Vanderbilt Health DNA: Discoveries in Action
Season 2, Episode 7
Climate Is Us: Why Climate Change Is Healthcare's Lane

Dr. Reed Omary: I think it's beyond our opportunity as physicians. It's actually a responsibility. We need to care about the health of the public. We need to care about equity. We need to care about the planet. And it's not just for us right now, it's for every subsequent generation, our children, our grandchildren, 100 generations from now. It's who we are. It comes to our values.

Dr. Louise Rollins-Smith: So new species of amphibians are being discovered all the time in remote places where no one has been. And if we don't understand some of those potential pain killers or antimicrobial agents that are in the biological medicine cabinet, then it's lost. It's lost forever.

Dr. Carol Ziegler: To step back from that, the metaparadigm of nursing has these four concepts. One is the person, that's the patient, the nurse, their health, and the environment. So environment's always been baked into nursing, I think more than any other of the health professions.

Clark Buckner: Today, we're going to get real climate change or global weirding as some call it because, let's be honest, what we're seeing is weird and it's scary. The extreme temperatures across the country, with record-setting heat in the Pacific Northwest and wildfires around the globe this summer, and most recently, Hurricane Ida. As this episode name states, climate is us. It impacts our health and our ability to be healthy. Just think about what ragweed does to you and the season change. That's the environment impacting you and that's the routine seasonal annoyance. For what we're talking about here, there is no over-the-counter antidote. In fact, healthcare and academic medicine's role in stemming climate change or actively talking openly and publicly about its unavoidable and negative effects on our health and wellbeing is piecemeal at best right now.

You're listening to season two of Vanderbilt Health DNA: Discoveries in Action. I'm your host, Clark Buckner. The reasoning behind the show's name is quite simple. The path to better health lies in our DNA. Discoveries in Action is about the big ideas and breakthroughs happening right here in Nashville, Tennessee from Vanderbilt Health. Our drive to discover, care, learn, and share is in our DNA. It defines who we are just as your DNA defines you. The chair of the radiology department, Dr. Reed Omary had this to say to people who tuned in virtually to Climate Change Grand Rounds.

Dr. Reed Omary: This sort of topic might originally be received as, "What the hell does climate change have to do with radiology?" I'm confident that a number of people, in back of their minds, might've wondered that, but it's clearly a collective problem for all of us and, as you had mentioned, for our next 500 generations. So we're all in this together. There's a lot we can learn from COVID that hopefully we can do differently moving forward.

I think all of us during this COVID pandemic have explored what's the relationship of who we are, what we do, and what is our role in the world? I think all of us have endured those existential questions. And when I look at what was the biggest learn, the single biggest learn for me from the pandemic was that we, in academic medicine, need to step outside of our traditional walls and our boundaries. We cannot solve the greatest problems and challenges and crises affecting the world if we sit behind our closed borders.

And when we look at the pandemic in particular, there was no one entity that could solve it. We certainly know that governments alone could not solve it. All the academic medical centers which Vanderbilt was really a pioneer in helping develop the vaccines, they alone can't solve it. They provided the materials that, of course, went into the making of the vaccines, but then we get to really the policy side and the supply chain. And so, we need the industry to do that. And so, what COVID taught all of us was that we need to work together to solve these really giant problems. We knew that there would be a pandemic, we just didn't know when or what it would contain. We had seen movies, we had read books, it seems science fiction, or it seemed to be in another part of the world.

Climate change, we absolutely know is going to happen. It is happening. Tell that to any Portlander right now and having to endure 115 degrees. And who would have known that Siberia could hit 118 degrees Fahrenheit? So if we're going to take the lessons of the pandemic and apply it to our future, we need to ask ourselves, "What can we do? What can we do as individuals? What can we do as departments? What can we do as medical centers? What can we do as citizens?" And for me as a chair of radiology, I think it's important to use every bit of influence that I have to help shape the thinking and more importantly, the actions of our community.

