00] quality of the institution that you come from in terms of the resources that are available and the infrastructure that's available to make this kind of project work.

And all of these things are graded through a rigorous peer review process from scientific experts in the field.

And when those scientific experts sometimes aren't available on a specific NIH panel, other individuals are brought in to adjudicate in a fair and balanced way based on, again, scientific rigor, innovation, the candidate, the environment, et cetera.

Stephen Calabria: For what specific research were you looking to receive funding?

Dinushika Mohottige: So I applied and successfully received NIH funding for a project that looks at structural racism as a third hit among individuals who are black and have APOL1 high risk alleles.

This was a really important question to answer for the reasons that I've outlined [00:24:00] that we have. Again, wide, 20 plus year long kidney disease disparities in the United States that disproportionately burden Black American people that we have.

Unfortunately, despite a lot of wonderful efforts, made little progress in closing those gaps. We know that genes are perhaps part of the story, but they do not tell all the story, as I just mentioned.

And this project was an effort to identify what environmental factors act as those, again, third hits. We know that certain viruses, for instance, COVID-19 HIV, can act as a second hit to accelerate this disease progression.

But there's a lot that we don't know. And this not only applies to EOL one, but other genetic variations as well. There are epigenetic things that happen, or gene environment interactions that happen to accelerate [00:25:00] disease risk in certain populations.

It was fundamentally important to tackle this question for this population that has borne the brunt of kidney failure, its morbidity and harm in this country for a very long time.

Stephen Calabria: Now someone who is just coming to the research cold would probably look at it and say, okay, this is focusing overwhelmingly on race and your response puts the lie to it. Is that right?

Dinushika Mohottige: Yes, absolutely. So we are focusing on a specific risk allele in this case, which, due to, again, those geo evolutionary adaptations, primarily impacts communities with recent African ancestry, which again, in the US context, primarily means that we're looking at people who self-identify as Black African-American Afro-Caribbean, Latino in some instances, Native American in some instances as well.

But it is [00:26:00] not a race specific gene. The second point again, just to, to hone in on, I think it's important to recognize the data that we have about who is, impacted primarily by certain disease processes.

And we have ample evidence that, again, for over two decades, Black Americans have a two to three fold higher chance of developing kidney failure than their white counterparts.

And so we have to disrupt that trajectory. But that doesn't mean that everyone can't benefit from advances in science that identify things in the environment that accelerate kidney disease risk, and that was a critical part of this project.

Stephen Calabria: How do you frame why this research is so important, both to our institution, to healthcare generally, and to the American taxpayer, who might look at the rejection letter and think, okay, it's saving us [00:27:00] some money by kicking some money towards grants that may or may not yield positive results.

Dinushika Mohottige: We spend 35 to $37 billion in the United States per year on dialysis care.

I think it is critical to recognize that is about 7% of the Medicare budget. And the point of this kind of research is to focus on curbing the burden of chronic kidney disease in the United States.

I already mentioned chronic kidney disease impacts nearly 37 million Americans. There is not a nephrologist in this country whose primary goal it is not to save as much kidney function as they can in every single person they take care of.

So it is our primary duty to identify people who have risk for kidney disease early and to intervene. The goal of this project was to do just that.

So it is [00:28:00] antithetical to me to the goals of any policymakers who are trying to address the burden of chronic kidney disease and excess healthcare spending, to defund work like this that aims to do exactly that.

Stephen Calabria: Can the discoveries you were hoping to find potentially help folks with other risk alleles?

Dinushika Mohottige: Absolutely. And I think this is the important thing to recognize is that epigenetic work that tries to understand gene environment interactions, there has been a lot of excellent epigenetic work done, and there is still so much more to be done, to understand what exactly is in the environment that is interacting with these high risk alleles to accelerate disease.

We can't say for sure that what we would've found for this particular risk allele would apply to risk alleles for other disease processes.

But at least it would highlight areas of future research for those investigators and for people impacted by those other [00:29:00] risk alleles.

So we're talking about things like the air you breathe, the water you drink, the kinds of food you eat, and then broader community level factors that we know influence kidney disease risk.

