The Brookings Institution
Center for Sustainable Development

and

The Rockefeller Foundation

17 Rooms Podcast
"Digital health tools for pandemic preparedness"
December 28, 2021

Co-Hosts:

John McArthur
Senior Fellow and Director, Center for Sustainable Development
The Brookings Institution

Zia Khan
Senior Vice President for Innovation
The Rockefeller Foundation

Guests:

Steve Davis
Senior Strategy Advisor and Interim China Country Director, Bill & Melinda Gates Foundation
Lecturer, Stanford Graduate School of Business

Pardis Sabeti
Professor, Center for Systems Biology and Department of Organismic and Evolutionary Biology, Harvard University
Institute Member, Broad Institute

Episode Summary:

In this eighth interview of the "17 Rooms" podcast, Steve Davis and Pardis Sabeti discuss the uptake of participatory digital health tools for pandemic preparedness and response. Davis, senior strategy advisor and Interim China Country director at the Bill & Melinda Gates Foundation and Sabeti, professor at Harvard University, moderated Room 3 focused on Sustainable Development Goal number 3—on good health and well-being—during the 2021 17 Rooms flagship process.

MCARTHUR: Hi, I'm John McArthur, senior fellow and director of the Center for Sustainable Development at Brookings.

KHAN: And I'm Zia Khan, senior vice president for innovation at The Rockefeller Foundation. This is 17 Rooms, a podcast about actions, insights and community for the Sustainable Development Goals and the people driving them.

John, one thing that's been so frustrating about COVID is how hard it has been to get good information or good data to inform decisions, whether these are decisions governments are making or mayors and cities or even just individuals. And it feels like there's a constellation of tools that could be useful, but they're not all coming together. We have some colleagues who are setting up Pandemic Prevention Institute to help address part of this challenge, but it's a real big problem. We don't have something that we use like we do for managing how we dress for the weather or buying homes according to house prices. It just feels like those tools should exist.

MCARTHUR: One of the challenges in a pandemic is that the big picture of what's happening in a society connects so directly with the very micro picture of what each individual is seeing and doing. And we've seen that there's a real problem in how people and individuals are interfacing with the big institutions and vice versa. And the information seems to be too often too crude or the instruction for people to act upon. And then if the information's too crude, then the individuals don't feel trust or agency. And so, part of the big challenge of pandemic avoidance is to develop better tools. Don't just refine information but give individuals better agency to share information and absorb information in a way that interacts with how the big public institutions are tracking information and in turn, sharing it back to the community.

So, this is in many ways, when we're talking about vaccines and treatment and so many other parts of pandemic, this digital tool question is perhaps overlooked. And in today's episode, we're joined by Steve Davis and Pardis Sabeti to learn about their efforts to increase the uptake and investment in participatory digital health tools for pandemic response. Steve Davis is a senior strategy advisor at the Bill and Melinda Gates Foundation and lecturer at Stanford Graduate School of Business. He's led many organizations in the nonprofit and private sector driving innovation. Full disclosure to our listeners, Bill and Melinda Gates Foundation is also a financial supporter of Brookings. Everyone's opinion expressed today is their own party.

Pardis Sabeti is a professor at the Center for Systems Biology and Department of Organismic and Evolutionary Biology at Harvard University. She's a computational geneticist with expertise developing algorithms to detect genetic signatures of adaptation in humans and the microbial organisms that infect them. Just one example of her many accomplishments, Pardis was named a *Time* magazine's Person of the Year in 2014 for her work sequencing the Ebola genome alongside other Ebola fighters.

Pardis and Steve co-moderate Room 3, a working group for SDG 3 on good health and well-being in this year's 17 Rooms process. For new listeners, 17 Rooms is an approach to spurring action for the Sustainable Development Goals, or SDGs. It convenes 17 working groups, one per goal, and asks them to focus on an area within an SDG that's ripe for action and to define some concrete next steps that can be achieved in 12 to 18 months to make progress. Zia, so much complexity, so much to dive into.

KHAN: And what's fantastic about our co-moderators are not only are they amazing innovators and think hard about innovations that will be useful to people, but they also think about how the use of those innovations can build trust and build new knowledge. Pardis and Steve are co-moderators of Room 3, the working group for SDG 3 on good health and well-being. This is their story.

MCARTHUR: Hi, Pardis, welcome to 17 Rooms.

SABETI: Hey, John, it's great to be here. Thanks for having me.

MCARTHUR: And Steve, so nice to have you here too.