Where I think we need to go is we need to be leaders in this, and it's more than just talking about it. We need to act on it and we need to change your behaviors. And I think really the way to do that is to raise awareness, but it's really to try and embed it in all of our daily practices. So just thinking, what is our carbon footprint? If we walk around to the vast majority of medical centers, of universities, of stores and just ask what's your carbon footprint, the reaction mostly is going to be like glazed eyes, "What do you mean?" There might be like, "I never thought about it." Occasionally, the reaction might be a little bit, I'll just say, aggressive.

It's something that we should be monitoring. And there's no question that medical centers are really good at monitoring things. We monitor the pulse of our patients, the oxygen saturation. We need to start monitoring what are our effects on the climate and think about ways we can audit that and think about everything from supply chain. I'm a radiologist. When we select our imaging equipment, how do we make those choices? Typically, it's on things like how fast they work, what's the image quality, what's the price. Maybe start thinking more broadly from a sustainability perspective, is the imaging equipment built with a modular design so that we can engage in what I would say is that circular economy? That should become our standard or our default.

Just like when we think about building our teams, we shouldn't just right away, just, "Hey, we want person A, B, and C." We want to think about, "We need to build our team, so there's complimentary expertise. We need to have that reflective pause to add team members who intentionally bring diverse experiences and backgrounds and perspectives because that aids in our decision-making and ultimately, that helps us be more successful." I think the same thing should happen when we look at sustainability and climate change for all of the products that we use in healthcare and take that pause and have it be part of our decision-making process.

Clark Buckner: It's not just heat strokes and sun exposure from increased temperatures. It's also the effects of flooding from sea level rise and more severe storms like the recent Hurricane Ida. Changes to the environment, our planet will bring more vector-borne diseases such as malaria and dengue fever, more cardiovascular disease, depression, and anxiety, and the list goes on. Those will inevitably spur people to seek medical treatment. That's why Dr. Carol Ziegler, a nurse practitioner with the Vanderbilt School of Nursing, started teaching a course in 2018 called Planetary Health, Policy, and Social Justice. Dr. Ziegler, who was a member of the Vanderbilt Institute for Global Health, preachers that climate change is squarely in healthcare's realm in every community, in every zip code, on every continent.

Dr. Carol Ziegler: I'm Carol Ziegler. I'm a family nurse practitioner at Meharry Clinic here in Nashville, and I'm a professor of nursing at the School of Nursing. So I think we fit in multiple ways. The primary one being, especially for nurses, our main role is patient advocacy. We're on the frontline, so we're seeing people impacted not only by extreme weather events, but also heat, and then more tertiary impacts like displacement impacts in poor outdoor and indoor air quality. So we see the impacts on folks typically who are low income, who have comorbid conditions, or at extremes of age, so the very old, the very young. And a lot of our patients have underlying comorbidities like diabetes, hypertension, heart disease, respiratory illnesses like COPD and asthma. And so, they're dramatically impacted by increasing temperatures and also poor air quality.

Well, I think the generation we're seeing now is very motivated by social justice. And I think one of the most extreme ways it shows up is environmental health and climate change. So we know that the countries, even if we look at global health, the countries that have contributed the least to carbon dioxide and greenhouse gas emissions have the most dramatic impacts from climate change, right? So if you're in island nation, in the Caribbean, sea level rise is likely to wipe you out potentially, say people in Haiti with tee-tiny carbon footprints.

We also look at just locally the impact again of energy justice, so folks that don't have access to air conditioning, right? They're dramatically impacted by climate change. And again, even here in our own zip code, in my zip code 37206, it's the people that take the bus everywhere, they live multiple people to a tiny apartment. Their carbon footprint is smaller than most of ours, and yet they're paying the price with their bodies, essentially.

So that course came out of a series of conversations with Michael Vandenbergh, who's at the School of Law, and Jonathan Gilligan, who is at Earth and Environmental Sciences. They're both geniuses. They've written books on climate. They're leaders in the field. And we were just talking about how the healthcare industry, the healthcare folks like myself, we're not really at the front, we're not speaking about it enough. And so, we were thinking of ways to really bring it to students in a way that was impactful and let them get at policy at clinical issues related to climate, and could be a good scaffold for interprofessional team development. So we started this class. We changed the names a couple of times of the course. We landed on Planetary Health, Policy, and Social Justice.

