

Nephrology with Dr. Samira Farouk

Ologies Podcast

March 9, 2021

Oh hey, it's that piece of gum you managed to gnaw on through an entire movie, Alie Ward. I'm back with a special episode celebrating March. It is the month of the kidney. Did you know that? Or maybe it's the two fortnights of each kidney, depending on how many you have. How many should you have? How many do you really need, is the question. Who has the most kidneys? We're gonna get there, my little beans. But nephrology – you have not heard this one before. This is not about clouds, that was *nephology*, but this topic might be a little foggy for a lot of us because how does a kidney even work? Why can we take them out of our bodies and pretty much be fine? Why does your pee smell like coffee? A nephrologist weighs in.

Nephrology comes from the Greek *nephro*, for 'kidney'. This ologist and I met over a year ago via Science Twitter. She was like, "Really? No nephrology episodes?" And I was like, "Welcome to my spreadsheet of people I want to interview." And she tweeted back a GIF of "Ready when you are." So here we are, it's a year later, at the start of World Kidney Month, the week of World Kidney Day. We're doing it!

We could not do it without you, so a quick thanks to everyone at [Patreon.com/Ologies](https://patreon.com/Ologies) who supports the show. It costs a dollar a month to join, and you can submit your questions to the ologists. And thank you to everyone who shares this episode, especially to folks needing kidney info or maybe who are interested in donating, perhaps? No pressure. Maybe you're like, "I could donate a kidney and coast on that for the rest of my life," and I'm honestly fine with that. Thank you to everyone reviewing and rating the show. I read every single review and I bust out a new one as proof each week, such as this one from BKTCo, who says:

Thanks, Dad! I decided to go back to graduate school for forensic anthropology solely because I started listening to Ologies during a global pandemic that made me slow down for the first time in my adult life. Feed your brain cells with the soothing sounds of ol' Dad Ward.

Oh! I'm so proud of you. Your brain cells and your pee organs, all of us, they're in for a treat.

So, just in the US – just learned this – 15% of adults have chronic kidney disease. WHAT? That's 37 million people! And a lot of them don't even know. This ologist is gonna tell you all about it. She did her undergrad at Princeton University, got her MD from Rutgers University from the Robert Wood Johnson Medical School, where she graduated with a distinction – thank you very much – in research. She is an Assistant Professor of Nephrology and Medical Education and the Assistant Director of the Nephrology Fellowship Program at Mount Sinai. She is also one of the organizers of something called NephMadness, which is like March Madness but with different disciplines in kidney medicine as the brackets. #NephMadness – check that out.

She lives and breathes the beans. And while this podcast is obviously not qualified or intended to treat or diagnose any medical condition, it is not medical advice for so many legal reasons, it does offer a wealth of info such as: Where are the kidneys? Why shouldn't you punch them? How much should I pee? How much should *you* pee? Should you ever drink pee? What's worse, childbirth or kidney stones? How hard is it to get a kidney donation? Do people really wake up in ice baths with stolen organs? What's the most altruistic way to get a free tattoo? What bad habits do your kidneys hate? Should you invest in a motivational thermos, and more with transplant nephrologist Dr. Samira Farouk.

Alie Ward: I like to keep all the awkward bits in sometimes. *[Alie and Dr. Farouk laugh]* If you end up confessing to something, we can cut it out. Don't worry.

Dr. Samira Farouk: I appreciate it.

Alie: I'm so excited to talk to you! First thing I always have people do is if you could say your first and last name, and also your pronouns.

Dr. F: Sure. My name is Samira Farouk. My pronouns are she/her.

Alie: Awesome. And you are a nephrologist.

Dr. F: I am a nephrologist at Mount Sinai Hospital in New York City.

Alie: Heard of it. Heard of it! *[Dr. Farouk laughs]* Very exciting! A lot of listeners were all very hyped about this because a lot of us have kidneys, which is crazy!

Dr. F: Yeah! I love to talk about the kidneys. I will do it anywhere. I like to get into arguments with people about which organ is the best and specifically why the kidneys are better than the brain and the heart. So if you want to hear those arguments, we can get into that.

Alie: *[laughs]* I'd love a Lincoln/Douglas-style debate about the brain versus the kidneys. I mean, the brain wouldn't work without the kidneys properly working.

Dr. F: Really nothing would work without the kidneys and they're just kind of behind the scenes doing all the work quietly. They're also kind of the martyrs. So, a lot is happening that no one appreciates. We don't even have an emoji! There's a whole movement on social media to try to get a kidney emoji. We were very upset that recently a lung emoji was added. *[Alie laughs]*

Alie: At least it would double-duty. Would they put it in the food area? Would they put it in the organ area? It could be used for both!

Dr. F: Yeah, it could definitely be used for both. And there's actually a petition that's been circulating, so... serious stuff.

Alie: I'm signing it.

Aside: P.S. This petition is on Change.org and it currently has 3,171 signatures and counting, my friends. I will link that on my website. It's one small graphic for phones, one big emotion for kidney doctors, and donors, and very patient patients.

Alie: I've always wondered, do kidneys look like kidney beans? Are they the same color or are they a completely different color palette?

Dr. F: They are pinkish. Light pinkish. I'm a transplant nephrologist, so I see patients before and after kidney transplant. So if you're in the OR with a kidney transplant surgeon, pre and post the kidney being hooked up, it's kind of like a whitish-grayish color. Then once it gets blood going into it and it starts making urine, it "pinks up;" that's the term we use.

Alie: Was there something that attracted you to this field in particular? Did you have any brushes with transplants when you were younger? Do you have kidney disease? How did you end up doing this very necessary and specialized field?

Dr. F: Yeah, I'm just going to go back to my nephrology fellowship interviews when I got asked this question. I actually wanted to be a cardiologist when I was in medical school. And before that, I had done some research in cardiology and that's kind of like the "cool" internal medicine specialty. So, I had done a little bit of research and when I was in residency, that

was the plan. I'd always loved nephrology because the disease processes were very complex. And all the nephrologists that I met seemed like very smart people that were really great educators and they just made their very complicated topic feel easy to understand. But my first interactions with dialysis in medical school, I just was not that interested. I thought it was not the right field for me. [*Yeah, I'm not into it, either.*"]

But then in residency training, I had some more experiences with patients with kidney disease, and kind of fell in love with it, and realized that it was a topic that I loved to teach about myself when I had opportunities to do that. And then I think, like anyone in medicine, mentorship was really huge for me. And I got lucky to be paired up with some nephrologists at Mount Sinai that became mentors for me and, kind of, inducted me into their nerd club. So I made a pretty dramatic switch from the "cool cardiologist" to the "nerd nephrologist."

Alie: Oh! I love that it's different tables in the cafeteria talking about medical processes. [*laughs*]

Dr. F: Oh yeah. We definitely have our own table.

Alie: Can you explain to me, what is a kidney? What is it [*sing-song voice*] doiiiiinnng? What's happening in these big beans in our back?

Dr. F: Yeah, I was waiting for that question. So what do they do? One of the words that we use when we try to describe what the kidneys do is they maintain 'homeostasis'. What homeostasis means, simply, is keeping everything the way it needs to be. Things like your blood levels of different things like potassium and sodium and what is the balance of water that you should have. Everyone drinks different amounts of fluids and how does your body know what to get rid of and what to hold on to? There are other things like pH, like how acidic is your blood? The kidney plays a really important role in making sure that our blood pH isn't too low or isn't too high.

When we're talking about balance of fluids, the other category that we think about is electrolytes. The main ones that we talk about are things that can go wrong. Patients that develop kidney disease have problems with their sodium, or their potassium levels are too high, or their blood becomes a little bit too acidic. A lot of that work is done by the small units of the kidney that are called nephrons.

What happens is that the blood comes into the kidney through the renal artery, and that artery basically sends the blood into these smaller filtering units. Then within each of those filtering units, that's kind of where all this [*magical tinkling*] magic happens. So these little units kind of decide what needs to stay in the body and what needs to leave. What leaves comes out as urine, [*You're in luck.*] and then what stays goes back into our circulation, so we hold onto those things.

That's why we don't hemorrhage out fluid or blood, and that's why we can, kind of, maintain our blood pressure and keep everything in a normal range. That's why you don't develop lots of fluid in your legs and other parts of your body. If your kidneys are not working well, that's one of the signs that the kidney may not be doing what it's supposed to do.

On top of all that – which is incredibly time-consuming, I imagine – there's also hormones that the kidneys make that manage a couple other important things. One of those things is your blood counts, specifically the hemoglobin levels. The kidney actually produces a hormone called erythropoietin, which tells your body to make red blood cells. When the kidneys are injured or damaged, that hormone does not get produced as well, so another presentation of kidney disease would be low blood counts or anemia. Another hormone or hormone pathway that the kidneys are involved with is the regulation of vitamin D, and

calcium, and phosphorus pathways. Those are three things that are really important for us maintaining our bone health.