DAVIS: Hey, John.

KHAN: Well, thanks again to you both for all your leadership and work and for joining us here today. And I'd like to start by asking you your story. How did you come to be working on health and how did you come to 17 Rooms? Maybe Pardis, we could start with you.

SABETI: Sure. How did I come to be working on health? That's a big question. But I was an immigrant refugee daughter from Iran whose father gave her a big opportunity, he said to me, "Sweetheart, you can be whatever you want to be. The world is yours, a doctor or lawyer, you can choose." And then he laughed, but he meant it. And my sister became an attorney, and I became a doctor, and neither of us actually practice classically. But we use our degrees in various ways.

So, ultimately, I was somebody who always wanted to help make the world better through science and thought originally when I went out and did an M.D. that it was going to be through practicing medicine but recognized through a circuitous path where I actually met John at Oxford, ended up getting a Ph.D. along the way, and realized that the way I could make a bigger impact is actually through research.

And so I've been really interested in a long time around the interface of science and medicine and have always been interested in infectious diseases. Just the microbes themselves have been fascinating to me. And the research I did in my Ph.D. really was at that edge of humans and pathogens. That's a little bit of how I came to be here.

Ultimately, what got me to 17 Rooms is that I was in the space, I know John well, John's one of my dearest friends in the whole world. And so I was delighted to kind of engage, although even John can't get me to take on another responsibility by himself. But when I heard about you, Zia, and when they said your co-moderator is Steve Davis, I was like, I'm in, let's do this.

MCARTHUR: Well, Pardis, you've outed us as friends, so that's totally cool …

SABETI: … Yeah, I know a lot of things about you ...

MCARTHUR: … It's true, we are friends. But I think maybe for those who haven't had the privilege of knowing you for years that I have, it's really interesting this bit from evolution, which I remember years ago you were saying how the questions of evolution are so

profoundly motivating to you, to these questions of epidemics and disease and even digital stuff. You've gone very, very big to very, very practical. Just for our listeners, what's that quick journey?

SABETI: The kind of work I've always done has been at the interface of math and biology. And I've loved math since I was a little girl, that's more my thing than anything else, but I've always been interested in that interface with nature. And so biology is mathematical information. And ultimately, my Ph.D. was really around what we call computational genetics. It's around using algorithms and different tools to mine data looking for patterns. I love looking for patterns in data, that's like my favorite thing to do.

And so ultimately, my Ph.D. was around looking for patterns of natural selection in the human genome. And when I've developed the test and I ran it, a lot of the top things that popped up were receptors for various historical infections, including a gene that was critical for a hemorrhagic fever virus called Lassa that caught my attention. And it was a thread I was pulling, and I was like, what is this and what's this about? And at the end of the day, microbes are one of the strongest drivers of our evolution, and they themselves evolve, so they're fascinating from that standpoint.

So, I got more and more into studying the genomes of the pathogens themselves, and then having to be out in the field to do that work, and then recognizing that it's not just genomic technology that we need to be better in order to combat against pathogens, but information technology. We're in the genomic information age and it's a really special time and a unique time to try to combat these large global problems, and pandemics being a major existential threat. And so I think for me, that's a little bit of that journey, because I like math, I like biology, I like the intersection between the two. And when you're dealing with pandemics, I think those two are core to our ability to respond.

KHAN: And Steve, I would like to ask you the same question recognizing that your person is usually on multiple journeys at the same time. But if you could just share your story with us.

DAVIS: Yeah, well, thanks, Zia. And yeah, my career is a bit more of a pinball machine than anything else. But I started human rights activist *cum* civil rights lawyer *cum* Chinese scholar *cum* digital media startup guy, social entrepreneur, teacher, professor. I have had a number of journeys. But I guess why I ended up here in the digital health space more and more in the last two decades is I was very fortunate to be part of the early internet days and helped build and ran what became a fairly large global digital media company. So, I got fully engaged. And I'm not a technologist, I'm not a doctor, but thinking about the power of new tools and new technologies, that led me to actually running the social innovation practice at McKinsey. And then becoming the CEO of one of the largest global health innovation NGOs in the world, PATH. And there again did a lot in the digital health space.

So I guess it's a convergence of two of my journeys. One is my work in global health and innovation and then my work in digital health and digital media. And I just see the power, a and truly transformative power, of using effective data and digital platforms over the next decade to impact health, particularly in lower- and middle-income countries, is something I'm extremely excited about. I know there's a bunch of challenges, but that's where my passion is in part right now. And as a result, I also have been co-chairing for Dr. Tedros at the WHO the Digital Health Technical Advisory Group. So, I've come to it circuitously, but it's sort of a convergence of a lot of cool things.