And so, that course then got university course funding and it's run now, I believe, three years. It typically is anywhere from 10 to 15 students from across the university, graduating and undergraduate. They work on a project that addresses both health impacts of climate change real-time in our population here and also addresses carbon mitigation. It's a big ask, but we have them work on that with a community partner. And the students have come up with these incredible projects over the years that have had impact on things like how they look at treating mosquitoes in the city, so we had a group work with the health department. And so, the students, I think, consistently say they get a lot out of it. They feel like they have a meaningful tool set to both understand climate and how it impacts health and then also to do something about it, right, to have skills, to be activists in the community.

So a couple of things that have been worked on in the past one is we need a better way to track visits, right? So ICD-10 codes. There's not a quick and dirty way for providers, say an emergency room or a primary care clinic, to really identify codes that relate back then to climate change impacts or planetary health impacts. So that's a big gap that's there that we need to fix. Another is there is no policy, at least, locally in Nashville and Tennessee to require air conditioning in public housing. So a lot of folks who are low income, they're typically not insulated well. I don't know if you've ever been in an apartment in the summer. It's a hot box. It's so hot. There's no regulation. People over 65 or pregnant women can get air conditioning units from the amazing people at Metro Action Commission, Marvin Cox, who does a great job over there of trying to make sure people have access, but he has limited supply, so they can only give them to certain folks. So not having a policy about air conditioning.

Also, just the access, right? So we know that when folks access the ER, and this is kind of, I'm drawing some broad concepts here, but it actually increases the carbon emissions of a hospital. It's much more intensive to see someone in the ER than to invest in primary care. The answer really is to increase access, invest in primary care, right, for folks. And then, primary care providers are better equipped to do things like advocate for someone to get an air conditioning unit or advocate for them to get their air quality tested. We have NGOs here that can do that, right, for folks, and then remediate if there's a problem.

So it's, one, identifying who's at risk, and that also includes mental health, which I didn't mention, but making sure we know what their baseline mental health is if there is an extreme weather event, and then really assessing their risks. And having providers also be aware of the heat. And so, not just heat

index for the day, but that we're now in this different global time where this is now a new risk that needs to be on all of our radars. If you think about someone who has low income and struggling just to make ends meet, they have all sorts of other issues at the top of their mind. Health is not always at the top, right? So we have to have ways to make the default choice, the easy, the healthy choice for people so that it takes away from that burden that they have.

Clark Buckner: Have you ever heard of One Health? If you haven't, you should check it out. It's an initiative that connects the health and wellbeing of animals, humans, and the planet. Our ecosystem is linked. In fact, did you know that frogs and sharks have similar immune systems to us, humans? We're going to dig into what that means from VUMC's leading frog expert.

Dr. Louise Rollins-Smith: I'm Dr. Louise Rollins-Smith. I have a PhD. My department is pathology, microbiology, immunology, and I'm a full professor. So many years ago, I worked as a graduate student in a developmental biology lab, and amphibians are really of great interest because their development occurs from the egg through the tadpole basically right in a dish, right in front of you. So I studied the development of the immune system in graduate school and as a post-doc. And so, I continued on that.

I added skills. I was having a PhD in zoology, and then I added skills in immunology and microbiology to that. Initially, it was because I did a post-doc in a lab that studied the development of the immune system using amphibian model systems, so it's kind of the direction of your career follows the training. It was just fascinating to me to use embryos and developing frogs to figure out how the stem cells move into the organs where they develop. And so, that got me into amphibians primarily, and then it all unfolds from there.

There's a whole lot of overlap. So amphibians have basically the same kind of components to the immune system in terms of cells and organs in which the cells develop, and many of the same subsets are cells, T lymphocytes, B lymphocytes, that make antibodies and immune responses. So very much the same. The immune system that we have in humans basically arose in its basic components in the sharks. And so, from fishes and amphibians and up, we all have a very similar immune system.

Many frogs have diverse, granular glands, specialized, granular glands in the skin compartment. And within those granular glands, it's essentially a first aid kit. So some of them have sort of painkillers, antimicrobial peptides, and toxins to ward off predators. So they have an amazing array of chemicals stored in those granular glance. Some of which have potential uses in human medicine. We did a study a while back on some of the peptides from Australian frogs that are active against viruses. In fact, we had a collaborator that was working on HIV, so we showed that some of these peptides are actually inhibitory to the HIV virus.