Aside: To recap: your renal artery brings your dirty, dirty blood into your kidney, which has an outer skin-like thing called a cortex and an inner layer called the medulla, and it filters the blood through a million or more microscopic nephrons that have structures inside to further filter it. Then that area, where the kidney kind of bunches up in the center, that's called a renal pelvis. Your two pee tubes, if you have both of them, are your ureters, which are kind of like pee-filled waterslides that lead to the splash pool of your bladder.

Right now, if they're healthy, your kidneys are making sure that your electrolytes, or salts like sodium and potassium, are all in check. It's also making hormones to help keep your blood counts healthy and your bones strong. If they're not healthy, they're probably still working their hardest to take care of you. Have you even thanked them? You should do that.

Alie: How many symptoms do people have that they don't relate to kidney function? Is that part of what you have to do in terms of diagnosis? Do people not realize, like, "Oh, swollen feet has something to do with my back beans"?

Dr. F: One of the challenges that we face as nephrologists in trying to treat patients with chronic kidney disease is that it's actually a silent disease until the very, very, very end. There's different stages of chronic kidney disease. There are stages 1 through 5, and generally, patients probably will not have any symptoms until they're at stage 5. Unfortunately, once they've reached stage 5 the opportunities for treatment become much more limited because what happens with kidney injury is that it's kind of like the skin in some ways. If you get a cut on your skin, it turns into a scar. When the kidney is damaged, it's going to scar, and right now we don't really have anything to kind of reverse that scarring process.

So, what we really try to do is have patients come and see us when they're a bit earlier in their disease process because if they come and see us, say at stage 3 for example, then we may have some room to do some treatment options that may actually slow down their progression of the disease and maybe even keep them away from that more advanced stage.

Aside: If you're like me and love to worry and you just thought to yourself, "What if I have stage 4 kidney disease and I don't even know it?" I'm gonna run it down for you. The stages are based on something called an estimated glomerular filtration rate, or eGFR, and that's how good your kidneys clean your pee and water out of your blood.

Stages 1 and 2 - you might have high blood pressure, swelling in the legs, urinary tract infections, or wonky urine tests.

Stage 3 - you might have changes in how you pee, swelling in your hands and feet, you might be tired, you might have dry, itchy skin, back pain, some muscle cramps.

Stage 4 - anemia, decreased appetite, abnormal levels of phosphorus, or calcium, or vitamin D.

Stage 5 - you might experience fatigue, shortness of breath, nausea, vomiting, your thyroid might be wonky, and swelling in hands or legs or lower back.

And that eGFR rate is based on the levels of creatinine in your blood, not to be confused with creatine, which is an organic compound in protein that's used as a supplement that can bulk up your muscles, maybe enhance cognitive performance. And also, I just thought maybe I should get some and put some in coffee. Anyway, that's neither here nor there. Your pee is

not a pre-workout elixir, I think. Either way, are your kidneys taking out the stuff they need to take out?

Alie: Can you run through some of the things that end up in pee? I know the notion that if you're stranded and you have nothing to drink, you can drink your pee. Other people say you can't. Some people say it's sterile. What exactly is in pee?

Dr. F: So, there's actually an article about this, I think a couple of years ago, where someone somewhere in the UK was drinking their pee and it turned into an article. So I guess it's safe to do that, but we definitely don't recommend that.

So, what is in pee? Water. A lot of water. And that water content will depend on how much water you drink. And so if you're drinking a lot of water, your urine might be lighter colored or even clear. And if you're in a more dehydrated state or not drinking water all day, your pee is going to be a little bit darker. There are some electrolytes that are in there. There might not be that much, but there might be some. Some of those would be sodium or salt (sodium chloride) and potassium. One of the "waste products" would be called urea.

Aside: Quick aside: Urea is a colorless, odorless, nitrogenous metabolite. It's also called carbamide. It's in pee as the result of breaking down amino acids that make up proteins. Urea also breaks down into ammonia – hence fresh vs. stale pee odors – and urea is still used in a boggling array of industrial applications. It's in moisturizers, tooth whiteners, it's used as a cloud-seeding agent to make rain, and as the main hair-removal chemical in Nair. Romans were hip to pee. They knew what was up. They used to collect pee in public urinals on the street and be like "Thanks for the money, folks!" and then they'd sell it to launder togas. And they'd also use it as mouthwash. Don't worry, we can synthesize it these days, if you really want.

Dr. F: And so that's something that actually increases in the blood of patients that have kidney disease because they're not really able to get rid of that. But there's not much else that's really worth mentioning.

Alie: If you are stranded, can you drink your pee or will that just double-toxify you?

Dr. F: I'm going to say: Don't drink your pee. [*both laugh*]

Aside: Most doctors agree: Do not drink your pee. You're just adding more salt to your blood and that could dehydrate you faster. Also, I watched a clip of TV survivalist Bear Grylls making people sip their own weewee out of Nalgene bottles, and one chick was throwing it back up and I noped out of that video so hard. I didn't need to do that to myself, and neither do you, in real life or on the internet.

Also, if you're like, "By the way, why is pee yellow?" That is a remnant of breaking down your older red blood cells. So just think about *that* the next time you're watching yourself pee. And if it smells like coffee, doctors say, you're drinking too much coffee. Or just not enough water.

If you've never gotten the jokes about asparagus pee, you may be in the 50% of people who genetically are not able to smell asparagusic acid, which is broken down from asparagus. If you do have musky asparagus pee and it's driving you away from this delicious vegetable, try skipping the tips where most of the smelly compound lies. And just enjoy the slimy, woody stalks of asparagus, I guess. Or just get some air freshener and move on.

Alie: Where does nephrology end and urology begin? Is there a juncture at the bladder? Where does it stop?

Dr. F: I love that question. We often incorrectly have patients that come into our offices and they would benefit a lot more from seeing a urologist. And so the way that we describe it to our patients is that we deal with the problems that are happening within the kidney. Another way to think about it is that the urologists are thinking more about the plumbing and we're thinking about all the really cool stuff that's happening in the kidney.

Alie: Oh! Now, what about bathtubs and black-market organs?

Dr. F: No, no, no, no, no.

Alie: It doesn't happen?

Dr. F: Unfortunately, it happens. Not as much in the US, but definitely in other countries. The official term for that is 'transplant tourism'. It's definitely something we try to try to limit, and there are efforts in other countries that are trying to limit that as well. But unfortunately, we know that it happens, that people are buying and selling organs. And aside from ethical problems with that, another medical issue is that those organs are not screened for infections and other things that may potentially transmit to the person who's receiving that kidney. So, it's possible that someone who buys a kidney is now going to end up with Hepatitis C, for example, because we didn't know that that was present before.

But I do want to say that we are very excited to be... during the last year or so we've started to be able to actually transplant kidneys that do have hepatitis C virus into individuals that don't have it because we have a cure now for hep C. So that has been very cool to expand our donor pool significantly.

Aside: So while the widespread threat of waking up in a bathtub of ice missing a kidney was a late 1990s email-chain urban legend, there are plenty of suspected organ harvesting on the black market. Reportedly, a lot from political prisoners in some countries and impoverished folks who are lured into it for money. In China, where living organ donors are rare, wait time for a liver or kidney, in the early 2000s at least, was just a few weeks or a month as opposed to the US, where around 100,000 patients at a time wait years hoping for a lifesaving match. Why the short wait times? Some reports accuse the government of harvesting from prisoners.

Alie: Do we have enough kidneys from living donors to get everyone who is on dialysis or who has kidney disease healthy again? Is it not a matter of supply, but of reluctance?

Dr. F: That's an interesting question. The number of living-donor kidney transplants that are performed... It varies from institution to institution, but at most centers the majority of transplants that are done are going to come from deceased donors, or people that have agreed to be organ donors and then their organs are donated after they pass away. There's a lot of reasons for why the numbers may be low for living donation. A lot of it, in my opinion, is that it takes a really concerted effort to communicate with the patient, their family, and individuals that may be potential living donors, to find potential donors.

And then there's a whole process that has to happen after that where living donors have to be screened pretty rigorously, similar to the person that's going to be receiving the kidney. And so a lot of times the conversation is hard because patients with kidney disease, or any disease, may not be willing to share that with other people. We often see patients in our clinic that no one in their family or community knows about their kidney disease. It's really something that they're trying to manage on their own. So, if you're presented with that kind of situation, it can be challenging to find someone that's going to be a living donor for you.

Alie: What types of things are you looking for when you're screening for a match? Is it just blood type, or are there tissue types and sizes?

Dr. F: There are two main things that we look at. The first thing is a blood-type match. The different types are A, B, O, or AB blood type. I think what's most important as part of the living-donor evaluation process is that even if... Say I need a kidney transplant and I have someone that's willing to donate to me but we're two different blood type matches, that doesn't mean that I'm all out of the system and now I have to just get a deceased-donor kidney transplant.