And then 17 Rooms—through all that work, I engaged with The Rockefeller Foundation and Brookings a number of different ways and times. And then a few years ago, I was asked to be in one of the first 17 Rooms, but actually on SDG 3 on empowering women. And that was a great experience. And then I was then asked to join this one as well to help co-lead it. And I didn't know Pardis before, but I was so thrilled to get to co-chair with her and really, I've just been able to follow in her draft because she's doing some really cool work in this area.

MCARTHUR: It is so interesting to hear your respective paths converge in science and practice, innovation, business. And just as a footnote, Steve, I think you're so focused on SDG 3 these days, you started in SDG Room 5 on gender equality just for our listeners, which is another terrific episode in this podcast series coming up in a bit. But on this question of Room 3 this year.

We are all living amidst this pandemic. We're going from wave to wave wherever we live in the world. It doesn't feel like it's going away anytime soon. There's discussion of whether we go from pandemic to epidemic, so much is talking about vaccines, testing. How does the digital health piece fit into this? Is this the big piece that is so big no one's talking about it? Or is this like a crucial link in the chain? How do you recommend we think about this digital piece of the puzzle?

DAVIS: So, the pandemic has tragically, because it has been such a global tragedy and affecting so many lives, but it's tragically exposed both the extraordinary power of digital tools and data and exposed some of the big gaps and some of the big challenges we have. So, sitting in the perch as an advisor to the WHO in this area, it's been extraordinary, I've described it in a number of articles, like this firehose of innovation that we were on the receiving end of. Primarily product innovation. But if you think, every aspect of this pandemic has shown up digitally. I mean, obviously, our lives have turned virtual, and our family gatherings are virtual and online schools are virtual.

But in health, it's extraordinary to see the, both from contact tracing and better population modeling tools to telemedicine capabilities to reach people when they couldn't come in to see a doctor. And the innovation has been robust. And also, I'd say, unique against prior periods because it's not only been the quality and the quantity, but there's been a lot of collaboration across public, private, and social sectors in this work. So it's been possibly one of the most exciting times to be in this space.

That said, despite all that great innovation, we still saw enormous challenges where the best innovation didn't get to the people that needed it the most. That a lot of country and subnational health systems didn't even know what tools they should be using and didn't have the access or the funding or the mechanism. It's a vacuum, a desert of policy, good policy and good governance in this area. So there's a huge gap around understanding what's available, the ecosystems are fragile, there's no clear policies on data governance, on digital privacy, on managing disinformation. So, I guess the bottom line here, and what led us to sort of think about this work, and the work that Pardis could describe more, is with that broad framing of that the pandemic has exposed so much opportunity and yet it has exposed so much work we have to do now.

So, a number of us are rolling up our sleeves and talking about, okay, how do we come out of this with better mechanisms to get best tools to the people that need them the most? How do

we start structuring being more innovative in policy, not just innovative in products? And then how do we develop better ecosystems that support and understand the nature of these tools? And then specifically—and then Pardis can describe what we've been thinking about—how do we take one slice of it and start building some prototypes in some ways that people can get more comfortable with particularly the tools that require or reflect people putting in information about themselves, and how does that become something that we get more comfortable with, because it's extraordinarily powerful.

KHAN: I'm curious to pursue this a little bit, which is the supply and the demand of digital tools and health. And there's always been some questions about that, how to best make the market for digital tools that will both be innovative but also useful in the field. And I feel like during COVID and the pandemic times, just the speed at which all of the digital tools were getting thrown at people, the need and the urgency with which they need to be deployed to solve this new problem. I'm curious, Pardis, what your perspective on that would be?

SABETI: As Steve talked about, there is a huge opportunity in digital health, and I'm 100 percent behind it as well. Ultimately, having gotten my M.D. and spent time in the wards, it's clear to me that in all of medicine we don't use data enough, that essentially, it's an interaction between you and your care provider. And oftentimes they're not even taking notes. So, they go outside, and they try to remember the conversation, and they write down a stream of consciousness about what they kind of heard from you, relay across what they remember from the conversation with you, what they remember from the patients that they saw, the limited number of patients they have seen, and are trying to make a diagnosis. Where it's like, Hey, there are thousands of people every single day, millions of people that are coming in with this. If we took this and really made this a larger data problem, we could solve this more quickly. So that's why digital is important to all of health, all of Room 3.