Clark Buckner: We all live on this planet together. As Dr. Rollins-Smith explains, the promise of biodiversity could vanish before we ever know its potential.

Dr. Louise Rollins-Smith: So we've been mostly looking at how amphibians in this part of the country as well as in several areas, other areas of the country, how their immune defenses have annual cycles. And it's pretty clear that the sets of antimicrobial peptides, for example, are higher in some seasons and lower in other seasons. Frogs have rhythms when the climate changes. We won't really know whether there'll be artificial warming, early warming, endless springtime that will interfere with breeding. We don't know whether the cycles of precipitation and rain are going to change. Amphibians are entirely dependent on water. So if there are periods of drought, that's going to impact them, that's going to stress them. That's going to alter their immune defenses. If they have to spend more time seeking cooler places, that's a drain on the energy. It will impact the immune system. So they're going to struggle with unpredictable weather just the way the rest of the species will.

So I think people have to recognize that the great diversity that we have in terms of animals is not a permanent thing and that it needs to be protected. I think in this time of COVID, I know that lots of people have gone back into parks and getting out into natural spaces partly for mental health, if nothing else, and rediscovering just how much variety there is. And so, it needs to be protected. We need to be aware of when developments are infringing on some of those natural spaces. We need those natural spaces and we need to deal with the climate crisis so that we can maintain that diversity as well.

So the antimicrobial peptide story, I think, is of interest. Some of those antimicrobial peptides from a variety of species have been tested as agents to reduce glucose, as agents to deal with diabetic foot ulcers. They have activities that can work against even some antibiotic-resistance bacteria. So there are many people who are studying them with the idea that eventually some of these peptides, which are very ancient and are preserved and maintained their ability to inhibit bacteria, could be developed into therapeutic agents. We don't even know the variety of antimicrobial peptides that might be found in some of the new species. So new species of amphibians are being discovered all the time in remote places where no one has been. And if we don't understand some of those potential pain killers or antimicrobial agents that are in the biological medicine cabinet, then it's lost. It's lost forever. So I think that is another reason besides their own inherent variety and beauty for maintaining amphibian populations.

Clark Buckner: You know, we're living in an era of reckoning, the real-life This is Fine meme. The room is raging with flames all around us. But what about when Dr. Ziegler and Dr. Rollins-Smith look out onto the horizon?

Dr. Louise Rollins-Smith: The youth movement partly promoted by Greta Thunberg, if I'm saying her name correctly, is really giving me some hope that there's a lot of recognition among young people that there is a climate crisis that the adults really need to pay attention and take greater action. And I hope that encourages them to develop careers in science so they can begin to help find the solutions, whether they're technological solutions, trying to figure out how better to trap greenhouse gases, or how better to preserve green spaces so that those green spaces continue to trap more greenhouse

gases. I hope that they will continue to be encouraged to go into research careers involving biology and science and technology.

Dr. Carol Ziegler: I'm a gen x-er, we're all kind of cynical. So the people I see coming up, the nursing students now, they're really devoted. And the youth generally, I think, have a really strong mind for justice and don't want to see us keep repeating the same mistakes we've made. It's like either we're all going to rise or we're all going to sink together. If you read the old texts that Florence Nightingale wrote on Notes on Nursing, it's all about air flow and air quality, and the clean environment, and do they have access to clean water. So it's always been part of what we do.

I think the difficult thing for most people is connecting this very abstract notion of planetary health and climate change to what do I feel like today, right? What's happening to me today? And that's where I think nurses play a really interesting role. We do it with things like cigarettes and cancer, right, what you eat and your health. So I think being able to say in this community, this number of people, they're exposed to heat, they work outside, or they have poor air quality and this is what is actually happening to their children because of their poor air quality. So being able to meet the person at that intersection and then also then advocate for them more broadly, especially in the policy arenas, I think is really where we have to start showing up more than we happen.