There is a program called the Swap Program or something called paired kidney donation. The idea behind that is: Say that there's another pair of people that are very similar to me, so someone else needs a kidney transplant, but they have a donor that's not a match for them, but that living donor is a match for me. And so what happens is that I get someone else's donor and then my donor donates to this other patient. And now we've both ended up with a living-kidney transplant on the other side.

Alie: Ah, and is that called a chain?

Dr. F: Yeah, that's the chain. It's also called pair donation. It's part of the national kidney registry program. Sometimes we can have very, very long chains of 11 to 12 donor-recipient pairs. Our goal is: How can we maximize patients getting that living-donor kidney transplant? That's another piece that really takes a lot of education from our end because oftentimes we see patients that you ask them in the visit, "Is there anyone that's a potential living donor for you?" And they say no. And if we don't probe that a bit more, it could be that they do have a couple living donors, but they've excluded them in their mind because they know that they're not a blood-type match.

Alie: Got it. Have you ever seen those videos of hermit crabs exchanging shells?

Dr. F: I have seen them. *[laughs]*

Alie: Is that what's happening?

Dr. F: Yeah, basically. Yeah.

[David Attenborough in his delightful British voice, with cheerful music in the background: "After a close inspection, the big crab moves in. This triggers a chain reaction. Each crab hurriedly moves into the shell vacated by the crab ahead of it in the line."]

Alie: It's one of the cutest things on the planet and just the idea of like, "Line up! I got a B negative!" It's so great.

Dr. F: The other type of match – you mentioned tissue typing. What we're looking for is something called HLA typing, that's human leukocyte antigen. The way that that works is that we each inherit two copies, one from your biological mother and one from your biological father, and we basically look for the degree of similarity between what yours is and what your potential donor's would be. The better the match, typically the better that that pair may do.

Aside: So they go by blood type and human leukocyte antigen, which tells transplant coordinators about your immune system compatibility.

Alie: Do you get to make the phone call, like, "Hey, are you sitting? I have a kidney for you!" Who gets to make that phone call?

Dr. F: Transplant institutes have very, very massive care teams because it's a pretty complicated process. And so we have transplant coordinators that are actually the ones that make that

initial call. Once they start that process, then there are many other individuals, including the transplant surgeon and the transplant nephrologist, and we all make a decision together. Unfortunately, I'm not the one that gets to make the call.

Alie: I wonder what those phone calls are like. Do you ever hear heartwarming stories?

Dr. F: Oh yeah. Especially for some of our patients that have been on dialysis for 10 years and then we call them and say "Hey, there's an organ for you!" It's why I went into transplant nephrology. And, when we see the patients in the hospital... In addition to the patients that are admitted for their surgeries, for living donors, we also have their donors that are admitted for a day or so after their donation surgery. Every time, it makes me pretty emotional to interact with the donors as well as their recipients.

Alie: Do they usually know each other, or are they part of a chain, or do they get to meet the person who is getting their kidney? Is there usually a bond there?

Dr. F: If they're not part of the paired program, then they almost always have some sort of connection to that recipient. If they don't have a connection, then you have to question the motives for that kidney transplant donation. We do a lot of background work to make sure that the donor-recipient relationship makes sense to us and that there is no coercion, that donors aren't being forced or being paid to do the donation. There are instances of altruistic donation, which basically means that you say, "I want to donate my kidney and I don't know the person that it's going to," and that's a little bit less common. I haven't really been a part of that many cases like that.

There actually is a really interesting podcast, I think it's called *Strangers*, but it basically is a series of podcasts of the journey of someone that actually did an altruistic donation. It goes through her process, before the transplant and then during, and there were some interesting questions about how the altruistic donor wanted to select her recipient. There are a lot of ethical questions there because there is already a waitlist in place. She wanted to make her own rules about who *she* thought was the best recipient. And so, because this was all happening on the podcast, there was actually a lot of interaction from the podcast listeners who weighed in on what their opinions were.

Aside: I looked around for this and I believe it's the podcast *Strangers* and it's the three-part series "Elizabeth and Mary." Also, Epidemiology guests the Drs. Erin from *This Podcast Will Kill You* recently did an organ-donation episode in February. And Dr. Farouk is a host on her own kidney podcast. A pee-cast, if you will!

Dr. F: It's called *Freely Filtered*; pun absolutely intended. ["Well done!"] It's me and three other nephrologists, and we try to meet a couple of times a month and sometimes we invite guests, depending on the topic, and we have a good time.

Alie: This is something that made me definitely want to do Nephrology. One thing I feel like people were talking about a few months ago that I did not know is: When you put in a kidney, you don't take out the old one. Is this true?

Dr. F: This is true. Yeah. [*Alie whoops with joy and surprise*]

Alie: Whaaaat?? That's amazing!

Dr. F: The native kidneys, which is what we call them, they stay there. The classic kidney transplant is that those stay, and then the new kidney comes in, and there's three connections that need to be made. It's an artery, a vein, and the ureter, which is how the urine is going to come out, and then that's it. There are some instances when someone's own

kidneys may need to come out, but generally those are because they are causing some sort of problem. For example, if someone has a disease called polycystic kidney disease – that’s a disease in which the kidney basically becomes filled with these fluid-filled sacs that are called cysts – the kidneys can become very, very large. That would be a potential reason to remove the kidneys, if those are causing symptoms for the patients. If kidneys are becoming infected, that would be another reason to remove them. But generally, those kidneys are left in because it just becomes a much more complicated surgery.

Unfortunately, kidney transplants don’t last forever. They last somewhere between 10-15 years, depending on the type of kidney and other factors related to the patient. The kidney transplant will stay, so... I think the most number of kidneys that I’ve seen in a patient is seven.

Alie: [*surprised hoot*] Wow. Oh my gosh, that’s like a bunch of grapes. Wow.

Dr. F: Yeah, and my surgical colleagues will say that as long as they can find a place to make those three connections then it can happen.

Alie: So, wait. The connections, are they still going to the old kidneys, or, they must be hooked up to be receiving blood so they’re not just gangrenous in there, but you’re able to, kind of, splice it. Is it like splicing cables?

Dr. F: The native kidneys and their blood supply are actually kind of left alone, so the arteries and the veins are going to be connected away from that.

Alie: [*in awe*] Wow. Oh my gosh, that’s so interesting.

Dr. F: You’re actually right, the artery just needs to be connected to another artery and the vein just needs to be connected to another vein. It’s a little bit more complicated than that I’m sure, but I’m not a surgeon. That’s how they explain it to me, so that’s how I explain it.
[*laughs*]

Alie: Wow. That’s amazing, that’s such good Two Truths and a Lie fodder. If you wanted to say: “One truth is: I have seven kidneys,” no one would believe you. [*both laugh*]

Aside: Okay, I’m talking to you, Dutch schoolteacher, Björn van Empel, who has received the *Guinness Book of World Records*’ highest number of kidney transplants at seven. The last of which was from his sister, a living donor, and I’m happy to report that, with persistent googling, I discovered that Björn is doing very well. 41 years old now, married to a wonderful woman who also had a kidney transplant as a child. They recently had a baby, against a lot of odds. And he has written a heartwarming book about his experience called *Sigh of Enlightenment*. And yes, I will link the book on my website in case you want to purchase it for March 12, World Kidney Day, because there are so many people out there who need spare kidneys or who maybe are packing a few extra.

Alie: That is so fascinating. I’ve always wondered too, how does dialysis, essentially, work? Does it reroute your blood, clean your blood through machinery, and then bring it back?

Dr. F: Yeah, basically. An important thing about dialysis that we try to emphasize is that the dialysis: 1) it doesn’t fix the kidneys, and 2) it only replaces a fraction of what the kidney is doing. The kidney does a ton of stuff and dialysis is going to do two main things. One is to try to restore some of the balance of some of those electrolytes. It’s going to get rid of “bad stuff” that the kidney cannot get rid of on its own. The second thing is to try to maintain your fluid balance.

If you have kidney disease, you're not making any urine. If you don't have any way to remove that fluid, you are essentially going to keep becoming more and more swollen. What the dialysis treatments do is provide a way to remove some of that fluid and to get rid of some of that bad stuff.

One of the important things that dialysis removes is potassium, and why do we as nephrologists care so much about potassium? If the potassium levels become too high that can be very dangerous for the heart and cause abnormal and potentially life-threatening arrhythmias. The dialysis importantly takes care of that and also removes a few other, what we would call, toxins.

There are two different types of dialysis I should also mention. One is done through the blood. That's probably the more common one in the United States and that is called hemodialysis. With that, the blood is directly being removed. The blood is removed, it goes through the filter, the bad things are removed, some fluid is removed, and then the clean blood is returned and that goes on for about three, three-and-a-half hours and the patients generally do that three times a week. That can be done in a clinic-type setting called a dialysis unit, but that can also be done at home. It's something called home hemodialysis. Patients that are able to manage that can do the treatments at home.