But then when you think about an infectious disease, there's another piece of information that is highly relevant that we can capture, which is your network. So it's not just that you have these symptoms at this point in time, but it's also that you ran into your friend Fred, who also had those symptoms who was in a car with somebody else. So all of that stuff matters. We don't use data enough in medicine and in infectious disease we don't use this added really potent layer of information, which is a network.

And so it's clear that this is a great place to start to thinking about digital health. And it's on principle obvious that rapid information, when you see the way contact tracing works and just how slow it is and painful it is and how seeing in the blind everybody is doing it, it's clear that that happens.

To get to your question about this supply and demand, who and how, that's the tricky part. It's interesting to me when we talk about all of the privacy concerns, the companies are tracking everything about us and then people are going on TikTok and letting companies track their every movement and every sound. But yet when you talk about privacy when it comes to a pandemic that could kill us all, everyone gets really startled. To me, that just shows you how deep the mistrust is of government. So, I think that when we talk about how to interact, it's really that we have to go slowly.

So, I was actually building Bluetooth-based contact tracing apps years before the pandemic struck. I started working at Harvard trying to build an app that the students would use, and we called it the Facebook app for outbreaks. It also should start within a close-knit community

where you can get enough buy-in that everyone like, it's useful for them because if one person in every neighborhood is using it, it's not useful. But if you actually start using it in places where everyone is using it, it becomes useful.

And so we were building those. But actually during the pandemic, we continued to build those, but we really scaled back how we approached it because we really thought about, how is it participatory and voluntary as opposed to required? And so I do think that's the world we're going into. But I think each step, there's gotta to be pilots and work with communities and work with all different groups of individuals and really an understanding of how it works. That's sort of where Steve and I came to together in this study in this SDG, in this Room, as we both recognize the power of this approach, but also recognize the hurdles to get to where we needed to go. And a lot of where we were focusing is essentially how to implement, how to engage, how to make sure that we perceive ahead of time all the pitfalls that might emerge in the process.

MCARTHUR: Can you explain for those who haven't got familiarity with participatory digital health tools, what does it mean in practice? Is this, I tell you if I'm sick? Is it, I just find out if my friends are sick? What does it actually mean? Is it all in my phone? Give us a sense of the practicalities if you can.

SABETI: Participatory in my mind, and that was actually something that Mark Smolinski was pointing to in our Room, is it's got to be something that's useful to you.

So when I was working in Nigeria, and I was studying this very specific disease, Lassa fever, and I was trying to figure out the biology of Lassa fever. But in order to do that, my colleagues and I set up the ability to do diagnostics for Lassa and then make sure that the treatment that was needed for Lassa was there. And what we found was by just solving one problem for this community—this one disease that they were really worried about where people would come in and they wouldn't know if they had it, and if they did, they wouldn't have the treatment—any person that got sick started seeing the hospital as a place where you could get answers and solutions. And so more and more people came.

And so even though we were not doing surveillance, we ended up having the largest catchment of fevers of unknown origin than anybody around. And basically, our hospital became a reference center for the whole country. And what we started to realize is if you even solve one problem for people, they will come to you. So all these other groups are doing surveillance, but they weren't having as much success because they were like, Hey, tell me something. It's like, No, no, no, the way you do surveillance is you actually give people the information that they need and then they'll give you more. Right? And so when we think about those types of apps, we think, what are the questions you have? Like, I have a cough and I don't know, is this a small thing that I'm going to be okay with? Or should I prepare myself to be down for a week?

These are the questions people have. So if you can just answer that question and say, Hey, I've got a cough and my lymph nodes are a little swollen, five other people in your network have just said mumps, you probably have mumps, go get tested. Right? Something that's useful. And so that's how I think about participatory is really thinking about the customer in mind as opposed to the customer being the government. If the customer is the government, nobody's going to want to participate. If the customer is a person and you're giving them

something, a resource they want, they might engage. So I think that's how I would think about it.

KHAN: Built into the notion of participating is sharing information and sharing data. And I want to come back to something you just mentioned around privacy, and I think this notion of privacy plays out so differently in so many different arenas. And Steve, you've been in so many of these different arenas. I'm curious about your take on privacy in the context of the pandemic, but also in the context of what you have been advancing in the Room and the practical actions that the Room is recommending.