Clark Buckner: Many people are already up against obstacles and everyday life. It's those social determinants of health that are already challenges to being healthy. Climate change is the ultimate social determinant of health, which is why it's time that this global weirding is a variable in decision-making. The Washington Post recently explored what extreme heat does to the body and parsed what will be habitable. Dr. Eva Parker, a Vanderbilt dermatologist, presented this year about how rising skin cancer rates can be attributed to the effects of climate. For medical professionals, their jobs will change not just in terms of what conditions they treat, but they're going to be caring for patients who are up against staggering challenges. Let's hear why our guests say it's time to give climate change a seat at the table.

Dr. Carol Ziegler: The main one for us on the frontline is to optimize your patient's baseline health, all of them, right? And I jokingly always tell my students, I asked them, "What's the maximum life expectancy for humans," and they'll say 80, whatever. I'm like, "It's 120," right? So with the right care and environment genetics, we can all make it theoretically to 120. So then, I always tell them if your patients don't make it that long, you fail. You failed your patients.

Optimizing health span. So if we think about if my life expectancy is 92, which it probably is, and folks in my zip code is in the 60s, that's 30 years I have to earn money, right, be with my kid, accumulate wealth, all these things. So to make sure that all your patients, all the folks we take care of, the humans we take care of, we optimize at every visit their baseline. So that means we're talking to every visit about diet, exercise, stress, sleep. What is your community support looks like? Do you have insurance on your house? Those sorts of things, we don't think about, but that matters. Is everybody vaccinated? I know

when we had the floods, we had a lot of patients coming in that needed tetanus because they just didn't know if it was up to date and they had stepped on something in their house, in the flood. So optimizing that baseline health is number one.

Number two, I think, is really getting the health sector to stop emitting such high levels of carbon, right? So if we're claiming we do no harm, we really have to get that under control. And now, it's going to take joint commission, it's going to take accreditation bodies to come in and say, "What are your emissions like, and what are you doing to get them down?"

And then, I think most importantly is educating each other, so students, other providers, about climate and the impacts, getting our professional organizations like the nursing associations. There's already a couple involved. Really, to collectively, with a baseline, is that everybody is onboard and talking about climate change, not just these one-offs around the country. And then, having nurses and physicians and frontline providers really at the tables. We're not at the table that we should be and talking about this everywhere we go. Making sure that every Senate committee hearing knows there's a nurse or a physician. And I always also tell my students like, "We need to get us, you folks that were in positions of power, in office so we can be making these decisions at high level."

Dr. Reed Omary: I think people are much more open to it, and there are a variety of reasons. I think, ultimately, the recognition of how the pandemic affected us all gives us sort of a touch point to benchmark for us to say, "What happens if we don't plan for what would fundamentally is the inevitable crisis of climate change?"

And the youth are our future. Love the energy, love the values, and wanting to make the world better. I think any way that we can serve to empower our youth to benefit the world, we should. And this is something where, fortunately, we're seeing, as this happened many times before, we see youth leading movements, social change. This is rock and roll focused on the planet, and that's a great place to be. So whether or not a given business is willing to consider climate change, whether or not a given individual is, it's going to happen. It's just a question of how fast individuals or organizations can go through the five stages of Elisabeth Kubler-Ross in Death and Dying and come to acceptance. The faster we come to acceptance, the faster we are able to pivot.

And I think more importantly for our future, the better off we are at recruiting and retaining the top talent around. It's going to be really hard, I think, moving forward to try and hire 20-somethings, the teenagers of today, if we stick our heads in the sand regarding climate change. And from a really practical perspective, I can say in almost every sector right now in the United States, there are staffing shortages for whether it's hospitality, whether it's healthcare, whether it's service. All of those are having staffing shortages. So within those industries, we really need to think, "How do we recruit the top talent?" So even if a leader in a particular organization, they don't really care so much from a values-based or a philosophy regarding climate change. It's a good business decision to be concerned about it because this is going to be essential for hiring our future.

It's really easy to succumb to the fallback position that me, as an individual, "I can't solve this. I can't fix this." If I'm in an organization, I'm just one organization, how can I possibly impact the world? Much of that is what I would just say well-intentioned binary thinking. It's all or none. The world's not structured all or none. There's plenty of in-betweens. And so, I think a classic way to dismiss climate change is to say that any one thing that I do as an individual or as an organization is just adding a drop of water into the ocean. And so, why should we even bother? I think that's absolutely the wrong way. And instead to really tie it to who are we as individuals, why are we here?