Alie: To be able to DIY it at home seems like something that, 50 years ago, couldn't even be imagined, I feel like.

Dr. F: Yeah, it's really amazing what the patients can do at home. For many patients, I think that can really change their quality of life as well.

Aside: So, I looked up a hemodialysis machine and they're about the size of a large nightstand, or maybe like a speaking podium, or a slot machine, but, I imagine, less loud and blinky. And Dr. Farouk says the type of dialysis that's right really depends on the patient because there's hemodialysis, which goes straight for the blood, but then there's another flavor too.

Dr. F: And the other type of dialysis is called peritoneal dialysis. It's a bit different because it doesn't require needles or accessing the blood. How that works is there's a plastic catheter that's placed in the abdomen and it sits in the peritoneal space. It's between your organs and your abdominal wall. Basically, that space between is used as the cleaning filter, and so for patients who are on peritoneal dialysis, they are able to put fluid through the catheter into that space in the abdomen and that fluid sits in there for four to six hours. That's when the dialysis is "happening," and then they can drain that fluid and put in new fluid again.

There are actually machines that can do this for them overnight while they're sleeping. That can be really awesome because when the dialysis happens at night when they're asleep, then during the daytime there is nothing for them to worry about.

Alie: That's got to be a quality-of-life upgrade too.

Dr. F: Yeah!

Alie: I have so many questions from listeners. Is it okay to rapid-fire you?

Dr. F: Yeah, yeah, I'll try my best.

Alie: Like a lightning round. [*Dr. Farouk laughs*] We'll do a lightning round.

Aside: Okay, but before we zip zap through your very good questions, a quick word about Ward-approved sponsors of the show who let us shower a charity in a golden donation. And

this week, Dr. Farouk says a donation to AAKP would be awesome, and that is the American Association of Kidney Patients, which, since 1969, is dedicated to improving the lives and long-term outcomes of kidney patients through education, advocacy, patient engagement, and the fostering of patient communities. They fight for early disease detection and diagnosis, increased kidney transplantation, patient dialysis choice, and more. You can learn about them at AAKP.org or on Twitter @KidneyPatients, and that donation was facilitated by sponsors of the show who you may hear about now.

[Ad Break]

Okay. Back to your questions, which I *filtered* through, to the best of my ability.

Alie: Will Plewa wanted to know: Camels and hopping mice. And I was like, “What? What does that mean?” Have you heard about camels and hopping mice and what their kidney deal is? How can camels not drink water for a while?

Dr. F: That’s a really awesome question and something that I actually recently have spoken about with my nephrology colleagues. Different animals have different abilities to, what we call, concentrate their urine. I think that’s the easiest way to put it, and so depending on your version of the kidney, however concentrated that system can make the urine, that’s how much water you need to or do not need to drink.

For example, as humans, we have a certain capacity, so we can only keep in a certain amount of water and beyond that point we just can’t do it anymore. [*“I’m either going to cry or wet my pants.”*] So, if you’re an animal that’s able to just hold on to all of your water and never get rid of it, then yeah, you can go longer periods of time without drinking water.

Aside: How do they do this? Okay, so they excrete less water in their wastes, solid and liquid, and if you’re a camel, your humps hold fat and not water, but when you break down the fat, there’s some water released. Also, you can drink up to 32 gallons at a time, camels.

Now, should we as human beings drink 1/32 of that in a day? Patrons Kelowna Ostwald and Charlotte are both good hydrators and TBH: frequent pee-ers, and they wanted to know if this is okay.

Alie: Now what about drinking a gallon a day? You know how people are like, “It’s so good for your skin!”? Is that advisable?

Dr. F: I was actually just talking to one of my *Freely Filtered* filtrates and I said, “I’m worried she’s going to ask me how much water people should drink.” [*Alie laughs*]

So, what do we tell patients that ask us this question? We always get asked. It makes sense that you should drink more water, ‘cause it’s going to flush out the kidney, whatever that means. The kidney is smarter than that and so we can’t just flush it out. It’s not like the heart, where it’s just, like, a pump, it’s more sophisticated. We say: drink to your thirst and the kidney will figure out the rest.

Drinking too much water is probably not going to help or hurt anything; drinking too little water is probably, for some short period of time is okay, because again, if your kidneys are working appropriately, it’s going to be able to respond and regulate to keep everything where it needs to be.

Alie: Does it ever happen to you where you are dehydrated, but you don’t feel thirsty and then you start drinking water and then you’re like, “I didn’t realize how thirsty I was!”? Why does our brain do that?

Dr. F: Personally, yes. Yeah, that's happened to me. *[laughs]*

Alie: *[laughs]* Sometimes I'll be like, "I didn't realize..." and then I'll be like, "Ahhhh! Water is so good, why didn't I drink it for six hours?"

Dr. F: Another cool thing that's not directly related to the kidney but kind of is that one of our mechanisms for thirst is actually your level of sodium in the blood. And so, the reason we feel thirsty, one of the reasons, is that your sodium level, if it starts to go up, then that's a signal to your brain that you need more water.

For people that have what we call a 'normal thirst mechanism', even very small rises in your sodium will make you incredibly thirsty, so another way that we maintain what is the normal balance, or our homeostasis, is by responding to that thirst mechanism. *[clip from Seinfeld: "Boy, these pretzels are making me thirsty."]*

Aside: Now, if you have salt cravings that shock your friends and family, that can be one symptom of Addison's disease, or adrenal insufficiency, alongside fatigue and skin pigment changes. The adrenal glands sit on top of your kidneys kinda like little hats or nipple tassels, and they deserve their own episode. We will get to that in the future.

Now, what about if you're sick and you're supposed to drink a lot of fluids? Is this because the kidneys are also germ custodians and virus cleaners? Not really. It's because you can lose fluid sweating through a fever, and also dehydration makes your thick, disgusting mucus more thick and disgusting, no offense. But before you chug a gallon of water in the span of this episode, just slow it down, champ.

If your electrolytes get too diluted, it can lead to hyponatremia, which makes you feel drunkish and can cause a coma and even death. So, if you need to get one of those water bottles with the timestamps and the motivational benchmarks on it every hour, I will not judge you. Me and your kidneys will be very *pee*-roud of you. You're not *flushing* your money down the toilet.

Alie: Let's see. Marijke asked: Who was Henle and how did he get the most memorable structure named after him? I'm guessing she's talking about the loop of Henle?

Dr. F: Oh no, I don't know a lot about Henle. Augh! But I do love the loop of Henle, and I think in nephrology we like to get very nerdy with how we name different things.

I just started this nephrology mentorship program for medical students and residents that want to learn a little bit more about nephrology. It's a year-long program and we've broken up the trainees into different groups. And they're each named based on a different part of the kidney. We have two groups that are inspired by the loop of Henle, there's the ascending limb of the loop of Henle and the descending limb of the loop of Henle and they do different things. Within our little mentorship program, we've had some nice debate about who's group is better and whose part of the nephron is better.

Alie: *[laughs]* You know, Ethan Bottone, a listener asked: Why do several parts of the kidneys and pancreas have really weird names like the islets of Langerhans and Bowman's capsule? Is it just because nephrologists are cooler and more imaginative?

Dr. F: Yeah. Yeah, absolutely, and so that we kind of have our own little secret language and so that when we have a mentorship program we have options for how to name our groups.

Alie: *[laughs]* That's why. That's the origin of it. Of course.

Aside: Henle, by the by, is Dr. Friedrich Gustav Jakob Henle, a Bavarian-born doctor from the 1800s, and you have all kinds of Henle thingamabobs in your body and face including the crypts of Henle (those are in your eyeball area), and he was the founder of modern medicine and also a big proponent of germ theory. So, a hero today, but I'm sure at least a few people back then were like, "Yeah, that guy with the cleanshaven face and the hairy neckbeard cuts up dead people all day and thinks invisible animals are responsible for plagues. Okay." But he was right. And we're lucky that he was a little loopy.

Alie: Melissa Wise, first-time question-asker, wanted to know: What is it about trauma damage to the kidneys that's so bad? You get stabbed there and almost immediately die? Why? And then we had another question, Juliebear said: Why are kidney strikes verboten in most boxing and martial arts? Caitlyn Powell said: Kidney punches are illegal in boxing. Why is it more painful or dangerous? So, what is it about kidneys where it's like, "Don't even think about punching me there"?

Dr. F: Huh. If you're thinking about anatomy, there's a lot of structures in that area and the kidney, I think, is relatively exposed in a sense. So that's why if you do get trauma to that area you can get bruises of the kidney, just like you can of your skin. Those are called contusions and they definitely are not going to be good for the kidney moving forward. If you're causing trauma in an area that has a big blood supply that can be ruptured, that can definitely lead to some devastating effects moving forward.

Aside: Harry Houdini, if you're wondering, didn't die of a kidney punch, but I did stumble upon a few newspaper articles with titles like "One-Punch Killings: They Happen More Often Than You Might Think," which suggests that I think about one-punch killings a lot, if at all. And the moral is, essentially, just don't punch anyone.