DAVIS: Well, thanks for asking that question, Zia, because I think despite, as Pardis says, the opportunities that we see for advancing participatory tools and digital health all around, one of the biggest stumbling blocks that we have to address is our privacy and legitimate privacy concerns. And it's, of course, a larger issue in digital tools writ large, whether you look at social media or other things, and it gets particularly tricky when you're dealing with digital and health, where you've got both health privacy concerns and laws as well as that that the nature of using people's data from digital tools.

And by the way, the participatory tools are not only in infectious disease, but they could be used for chronic disease management, we've been using participatory tools in some parts of the world for TB management. Other things where people's day to day behavior gets captured and recorded and then fed back to them and said, Look at here's what you need to do next or here's what you should do or maybe here's what your neighbor might do. These are the kinds of tools that are so powerful. But of course, it means that you're giving up some information about yourself.

Now the irony, and you can make fun of it, is the fact that we give far more information up every time we probably put a credit card in an Amazon purchase or that we do a lot of other things, go on social media—we're sharing a lot of information about ourselves. But because this is a health issue and because this seems to expose people to a lot of concern, they don't want people to know their health condition, they don't want their situation or location tracked, et cetera.

So the privacy thing is one that we have to balance to say, What is the level of information we're going to be sharing? How anonymous will it be? How will it effectively be used? How could it be misused? And I think when you start walking through it from just a black and white privacy or not, but through a more careful analysis and education process, people start saying, Oh, I see, you're really not going to be sharing my day-to-day movement with the public security bureau. You're trying to just understand a few things about me to help my community know about health issues. I think we can make a pretty good case. But that's at the core of our proposition actually in this Room project this year, is to say we need to actually start to build a stronger global process and a thought process around what privacy means in this context. How do we get people to understand it, had do people get to see the value of it, and also a little bit of value versus the risk? Like, okay, in a pandemic, there is a certain set of tradeoffs the community has to make, families have to make. And if you can see the value proposition of these tools, you might be willing to share more, knowing full well that in some parts of the world—and I happen to work in a lot of those parts of the world—that this information can be misused by authoritarian regimes and other issues which we've got to be thoughtful about as well.

MCARTHUR: I'm thinking in this conversation in a new way about all the technologies that could be merged. It's like your sports watch or your Apple watch or your Garmin or whatever with your Facebook account, with WebMD, all being in the same place. You've got the clinical assessment, biometric data of some form, and the social graph. This is such a big set of issues and, Pardis, you mentioned that you were working on this for years before the pandemic. What did your room decide to do next? What are the types of things that you came up with as good next steps? Which is always our basic question. Don't tell us what perfect looks like, tell us what might be done next to move the ball forward.

SABETI: Our Room—it was a really terrific group of folks. I always tell Steve I could listen to you talk all day long. It was so fun and delightful to get to co-moderate with him and to have him as a thought partner. And so, I'm grateful to you all for making that happen. And everyone in the room, it was just really a fun experience to have different people who have each been in this in some way for a really long time thinking about a different piece and together start identifying.

So it's difficult, right, when you think about this, because whenever you bring any kind of Room like this together, it's a challenge because every person in that Room you selected because they're very busy and they have a mission that they have. And then so how do you get them all to, like, get excited about somebody else's project? I describe it as like an extracurricular in a way, right? You don't want it to be an extracurricular. You want it to be the main assignment. And so I think for us, we were trying to figure out how do we make whatever we do be everyone's main assignment. And that's sort of why we focus like not on any specific technology, but essentially how do we get all of those technologies out there, and how do we kind of break through the cultural challenges of making that possible.

So, one of the things is that I and others have been thinking about a lot of work in the field, like my own group has developed this simulation that simulates a virtual virus via Bluetooth, so that you don't have to learn how to use an app in the middle of an actual outbreak, but that you actually can see what it would look like to have such an app in a virtual outbreak. And we have run this for years at schools all around and conferences, and it's fascinating what you can learn from that. I mean, most of the simulation really mimics real life. We've had immunity passports since 2017 in our games, and we've seen military altercations, and vaccine shortages, and all these things, we saw them all play out of these simulations.

And so one of the things we've been thinking about is how we could create these simulation opportunities for different developers to come together and get to test out their technologies in the setting where the communities can see what they do, where global leaders can see what they do. I mean, I think even a lot of global leaders don't actually understand what is the value-add. Right? They can kind of get it—yes, you know, data is always good, but like how and why. And ultimately the other pieces of it were really around like, how do we also have those kind of educational engagements and simulations? And then also, how do we then create opportunities for different app developers to create a standard practice of, okay, you have a new technology, how do you get it into this community, and how do you move it forward?