We have a connection to others. We have a connection in the planet and we have a connection to every subsequent generation that's going to follow us. And this is our responsibility to do anything we can because if we collectively add up all of those changes, we start to do something substantial and we find ourselves in a community that is larger than ourselves. We certainly know in the United States the notion of individual freedom. Individual freedom is wonderful and, because it's not or, and being part of something bigger than ourselves is it's incredibly powerful. I mean, think about how many people are a part of communities in the spiritual religious realms. There's something quite powerful about that.

Clark Buckner: Just like we all contribute in different ways to our communities, we all play different roles in contributing to climate change and taking steps to mitigate our footprint. We may think of our neighbors as the people who live right around us, but we're on this planet together and we've got nowhere else to go. What's the takeaway? We can't go solve this in a day or even a decade, but don't get stressed and to complacency. What if we changed the way we talk about climate change? What if we said, "What about that climate change," instead of, "What about that weird weather, huh?" That's of course a silly conversation piece, but climate and carbon footprint and sustainability, as we've heard today, are already woven into the wellbeing of our existence. So let's find ways to weave it into our conversations and our lives personally and professionally.

Dr. Carol Ziegler: I think the main thing is just that I always like to double-click on the justice issue. So just making sure that folks really understand that there's a significant population that we all think of as people use words like marginalized or underserved or all these labeling, boxing in words, who actually are extremely green and they don't get any credit for it, right? So most of the folks I take care of take the bus every day, like I said, before they leave. Eight, nine people in an apartment, they often have their power cut off. So they're super, super low emitters because they're not driving a Prius, right? It's like they don't get that crunchy credit for the impact and they're bearing it literally with their bodies and their children. So I think piloting that. So those of us that are even involved with the issue really realized as much as we're talking about it, which is great until we can lift all boats, let it sink. I mean, it's what I would say just because it's really so inequitable the way that it's painting out.

Dr. Reed Omary: Well, I think we need to advocate for our patients. We need to advocate for the families of our patients. We need to advocate for our children. Maybe what the traditional notion of a physician taking care of that one patient at that one moment that they're in clinic or in the operating

room, that will continue. I think we want to expand that and ask as a physician, "What is the way I can impact the greatest number of people possible?" I will always continue to see those patients in clinic or in the operating room, and I will do everything I can to improve the wellbeing of everyone in our community around the world. And this gets to the United Nations Sustainability Development Goals, understanding the relationship of climate change to equity and health around the world. And it should be something that we all consider and it comes to the core values of being a physician.

What if physicians, as part of their training, were taught how to advocate for the critical social concerns that affect everyone? And what if, as part of that training, that physicians were taught how to advocate to make the planet better, to make the world better for those around them in ways that may not directly impact the care of a patient at a given time, but may impact the future wellbeing of that individual, of that person? So we shift from a concept of physicians focusing mainly on healthcare and thinking about physicians as also focusing on the health of individuals, communities, and the planet.

Clark Buckner: We appreciate you joining the climate episode on Vanderbilt Health DNA: Discoveries in Action. Climate change is an existential threat that we all have to respond to. On our next episode, we're going to hear from people who work to make sure, as a population, we have the right weapons in our arsenal to beat back pathogens. One thing is for sure, COVID and SARS-CoV-2 are going to be around for a very long time and we're going to need a lot of expertise. To learn more about the show, check out episode extras and find out more information about Vanderbilt Health and today's experts. Visit listendna.com. You can also find us on Twitter, @UMC_Insights, and on all of your favorite platforms, @VanderbiltHealth. And of course, don't forget to follow, rate, and review the show anywhere and everywhere you get your podcasts like Apple Podcasts, Google, and Spotify, we're there.

Until next time, Vanderbilt Health, making health care personal. As a reminder, Vanderbilt Health DNA: Discoveries in Action is an editorialized podcast from Vanderbilt Health that isn't meant to replace any form of medical advice for treatment. If you have questions about your medical care or health, please consult your physician or care provider.