And if you live in Czechoslovakia, and maybe you're having a flirty snowball fight with your husband, just be careful. In a 2017 paper titled "Snowball Fight: An Unusual Cause of Spleen Injury," doctors reported that a patient sought treatment for excruciating pain with no underlying cause, just a snowball fight with his wife five days ago, and with one liter of blood in clots in his abdomen, "spleen trauma suspicion was high. The patient added information about the possible trauma. It was not an ordinary snowball," the report says, "but a piece of ice about 40 centimeters or 1.5 feet long." He endured a spleen removal, but doctors did not note the prognosis of his relationship. So, amateur or professional, just lay off the organs.

Alie: I didn't know that in boxing, because I don't watch a lot of boxing, but it's funny that you can absolutely bust open each other's faces and eyes, but... leave the kidneys alone. Yikes!

Dr. F: The other cool thing though is that patients often will say that "my kidneys hurt," which is really interesting because the kidneys are actually not innervated by any nerves. And so, we actually should not really feel pain there. So, the only times in my clinical practice that I've had patients that have kidney pain are in the setting of kidney stones or if they have a severe kidney infection called pyelonephritis. But otherwise, chronic kidney disease is painless from the standpoint of, you know, talking about pain from the kidney itself.

Alie: I had a kidney infection once it sent me to the hospital and I ignored it for several days because I had taken my first-ever yoga class and just thought I was sore. And then I was like, "This is sorer than I should be. But I don't know how yoga works."

Dr. F: That sounds very bad. [*chuckles*]

Alie: Yeah. It was not fun.

Aside: So, pain receptors in parts of your upper pee tubes and where the kidney attaches to arteries can get inflamed and painful, though. Also, no matter how many hours you're working a week, never deal with a UTI with just cranberry pills because you don't have time to go to the doctor. You will end up at the doctor and it might cost \$4,000 because of your high deductible, in 2011, Alie.

What about an exotic disease affecting up to 10% of unfortunate human souls? It's called nephrolithiasis and it means "there's rocks up in there."

Alie: Kristina Weaver says: We know soda is bad for your health, but does drinking a lot of soda increase your chance of getting kidney stones? And why are some people more susceptible to getting kidney stones than other people? And how do you prevent them from forming in the first place?

Dr. F: Yeah. Kidney stones are incredibly interesting and also another area where we collaborate with our urology colleagues. There are different types of kidney stones and so one of the first things that we try to do when someone has a kidney stone is to understand what it is made out of. And so, there's different flavors that they come in. For example, they could be made out of something called calcium phosphate. They could be made out of calcium oxalate. They could be made out of uric acid. They could be made out of something called cysteine. And the reason that the composition is so important is that knowing what the kidney stone is made out of can give us a clue into why it might be forming. And then that can help us with what we can do next to prevent them. So, across the board, regardless of the type of kidney stone, almost everybody would agree that more water in *this* situation actually is helpful.

We recommend at least producing two liters of urine per day, which is a lot. And so, we do actually give our patients urinals that allow them to measure the volume of urine that they're producing. And another thing that we do specifically for patients with kidney stones, particularly if they're having a lot of kidney stones, is that looking at what's in the urine can actually help us understand what is their particular risk factor for causing that stone. We can do a 24-hour urine collection, and then we send that to a special lab and we do certain tests. And so, we actually measure urine in volume, we measure urine calcium, we can measure urine oxalate; remember, that calcium oxalate stone.

And so, depending on what the levels of those are, like, if a certain element is too high or too low, then we can give medications or dietary recommendations to try to help lower or increase the level of that because there are some things in the urine that if they're too low that can actually increase your risk of forming stones. And so, some of these are going to be genetic and so they may run in families and that may also give us a clue. But sometimes they're not, and these urine studies can be really enlightening. But the first thing that we say is, you know, when we first see them and before we have any data is, "You need to drink more water."

Alie: Mm. Really?

Dr. F: Yes.

Alie: Oh.

Aside: So if you have a lot of kidney stones, like we have a listener named Sydney, who's 26 and has had seven kidney stones. ["Seven??"]

She's been told that they could be genetic but they have more stones than the rest of their family combined. Should Sydney be drinking more water?

Dr. F: Absolutely. First I would want to know how much urine they are currently making and if it's below that two-liter threshold then we can try a little bit more. But the key really is knowing what is that stone made out of and what is happening in the urine.

Aside: Sydney, it's time to start peeing in a bucket. Two liters, my babies! Now, kidney stones are also called nephroliths. And what about the color of different stones? Is it like birthstones? Is it fun to celebrate? Well, according to nephrologist Dr. Rajesh Shah, a calcium oxalate stone looks single, it's small, it's hard, it's painful and may cause bleeding. And then the phosphate stones are larger stones. I gather that they are smoother and they hurt less. Uric Acid: Those are multiple, and small, and yellowish. You can't see them in x-rays but you can feel them coming out of your pee tube.

So depending on what you pee out, it might look different. And if you're like, "Wow, such foamy pee I have lately," Call your doctor. That can be a sign of protein in your urine and is a signal of bigger health problems. Maybe even cancer, not to freak you out. And don't freak out if beets turn your pee pink, but so can blood. So, just when in doubt, check it out. And speaking of color...

Dr. F: In nephrology urine is gold and has all the answers. Whenever we don't know what's going on we need to look at the urine. That's not just for kidney stones, it's really for any kind of kidney disease. It's actually a pretty easy test that we can do routinely. Basically, all you need is a urine sample and a microscope and then we can look for clues to tell us what's happening inside the kidney.

Alie: Oh. Meagan Walker wants to know: What's the biggest kidney stone you've ever seen? Any whoppers?

Dr. F: Um, I would say anything that's approaching the centimeter mark, that's pretty large.

Alie: Ooh!

Aside: If you live in the US and are like, "How big is a centimeter?" It's about one-third to half an inch, which is like peeing out a ladybug, or some rock candy the size of a ladybug. Can they be made smaller, please?

Alie: And zapping them... are they zappable?

Dr. F: So, they can be zapped. When we're talking about big kidney stones, that's when we're going to start talking to our urologists about what we can do next. And so, do they want to zap them and make them into smaller kidney stones that may be easier to pass? Or is it so big that the stone needs to be removed surgically?

Alie: Ooh, my gosh.

Aside: Patron Meagan Walker said, "My mom said her kidney stone was more painful than childbirth." And to be honest, you all, that was a burning question on my mind also.

Alie: Do you have patients who have had kidney stones and have had children and do they tell you which pain is worse?

Dr. F: That's an interesting question. No, I've never asked that and that information has not been shared with me. *[laughs]*

Alie: *[laughs]* I feel like you always hear that it's on par with childbirth or it's like "the childbirth of the penis." You know what I mean? Dudes who have kidney stones are like, "It's supposed to hurt as much." I have never had a kidney stone or a baby, so I'm just curious.

Dr. F: Same over here. Kidney stone and pregnancy naïve, so...

Alie: Yeah. Maybe I'll take a Twitter poll and see if anyone's had both.

Aside: Okay, I took a Twitter poll. 12,077 people responded. 314 said that birthing hurt worse than kidney stones, but 398 said the kidney stones hurt worse. 11,352 chose the third option which was, "just show me the results."

Of the people that chimed in, Holly said, "100% kidney stones hurt worse and my firstborn was a no-drug birth. I'd do that every day before dealing with kidney stone pain again." Holly would have a baby *every day* before a kidney stone!

MichelleKellyCW says, "Two rounds of kidney stones vs a 40-hour labor with no drugs... stones had worse pain."

@Turtle63 said, "I had six kids (only one epidural). I would rather have all six in one day than to have another kidney stone."

@Abuyakkk says, "The kidney stone hurts worse for sure but the pain is gone a lot faster."

Dr. Teagan Wall said, "They don't give you an epidural for a kidney stone, but you also don't have to save for the kidney stone to go to college. So..."

Amanda Whitehead said, "My mother said they were comparable, but only one had a good prize at the end (she did not mean the stone)." I mean, *I* would keep it though. You made it! It's yours! It's art!

Dr. F: I have had patients bring me kidney stones in Ziploc bags, which is incredibly helpful and awesome.

Alie: Do they get to keep them afterwards?

Dr. F: Yeah. Well, we also ask them, particularly for patients that are having recurrent episodes, to try to collect the stone at home. And so, we can give them some supplies to help them strain them out because, you know, they're tiny.

Alie: Yeah. Ooo!

Dr. F: Relatively, relatively.

Alie: Relatively tiny. I'm sure it does not feel tiny when it's coming out of you.

Dr. F: Definitely not. And, in someone that has a history of kidney stones, it's an important question that we ask them as part of their pre-kidney transplant evaluation because if they've had stones in the past it's likely that they're going to form stones again. And so, if I know that going in, then I want to do everything I can to try to prevent a stone from forming in that transplant.