So, rather than every person developing a technology, be it an app or be it a diagnostic or anything, could we form a path where our goal is to just advance anybody's technology and development? And so I think that's really where we started focusing on is like, is what does everybody in the room need and what could we collectively do that helps advance everyone.

Essentially, we're trying to figure out what are the pain points and how we can we help resolve them. And then in line with the goals of this year, really also focusing on figuring out how to get vulnerable populations and women engaged, recognizing that any of these technologies always can drive further disparity in outcomes. And so how do we actually use it for good? It's so potent. Like so many times people go out with good intentions and create these different tools for good. And if you're not really looking around the corner, you can really create a lot of problems. And so I think we just want it to be focused on that of how do we get these things out in the world in the right way and engages people, but also we are being thoughtful to all of the challenges both perceived and those that are real.

DAVIS: And I might jump in first of all, to continue the love fest here. It was more my pleasure to get to know Pardis and her team— and by the way, with a great team behind her, too, we were blessed with folks from her lab to really help us on this—but to work together and particularly because they have been doing this work on educating schools particularly. But with this app, we did decided not to only focus on their app, but to use it to leverage that for sure, and use it as a way to start exposing people to the opportunity and the risk, et cetera.

So, concretely, we hope to be able to continue to advance that to set up a demonstration project or have a real live experiment at some global gathering, whether it be eventually at a Davos or somewhere like that. And there's some effort to coordinate on that. There's also a piece of our work, which is to create more the connectivity between what the tech community and the innovators need and the communities need on this. So sometimes these apps that have been made with great innovation, but not necessarily a great understanding of the market that they're trying to affect. That's a classic problem in technology, as we all know, but we think that can be acutely so in this area. So we've talked about more market influencing, market making and shaping by virtue of deeper connectivity.

And then we also provided some ideas, a bit of a phase two. Maybe someone else takes them on, but things that we think would need to happen to truly create a more vibrant ecosystem around these kind of tools, including understanding there's so much about trust using these tools, and we don't have a very good read yet on how that trust on these tools might differ, and what are the underlying issues that differ between, say, gender or race or different types of community, how they may perceive such tools and why. We already know that there is some research that's been done to show that there's certainly a difference, and certain groups trust the government more than others, et cetera. But taking that deeper specifically around participatory digital tools would be a very useful piece of research that people could advance. So, we do have some suggestions for going forward.

MCARTHUR: Zia, I'm going to ask you to put your innovation hat on for a moment because just taking a step back on what we're hearing, there's a product aspect of this. There's a infrastructure aspect, there's an ecosystem aspect. How do you map what Steve and Pardis are both describing into the broader efforts around, whether it's health or innovation writ large, for sustainable development?

KHAN: Well, what I love about simulation tools in general is they give people practice in solving problems that will come up in the future. And when we used to do a lot of work on climate resilience and disaster resilience, just having diverse groups of people work through a simulation helped them learn about patterns that could emerge and build relationships that they would draw upon in the future. And so I'm really hopeful that this kind of tool will

overcome those kinds of barriers because I think what we saw with the pandemic was it was a pandemic of information as much as it was a pandemic of a virus, and people just didn't have the basic facts or reacting to the facts. And just getting your arms around what exponential growth really means is something that has to be reckoned with.

So that's my view on the innovation side of it, John. And I'm curious, just building on that, if we could think about, let's say—and I'm sure will be this tour successful—we roll it out next year, you have a few demonstrations. If you could project concretely into 2030, what would be different in the world if another COVID-like pandemic were to emerge? What would this simulation tool have changed that we could visibly and concretely identify?

SABETI: So obviously, take what I say with a grain of salt. But the reason why in the middle of a pandemic I've spent so much time thinking about this and before that as an infectious disease researcher, while this has been something really important to me. So the origins of this is because it's a tool for education. And at the end of the day, the way I often talk about it is that because of the exponential spread of a virus, one person has can launch a pandemic and therefore one person has the power to stop it. And unlike other existential threats to humanity, every person on the planet matters. Every person is needed to help stop a pandemic together. And so education is incredibly important in this regard. You really want to empower every actor in the system.

And so we started building this simulation tool, it was for middle schoolers. This was a middle school app. This was working with Todd Brown at the Sarasota Military Prep Academy. He was a civics teacher who wanted to teach seventh and eighth graders about pandemics. So, I helped advise him as he developed a two-week civics module. And then we thought about how to launch a simulation. And Andrés Colubri was a terrific post-doc in my group who was building actual contact tracing apps. And we thought, why don't we turn it on its head and use those apps to spread a virtual virus to make the game more realistic. So that was the thought process.