We were trying to identify these using these rigorous methods and then develop actually an intervention where patients who are experiencing some of these adverse effects could be in an intervention where a community health worker helped mitigate their risk.

So let's say the accelerant is that you don't have access to a critical disease slowing medication. In the intervention that we proposed, and this would impact really anybody with chronic kidney disease, whether you have a risk of illness or not.

The intervention that we proposed would say, let's have a community health worker navigator identify what medications you're missing and if there's an insurance barrier, tackle that, find a way to make sure that [00:30:00] everyone is on the right therapies at the right time to slow disease progression.

And so in, in that sense, you know what we were proposing it, it goes even beyond the scope of gene environment interaction.

I have been motivated to continue the efforts to move this science forward, first and foremost by patients and by the people that I take care of.

So I mentioned that, I have worked at the VA now for nine years. I take care of people with these exact risk alleles, and it's actually remembering the why that is keeping me motivated to sustain the effort to make sure this work does get done, even with this very substantial blockade in the way.

It has never made sense to me why some people with these risk alleles very rapidly progress and others do not. And it is [00:31:00] it has been my focus on those stories of the people that inspired the research.

But more importantly I think our incredible stakeholder board that has kept me motivated to continue the effort to appeal this decision with the NIH to share the story about this defunded work to elevate the stories of patients, including people on the stakeholder board who are willing to do that and to make sure that this is not the end of this story.

It has been really hard though. As you said, it was demoralizing. It was cruel, some of the words in that termination letter. We are talking about human beings and their suffering with a chronic disease that can be prevented.

There is that sort of moral distress. And then there's the economic facts that [00:32:00] I already shared about where money is going, large pots of money going on treating this disease once kidneys have already failed.

We have to move toward prevention and early intervention. And so even though I am. I am still deeply distressed, I am heartened by the number of people who have wanted to hear this story, who are trying to elevate this story, including some scientific journalists, our advocacy organizations, and again, most importantly our patients.

Stephen Calabria: In terms of resilience, what advice would you give to early career researchers who may face similar obstacles in securing funding or advancing their work?

Dinushika Mohottige: Remember the why. I think the, remember the why is the primary force that has allowed me to work with others on this [00:33:00]

team and in this institution and my mentoring team to maintain the effort and the energy to keep this moving forward.

This was a devastating termination, not only because of what it does to, again, the investigator, the institution, et cetera, but again, the implications of what is valued versus not.

I am a kidney doctor. I went into medicine with the goal of reducing human suffering. I wish we could always do that.

As someone who takes care of people on dialysis and again knows their family members, this is not a small amount of suffering that people experience. I will continue to have the passion to fight this battle because I see the resilience of our patients.

I see the resilience of all of the advocates and caregivers who show up for their family members to take them to dialysis treatments. [00:34:00] Again, I told you I, it's an honor to take care of veterans.

I know the resilience that the people that I take care of have had to show in the face of tremendous adversity, not only their kidney disease.

And that is a motivating force that I cannot give up on this work, on this research, and I have to maintain the focus on the greater good and the mission that has been compromised, I hope, temporarily by this termination.

Stephen Calabria: That was it for my questions. Was there anything else you wanted to say?

Dinushika Mohottige: I think that's it. Thank you.

Stephen Calabria: Thanks again to Dr. Dinushika Mohottige for her time and expertise. That's all for this episode of Road to Resilience. If you enjoyed it, please rate review and subscribe to our podcast on your favorite podcast platform.

Want to get in touch with the show or suggest an idea for a future episode? Email us at podcast@mountsinai.org.

Road to Resilience is a production of the Mount Sinai Health System. It's produced by me, Stephen [00:35:00] Calabria, and our Executive Producer Lucia Lee, with assistance from Cindy Lin.

This episode of Road to Resilience is dedicated to the memory of Dominick Calabria, my father, who passed away on Thursday, April 10, 2025, from complications relating to end stage renal disease.

From all of us here at Mount Sinai, thanks for listening, and we'll catch you next time.