Aside: So, if you're like "I have a kidney to spare. I mean, it's hella stony baloney, but I kinda can't wait to get rid of this thing, to be honest." Just tell the docs first and they'll figure it out. How's that for fatherly advice?

Alie: Lizzy C, first-time question-asker says: My dad donated a kidney to me almost 23 years ago [*DJ airhorn*] and my "new kidney" is now 80 years old while I'm 39. Have there been any studies on the biological age of a transplanted kidney and longevity?

Dr. F: So, I don't know about official studies that have been done but it's definitely something that we take into consideration. We have to think about the donor kidney, and the characteristics of that, and how we're matching that with the recipient. And so, if we have someone that's,

what we call, an 'age mismatch', then that kidney may have some natural wear and tear because our kidneys are not designed to last forever. Over time, even patients without any clear cause of chronic kidney disease will lose some of their kidney function that they were born with, essentially.

Another important thing that we think about is there's something called a size mismatch. And so, depending on your ideal body weight and how tall you are, your kidney may be a different size than somebody else. And so, if I'm transplanting, say, a very tall person and they're getting a kidney from someone that's much smaller, then that kidney, even though it's working the best that it can, it may not be reflected in that recipient because that recipient is just bigger. So, it doesn't mean that we wouldn't do that transplant, but when we're looking at measures of kidney function in that recipient and we expect this kidney to be working a little bit better, it could be related to the size mismatch.

Aside: So, I had to google 'how big are kidneys', and in itty-bitty babes, they're two to three inches, and in adults they are about 10-11 cm long, or four to five inches. Also, your right kidney is usually longer than the left. So, take a sip of water and give 'em a little pat. Good job, buddies!

But before you assume that bigger is better, consider Polycystic Kidney Disease, or PKD. I did not know this until today o'clock, but when cysts form in a kidney, they can get huge, and be incredibly dangerous.

Patron Nicole Wackerle wrote in to say: "I'm amazed at how huge some polycystic kidneys can be! I work in the OR and have seen some removed that were the size of a human baby and SO HEAVY, and I'm amazed the person was just walking around with it inside them for so long!"

Now, are there photos online? Yes! Did I find them? Of course! Do they look like footballs bound in blood-filled bubble wrap? They do. And if you have PKD and are listening, I hope your match comes along soon and you and a new kidney walk off into the sunset happily ever after. Speaking of which:

Alie: We had a few people who had questions about mental health and kidneys. Chris Brewer asked: Can kidney disease cause mental health problems? Karin Celestine, first-time question-asker, says: Why do some people get depression after donating a kidney? They say, "I think it's called kidney depression." Have you ever heard about that?

Dr. F: I haven't heard about depression after kidney donation, but I'm sure it's been studied and maybe described. There is a strong association between patients with, not just chronic kidney disease or patients that are on dialysis, but anyone with chronic illness. There are significant links to depression and other mental health challenges. I'm not sure that there's been any, you know, biological link between what the kidney is unable to do and the link to that, but it's definitely plausible.

Aside: Okay, I looked into some studies and one titled "Depression and Kidney Transplantation" in the journal *Transplantation*, said that end-stage renal disease (ESRD) patients experience high levels of depression with approximately 20-30% suffering from depressive symptoms. And post-transplant can be tough because of the physical realities of recovery and inflammation. But there are transplantation-trained psychiatrists who are experts at this. And if you have any chronic illness, it's very understandable to have that affect your mental well-being. So, as Raven Baxter said a few episodes ago, give yourself

grace. And give any sick pals some extra patience and support and reach out to a doctor, because you matter, you deserve it.

Alie: This is a flimflam question. Ariel Vanzandt wants to know: What is your reaction when you hear talk of cleanses and detox teas? They immediately start defending the kidneys and the liver.

Dr. F: *[laughs]* My thought of that is: be careful. We don't always know what's in these things, often and they're not approved by the FDA, and oftentimes it's hard to even know what's in them. We do try to tell our patients that if you are going to take something, if you can bring it into the office so we can at least see what might be on the label even though that may not have all of the information. And just be very, very cautious when you do those things. And if you start to not feel well, definitely stop and seek professional medical care.

Alie: Hmm. Good to know.

Aside: As long as we're talking about things to put in your mouth, a bunch of folks asked about diet and kidney function, such as Eve Ross, Juan Martin Hunicken, Chris Rosendal. First-time question-askers Khyugpa, Alexia Kiger, and Chris Brewer asked about low-carb diets. And first-time question-asker Genevieve Pellerin wrote in: Eating too much protein can cause kidney failure: myth or reality?

Dr. F: So, with patients with normal kidney function, we don't generally think that there's any really dietary link. However, there are associations between other disease processes and kidney disease. For example, if you have diabetes, particularly for a prolonged period of time that has not been controlled very well, that is definitely associated with a higher incidence of kidney disease.

For a low-carb diet specifically should not hurt the kidneys. However, as kidney disease becomes more advanced, there is debate about whether or not changing the protein intake could be harmful or helpful. So again, I think our best recommendation is generally, everything is really kind of a patient-by-patient basis. So if you are thinking about trying a diet that is going to cut something out or have you take in a lot of, for example, protein, to discuss that with your physician first.

Aside: Especially do that if you have a history of kidney stones. And PS, I looked into global kidney disease rates and thought the US was going to land on top because deductibles can be brutal, we don't go to the doctor unless we have to, and we feed babies Pepsis and stuff. But actually, according to a 2017 study, Saudi Arabia and Belgium have the highest estimated rates of chronic kidney disease prevalence. 24%. Lowest rates, 7%, South Asia, 8% in Africa, and the US and Canada are around 14%.

One 2007 study published in the *Journal of Epidemiology* pointed a fizzy finger toward cola consumption, saying, "Cola beverages in particular contain phosphoric acid and have been associated with urinary changes that promote kidney stones." So, if this episode has made you fall in love with your hardy but vulnerable pee beans, just think about reducing or quitting some habits, maybe booze, smoking, cola type of things, and doing all the things we know we should do, like sleeping, and hydrating. Your kidneys are gonna be so happy! And though genetics does play a role, it may not be as impactful or broad as previously thought.

Alie: Amy Skinner, first-time question-asker, says: I'm an RN for 35 years and I want to know why, oh why, do we still look at and divide GFR results based on a person's race? It seems really outdated and ridiculously racist and I cannot believe that we still look at results this way. And Jacquelyn, also a first-time question-asker, said: I've heard that kidney failure is more

common in Black populations than white. Any thoughts or updates on that? Any new, current research?

Dr. F: Yeah, so a lot. We actually did a whole podcast on this couple months ago called *Race and EGFR*. So, there's been a lot of talk around the country about this and the use of race as a biological variable in the equations that we use to estimate GFR. Many of us believe that this is incorrect, and a lot of close analyses of the previous studies that this came from have been thought to be flawed in how the analysis was done. At several institutions, including Mount Sinai, actually a couple weeks ago this became official, we've removed the race coefficient so now we no longer report GFR, or the glomerular filtration rate, as Black and non-Black. We just report one value.

So, this actually started when a couple of medical students in the summer started a petition at Mount Sinai to address this issue and "why do we do this in this way that is incorrect?" It was signed by thousands of people and the Mount Sinai Health System. I was part of a task force actually that discussed the data behind this, and what do we do here, and what would be the consequences of removing the race coefficient? And so the result of all that was, in my opinion, a success. So, we're very happy that we're kind of moving forward with this. It really doesn't end here.

Even outside of nephrology, there's a lot of risk scores and calculations that include race as a variable and have important implications on care for different patient populations. Specifically for kidney transplant, we use our cutoff for who can be listed for kidney transplant as a glomerular filtration rate of less than 20. If you use the "race coefficient," at the same time point, a person that is Black, their GFR would be a bit higher, so that raises the possibility that we could be delaying listing for patients that are Black.

So, I think this is going to have important implications moving forward. There are significant disparities in care, not only in kidney transplant but also in nephrology. I think this is one small step in starting to address some of these. There's a lot of research being done within nephrology to understand these a bit better and to improve the care that we provide.

Aside: This very important topic was discussed on her *Freely Filtered* podcast Episode 23, titled "Race and Estimated GFR," from August of 2020. So, it's good news that these standards are changing at last.

This question is from a long-time friend of the show.

Alie: Marcy has a daughter Emmy, and her husband Andrew donated a kidney to her!

Dr. F: Amazing.

Alie: I know. So Andrew, Marcy, Emmy... Marcy wanted to ask, she's really curious about the COVID vaccine: How is the COVID vaccine or COVID affecting people with transplants or with kidney disease?