And right now we're in a partnership, our first big partnership is with the state of Louisiana. We are now in the course code for the state of Louisiana—we're really excited about that—as an elective course for all 11th and 12th graders across the state, where it's an education, it's a textbook where they're going to learn all about outbreak science and then throughout it, there's all these games that are played.

At the end of the day, like, what's so fascinating when you talk about, Zia, this issue that this was a pandemic of information, I'm like, but why is that? Because what I saw from where I stood is a lot of scientists telling people, "You're an idiot, take your vaccine." I mean, that's a little bit of a caricature, but it was something like that, right? Of like, "Trust us, we've got this." And we didn't have all the answers. We needed everybody to have answers and there's so much people could have done that they did not feel that they were given the agency or were empowered to do so.

And so ultimately, the simulation is just one piece of the kind of approach that we need, which is teach people, let them understand with you what you're talking about. When COVID hadn't hit certain schools before, how do you expect them to understand like the spread and all of that or what they should do? And we know how well people learn in games. Right? And we know that if you actually turn it into a game, people will do anything. It's quite

remarkable. Teenage boys will do calculus in order to win in some video game where they have points against their friends. And gamification is just a, it's a glorious way.

And I think that what was to us was remarkable is these middle schoolers, you should have heard the conversations they were having. The fact that they had immunity passports. The fact that a group of people then faked those immunity passports. You will just be amazed by different age groups, different cultures, different societies when we actually really work with them, how smart and how thoughtful they can get. But when you do treat your population like a bunch of idiots who should just follow scientists where they go, they will return as such. And I think that ultimately, in my mind, it's if you want them to understand why these are happening, give them tools and resources to do so and really engage with them.

So the simulation is just one piece. The world in 2030 I would love to see is that outbreak preparedness is part of all general education because at the end of the day, it teaches genetics, it teaches biology, it teaches public health, it teaches statistics. You actually can touch upon so many different things, it's kind of a remarkable thing. It's a little genome so you can get into genetics really easily. The stats are pretty straightforward, but really powerful, so you can get into stats. I personally think, and maybe I'm biased, that outbreak science is just something that could be a really great core curriculum around the world so that we understand that it is us against them and that we need to think together about how to solve it. And I think that if we really did embed that into the larger education and if all of our world leaders also experienced in some fashion, at least through simulations, if not the more education, that we can have very different conversations.

And t last thing I'll say, and sorry, I get really passionate about this, is that we talk about this is a once in a century pandemic, but we know it's not. We know that we've had four of these potential once in a century pandemics in the last decade, and that there are more and more to come, and the next one might actually be manmade. And the index case may not want to be found and maybe seeking to spread. And so the stakes are very, very high. What happens when the next COVID comes around? I was actually just in a meeting where Harvard was talking about the 1,746 cases that we've detected so far, and I was like, You do understand that then everything that we're doing here is a joke because if you had 1,746 cases and there was even a 1 percent risk to these college students, nothing you would have been doing here is effective. And I hate to say that this pandemic is not serious, it clearly is not serious for a lot of us if we are tolerating those kinds of numbers. We have to mentally prepare for that version of COVID where every person is literally afraid to go to the grocery store for their lives. And we're not prepared for that yet. And I think we really need to understand that as a population together and work through a lot more.

DAVIS: And Zia, I first of all say what she said. But then I'd add one maybe a bit more meta question that I think is important when you think of 2030, 2040, is in the profound opportunity for adoption of data capabilities and digital tools in our health systems around the world, for pandemic preparedness and response or anything more broadly, is going to be about sort of mindset shifts. I teach at Stanford the scaling innovation piece, and we know that without understanding the cultural and behavioral and mindset shifts, nothing gets fully adopted at scale.

So I think we're going to go through an interesting phase of trying to help people understand what data culture looks like and what that means, to whether you're empowered suddenly as a front line nurse in rural Tanzania to actually use the data that you've always been taking

down, but it's mainly been used to just report up to the central government and never have you been empowered to actually use that data, to people understanding that their own participation in some of these tools can actually have a profound effect on their community's health. And so there is a larger movement afoot, which I think we're all already participating in, and probably it's okay, we're not consciously thinking about it, but we need to be more intentional about this data culture shift and helping people understand what that means to them and what it means for their community because it's going to happen and helping people fill agency in that process.