Dr. F: Yeah, so I can't speak a lot about pediatrics, however in our kidney transplant population, and we've done a lot of work to look at how our patients have been impacted, has it been different? Do they present differently? The data, you know, it's still fresh as we haven't been studying it for that long. But what we found is they tend to present similarly. There are a few symptoms that maybe are more prevalent in patients with kidney transplant. For example, there was one study that found that maybe patients with transplants might present more often with diarrhea than respiratory systems, but that hasn't really been the case across the board.

In large studies looking at how patients have done survival-wise, kind of mixed data. Some studies have found that they do about the same, some studies have found that maybe they do a little bit worse.

Aside: So, when it comes to the COVID-19 vaccines, they haven't seen any significantly different adverse reactions, but definitely check in with your own doctor. But Dr. Farouk mentioned that some initial studies showed that anti-rejection drugs that transplant patients take could help curb the inflammation that's dangerous in other types or SARS-CoV infections.

Dr. F: And so for the majority of our patients that developed severe COVID-19 that required hospitalization, we really kind of minimally lower their immunosuppression and left the rest of it on.

Aside: What about not human kidneys? I mean, I hope that's what this question is about.

Alie: Patricia Handley had a great question: Is it safe to eat kidney knowing their function in the body? Seems sketchy.

Dr. F: So, I've never eaten it. But people do eat kidney from other animals. I've never done it but people do it, and I guess it's okay? *[laughs]*

Aside: Apparently, organ meats like kidney and liver are high in iron, and as one columnist on *Serious Eats* opined poetically, "There is nothing quite like them, that feral taste combined with a mouthfeel not quite as tender and fatty as liver, nor as chewy as gizzards." So, I guess it's not awful.

Many patrons are curious about saving a life, such as Becks Woodruff, kidney enthusiast, Lucy McGuffie, Mandy Wong, Rachel Weiss, Meagan Walker, and first-time question-asker Rebecca Small. They all wanted to know: Am I going to regret this? Is it safe?

Alie: So many people asked this. Chiara McDowell, first-time question-asker wanted to know: Assuming the actual surgery and recovery goes well, how dangerous is it to donate a kidney? Are you any more likely than the average person to be in trouble later in life because you only have one left? Can you speak to that? And what type of outreach do you do to try and encourage living donations?

Dr. F: Thanks for asking that. So, living donation is safe. We do a lot of evaluation beforehand to ensure that our living donors are safe to donate their kidneys. That includes full testing, similar to what the recipient would receive. That being said, there have been studies that compare what is the long-term risk of developing end-stage kidney disease. So, if you compare patients that donate their kidney to what we call a match control, so that's someone that's equally as healthy as them, there is a slightly increased risk that the donor will develop end-stage kidney disease. However, if you compare them to the rest of the population, there's no increased risk. So you know, the first successful kidney transplant was, actually, today in 1954. It was in Boston; a twin donated to his twin.

Aside: What are the odds we would talk on this day? I'm telling you, it was auspicious. And of course I looked up the twins. They were Richard and Ronald Herrick, and there's a picture of them in the '50s in the hospital and they look like a pair of Dan Levys in gowns.

Also, *Ologies* patron and first-time commenter, Kristin Herrera wrote in to say:

I donated a kidney to a stranger 5 years ago. I started a donation chain through the National Kidney Registry and 10 people received kidneys because of my donation. My

husband donated 6 months before me and four people received kidneys because of him. I encourage everyone to look into donating, it was an amazing experience, I would do it again if I could. KidneyRegistry.org.

The surgery wasn't terrible, nor was the healing, my husband went back to work after two weeks, I went back to work after three. There's the usual, don't lift anything heavy for 5 weeks, etc. It's a major abdominal surgery of course so your mileage may vary. It was a laparoscopic surgery, so there were four small incisions and then one big one at the bikini line (apparently in the same place you would have a C-section?). The only expense on our part was using sick and vacation time.

My life has not changed much because of it. I have noticed zero difference in my life having one kidney versus two. The one kidney takes up the slack of the missing one. I think my remaining one gives me 70% function over the 100% of two. If you do end up donating, two words of advice: 1) take the laxative when they offer it to you and 2) have or borrow a car that has excellent shock absorbers for when you get driven home from the hospital, especially if there is road work happening nearby.

So, that is Kristin's experience. But yes, the first ever lasting donation was in 1954 between Rick and Ron, kidney twins, sharing more than just fashion choices.

Dr. F: And that individual that donated, when he was in his 70s, he went on to develop end-stage kidney disease, which could have happened even without the donation. And so, in general, it's a very safe procedure, we don't see significantly increased risk. But then the question always comes up: Why do we evolutionarily have two kidneys? But all the studies that we've done so far do suggest that living donation is safe.

So what do we do for outreach? We try to empower our patients as best as we can to try and help them find donors within their existing communities. At Mount Sinai we have a program called the Kidney Coach Program, and it's for patients that are on the waitlist, that currently do not have a living donor, and we help them identify someone within their circle already who can be an advocate for them, and then they come to a few meetings where they are, basically, educated about different strategies about how they might be able to reach out. They might be given some language that they can use to start to talk about their disease if they've never done that before, and the end goal of that is to help them find someone who can be a living donor for them.

What we try to avoid is that we don't want individuals using social media to just find any stranger to donate. We find that people are actually more likely to donate when they know the person that they are donating to.

Aside: Take Selena Gomez and her best friend and *grown-ish* actress Francia Raisa. And though it's rumored that the two had a falling out afterward, they're supposedly pals again, which helped my heart. And they also have matching tattoos which, I'm going to guess, Selena probably picked up the tab for.

So, if you want a free tattoo maybe, and if you're considering kidney donation, or you have done it, there are groups and message boards where you can make new friends and ask questions like at LivingDonorsOnline.org.

Dr. F: There's another program through the National Kidney Foundation called The Big Ask, The Big Give, which is a national campaign to try and raise awareness about living kidney donation.

Alie: I think probably getting people over the fear of, “Oh no, what if I need that later?” I guess is probably the biggest challenge?

Dr. F: Definitely. If patients that donate their kidney do develop end-stage kidney disease for some reason, then they would go to the top of the list, essentially.

Alie: Oh, that’s good to know. You have like a little VIP.

Dr. F: Yeah, it’s like a safety net.

Alie: And last questions I always ask every ologist. What sucks? What’s the shittiest thing about your job? What sucks, what’s frustrating? Is it the gallons of pee people have to bring in for a 24-hour collection? Is it meetings?

Dr. F: I think for me, not to get too emotional, is not being able to help all of our patients on dialysis come off of dialysis. There are many reasons why we can’t do that, and another important issue that’s important to me is that for patients in New York, for example, have emergency Medicaid, that really only allows them to have coverage for their dialysis. It’s very hard for us to get them the coverage that they need to not only get through the kidney transplant procedure, but also to get coverage for their medications afterwards.

So, I think that’s really, really hard when we do have this treatment that we know can be successful, and it’s not something we can provide to everyone. So, a lot of what I do in my work is try to think about how we can do that better. I think that’s, for me, the worst part.

Even not thinking about transplants, we don’t have a cure for chronic kidney disease, and that really sucks. A lot of research is being done to try to figure this out and to try to better understand, like, what is that process that happens during the scarring, are there ways that we can reverse that? Are there ways that we can slow that? Because right now, unfortunately, you know, with the exception of a few diseases that do have some targeted treatment, a lot of what we do, unfortunately, is watch, and wait, and we have a couple of drugs that we can use.

In the last year we’ve had a really huge drug that was approved for us. It’s called the SGL-2 inhibitor, sodium-glucose cotransporter-2 inhibitors, that have shown a lot of improvement, but we haven’t had a drug like that in a long time. So, I think there’s some, kind of, excitement in the field that we finally have something that can potentially help, because before that we were just, really, providing supportive care and trying to help patients prepare for dialysis and kidney transplant. And that’s not fun when you can’t really stop what’s happening.

Aside: [*sarcastic*] Just minor annoyances like healthcare not really being a human right and letting people die as a for-profit business. Just kinda petty.

Alie: Do you think that recruiting more people to the cool table, the nerd table, will increase survival and treatment options in the future?

Dr. F: Yeah, I hope so. And you know, my passion is actually in medical education and doing exactly that. Unfortunately, nephrology has struggled a bit in the recent few years with interest in the field, people that are applying to be nephrologists. So, I think all of us are trying our best to show how cool our field is and all the potential we have and to get people excited about it. We need people that are fresh and young trainees that have new ideas to help us and to make our field and options for our patients a lot better.

So, the Advancing American Kidney Health Initiative was passed recently, which shined some light on kidney disease. There were some new parameters that were outlined to try to improve the number of kidney transplants, improve our organ procurement process, to try to maximize the number of patients that are able to do dialysis at home. That's been really important for us.

And the other thing that actually just happened in the last couple of days was that the Immuno Bill was passed, which allows now lifelong Medicare coverage for kidney transplant recipients to have cover for their immunosuppressants. Before that, it was only for three years.