MCARTHUR: It's quite compelling to hear a Harvard globally leading scientist question the role of scientific narratives in the pandemic, and also what you're talking about, Steve, and the need for an entirely different mindset or narrative shift, even though our business models, our conversations is quite profound actually and forcing me to think in a new way. I'm curious for our listeners, and unfortunately we have to soon draw this amazing conversation to a close, but for everyone listening, what's one thing you'd want them to take away from this conversation? What's one thing that you just think that it'd be so much better if more people knew based on what we've been discussing today?

DAVIS: The one thing I would say is—I have a whole chapter in a book I wrote last year about this—the digital revolution, while it has all sorts of concerns and potential negative impacts, it is net-net one of the most powerful things that will ever happen to human health. It's like every vaccine on steroids in terms of its opportunity to save lives and make better lives. And so we need to steer that. I'm not asking anybody to embrace it blindly or unquestioningly but find ways to understand the benefits of it and work with us to understand what we have to do to make that more powerful.

SABETI: Yeah, and I think I'll do a, "that's what he said." I think that's, absolutely, I agree with that. And I think that from that standpoint, I think the other thing to remember is, we're in a fight against a virus; that's the threat, that should be the threat. But all too often we're fighting against ourselves. And viruses are very good at exploiting, exposing the injustices that lie within us. They reveal it and they take advantage of it. And that ultimately, I think, I see that world that Steve says, I see the power of this technology, but we're never going to get there if anyone uses the data for nefarious purposes.

And so I think that's sort of why we found ourselves in our Room really focusing on how do we get that technology out there in the right way to people the way they need it, because I think that's one of the biggest challenges to its adoption. The technology itself is powerful and potent and doing what it needs to do and is on a path that we can see. But it's just how will it get laid out is the really big question. And, will we destroy ourselves in the process of trying to protect the planet?

KHAN: Well, I just want to say huge thanks to you both for this conversation and for the great work that you're pushing through in Room 3 to make sure that we have some really concrete actions and make progress on this issue. Thank you so much.

John, what was so fascinating to me about this conversation is often there's a way to look at innovations as tools that enhance what organizations are doing or make processes a little bit better. But what Steve and Pardis were talking about is the potential for innovations to transform how organizations can operate and open up entirely new windows for policies and processes.

MCARTHUR: And I think it's worth calling out, Zia, there was a bit of an anti-establishment vibe in the argument. And they're pretty explicit in calling out gaps in our institutions for not addressing the mindset of the individuals who need to be part of the solution in societies around the world. I can't get out of my mind this logic from the conversation that in a pandemic every individual matters. One person can start a pandemic, as Pardis said, and that means one person can also stop a pandemic. So, if we're going to think about digital technology and tools and how they interface with our public institutions, we need to think about the agency and the trust of every individual who's interfacing with these big, important systems. That's a generational point, ultimately. We have to think that their emphasis on new generations is going to lead next generations to look back on ours and say, what the heck were they thinking? Let's hope.

Well, to learn more, find this episode at Brookings Dot Edu Slash 17 Rooms Podcast. Coming Up Next, Room 9 with Lucy Harris, Sanjay Jain, and Liv Marte Kristiansen Nordhaug on a playbook for funding good digital public infrastructure. Very relevant to today's conversation, too. We'll see you next time.

MCARTHUR: I'm John McArthur.

KHAN: And I'm Zia Khan, and this has been 17 Rooms.

MCARTHUR: Our thanks go out to the guests you heard today, and also to the production team, including Fred Dews and Alexandra Bracken, producers; Jacob Taylor, associate producer; Gaston Reboredo, audio engineer, and Nicolette Kelly, audio intern. The show art was designed by Katie Merris. Additional support comes from Shrijana Khanal, Ian McAllister, Soren Messner-Zidell, Andrea Risotto, Marie Wilkin, Chris McKenna, Esther Rosen, David Batcheck, and Caio Pereira at the Brookings Institution, and Nathalia dos Santos, Sara Geisenheimer, Hunter Goldman, and Miranda Waters at The Rockefeller Foundation.

The 17 Rooms initiative is co-chaired by Zia Khan of The Rockefeller Foundation and me, John McArthur of the Center for Sustainable Development at The Brookings Institution. The Rockefeller Foundation generously provides support for the 17 Rooms initiative. The Bill and Melinda Gates Foundation also provides funding support to Brookings. All views expressed during this episode were solely those of the speakers.