Aside: This blew my mind:

Dr. F: So, I remember on one of my exams that I took when I was in training, there was a question that said, "How long are kidney transplant patients' medications covered by Medicare?" And I couldn't believe that that was a question. And the options were 12 months, 24 months, 36 months, 48 months. The answer at that time was 36 months, but now, after decades of advocacy that a lot of my mentors have been working on since the early 2000s, it's finally a reality that these medications are going to be covered. So, I think that's really huge because we, unfortunately, have seen patients that have lost their coverage and then show up with rejections of their kidney transplants.

Alie: Oh my gosh! That's horrible! Like you're only going to need it for three years and then you're suddenly going to be like, "Well, wean yourself off"? WHAT?!

Dr. F: There's so many reasons why that is so wrong, so I'm just so happy to see that is something that's been changed.

Alie: For real! You know what this world needs, by the way? Just, like, a really good rom-com about some kind of kidney transplant, just a sexy, goofy, cute... something to do with kidney transplants. And then Boom. Before you know it: the most competitive field to get into. You know?

Dr. F: *[laughs]* I mean, I would love to collaborate with you on that. So, we can combine our resources.

Alie: We'll work on it! *[laughs]*

Dr. F: I do want to say, I've spoken a lot about kidney transplant, and kidney transplant is definitely not the right treatment plan for everyone. There are definitely patients that, you know, don't want that for different reasons, or that's not the best thing for them. So, I think what I want to get across is that, as nephrologists, we really try to do a personalized approach to care. Whether that is home dialysis for you, whether that's kidney transplant for you, whether that is, you know, more conservative care, we definitely have patients that are approaching the need for dialysis but that's not in line with what they want. We definitely have options for them. So, I don't want to paint this as, like, Kidney-Transplant-Or-Bust because it's definitely not that.

Alie: Yeah. And what about your favorite thing about what you do?

Dr. F: Um... *[thinking]* There's too many. My favorite thing about what I do... One, I love when I'm seeing patients that, you know, the evening after or the morning after their kidney transplant surgery and they ask me if they need dialysis today and I can say no. And the other moment parallel to that is walking into the donor's room, and when they ask us how

their recipient is doing, and we can tell them that everything went really well and that they have saved that person's life.

And from a career standpoint, what I love is I love to teach and I love to talk about nephrology, and kidney transplant, and transplant nephrology, and to try to motivate and inspire trainees to come and join us, and to show them that we have more fun than cardiologists.

Alie: *[laughs]* You have just as much heart as cardiologists!

Aside: And puns, like her vintage pink kidney t-shirt that reads "Urine Good Hands." Now, for more medical attire, you can always check out IHeartGuts.com, which I found out today, helps you wear your heart and your goopy viscera on your sleeve.

Alie: If you get verklempt on the job, is there, like, a stairwell that you duck into to dry your tears?

Dr. F: Yeah, bathroom stalls are good for that. Empty elevators are good for that. Definitely a few stairwells that have some favorite spots from my residency. And for me, you know, the urine microscopy room is, like, my little safe haven, so...

Alie: Oh my gosh. You're doing such wonderful work. Thank you so much, on behalf of all of our kidneys out there, and all of the kidneys who might get to live a second life in a different body. What's more exciting than that!

Dr. F: Thank you for having me. I have to say, the reason I came across this was that I saw a tweet about the podcast on Nephology, but I thought it was Nephrology, so I was really excited. And then it wasn't. And I learned a lot about clouds. But I thought that Nephrology should be in the party. *[laughs]*

Alie: 100%. Absolutely.

So ask smart people simple questions, because they just want you to sit at their cool table with them and talk about guts. To sit with Dr. Samira Farouk, you can follow her on [Twitter](#) @SSFarouk. There are links to so many things we talked about on my website at the link in the show notes, as well as links to sponsors and the cause we donated to.

Also, if you're in the market for more science podcasts, you might also like my friend Wendy Zukerman's *Science Vs*. We're doing a little promo swap this week and I just have to tell you that if you like wonderful questions, and thorough research, and just a charming Australian accent, *Science Vs* has you so covered! She just did an episode on Science Vs. Immune Boosting, and the next episode this week is all about Brood X! So, if you heard Cicadology last week and you need to know more, hit up *Science Vs*. She has covered everything from UFOs to sharks and is a human delight. So, *Science Vs*, check them out wherever you get your podcasts.

Find *Ologies* @Ologies on [Twitter](#) and [Instagram](#). I am findable @AlieWard on [Twitter](#) and [Instagram](#). Thank you Erin Talbert for adminning the [Ologies Podcast Facebook group](#). Thank you, Shannon Feltus and Boni Dutch for managing our merch, which you can find at [OlogiesMerch.com](#). Thank you to Emily White and all the folks helping make transcripts available and free. Those are on the website linked in the show notes alongside free, bleeped, kid-safe versions. Thank you Caleb Patton for bleeping those. Thank you Noel Dilworth for scheduling and all kinds of life help. Thanks, as always, to hunk Jarrett Sleeper for the assistant editing. He hosts Quarantine Calisthenics on Twitch every weekday morning at 9am, in case you want some free exercise and want to see our garage.

Thanks, of course, to the lovely human being Steven Ray Morris, editor on *Ologies*. Nick Thorburn of the band Islands wrote and performed the theme music. And Islands has a new album due out soon. It's called Islomania, and it's out on June 11th. So get stoked for that.

And if you listen to the end of the episode, I divulge a lifehack or an embarrassing secret. Back when you would go to someone's house for the first time, especially, obviously, pre-pandemic, or back when I was dating people, I would go to someone's house for the first time, and when I saw their bathroom, my li'l hobgoblin brain would be like, *[silly goblin voice]* "That's where they poop. They poop in that." *[laughs]* So gross. And I would be like, "No, hobgoblin brain! Don't think about that!" And then I'd be like, *[silly goblin voice]* "Hehe! Just did, psycho!" But now the problem is solved because we all just live in our own houses. Just kidding. People are getting vaccines. We got this, kids!

Drink some water, all right? Treat yourself to one of those giant chug-lugger jugs with motivational sayings on them. You can do it. Your kidneys are going to thank you. Okay, I gotta pee.

Berbye.

Transcribed by

Wendy Fick

Natasha Shipman, Candler NC

Aveline

Brian Davis

Volunteer transcriber/new mama who needs a new project for naptime, Elena Horne

Madison Campbell, who is honored to have had the opportunity to work on this project and learn so much!

Some links you may enjoy:

A donation was made to the American Association of Kidney Patients, [AAKP.org](https://www.aakp.org)

[Dr. Samira Farouk's Mt. Sinai page](#)

[Kidney emoji petition!](#)

[Freely Filtered podcast: Episode 23 -- Race and eGFR](#)

[Strangers podcast: Elizabeth and Mary](#)

[Photo of a polycystic kidney](#)

[Popping a polycystic kidney?!](#)

[An ode to urea](#)

[The kidney emoji story](#)

[Welcome to NephMadness 2021](#)

[NKF Big Ask, Big Give](#)

[American Advancing Kidney Health Initiative](#)

[UK man who drinks urine](#)

[Freely Filtered Race & eGFR podcast](#)

[Nephrology mentorship program](#)

[Types of dialysis](#)

[SGLT2 inhibitor drugs](#)

[COVID-19 resources for the transplant community](#)

[Urine Good Hands](#)

[Dr. Farouk's shirt](#)

[Sniffing out significant "Pee values": genome wide association study of asparagus anosmia](#)

[Kidney Coach program](#)

[Camel facts](#)

[Camel kidney anatomy](#)

[More on slaughtered camel kidneys](#)

["Drink plenty of fluids": a systematic review of evidence for this recommendation in acute respiratory infections](#)

[Who was Henle?](#)

[Living Donors Online message board](#)

[AMA with a kidney donor](#)

[Green tea can help kidney stones?](#)

[Stages of kidney failure](#)

[Kidney vs. back pain](#)

[Stages of kidney disease](#)

[Snowballs and spleen fights!](#)

[Our dude Dr. Henle](#)

[How to play NephMadess](#)

[Desert rodents and urine concentration](#)

[Can you donate if you have kidney stones?](#)

[Carbonated Beverages and Chronic Kidney Disease](#)

[My twitter kidney stone vs. childbirth poll](#)

[Dr. Roshah describes kidney stones](#)

[The size of a ladybug?? How big is stuff? In cm and inches?](#)

[Depression and kidney transplantation](#)

[Avoiding kidney stone attacks](#)

[Percentage of people with chronic kidney disease](#)

[Eating kidneys](#)

[History of kidney transplantation](#)

[Mayo Clinic runs down how kidney transplants work](#)

[How is Bjorn doing](#)

[Book by Bjorn van Empel](#)

[Dr. Farouk's paper on COVID-19 and the kidney](#)

[Asparagus pee: why?](#)

[I Heart Guts](#)

For comments and inquiries on this or other transcripts, please contact OlogiteEmily@gmail.com