Fixing Healthcare Podcast Transcript

Interview with Karen DeSalvo

Jeremy Corr: Hello and welcome to the Fixing Healthcare Podcast. I am one of your hosts, Jeremy Corr. I'm also the host of the popular New Books and Medicine podcast and CEO and Executive Podcast Solutions. With me is Dr. Robert Pearl. For 18 years Robert was the CEO of the Permanente Medical Group, the nation's largest physician group.

Jeremy Corr: He's currently a Forbes contributor, a professor at both the Stanford School of Medicine and business and author of the bestselling book Mistreated: Why We Think We're Getting Good Healthcare and Why We're Usually Wrong. His new book, Uncaring: How the Culture of Medicine Kills Doctors and Patients was published in 2021. All profits go to Doctors Without Borders.

Jeremy Corr: If you want more information on the book, and a broad range of other healthcare topics, you can visit his website at robertpearlmd.com. Together we also host the biweekly podcast, Coronavirus, The Truth. Next week, we'll be adding a fourth show to our podcast series, titled Breaking Healthcare's Rules. Our first guest will be Malcolm Gladwell.

Jeremy Corr: Our guest today is Dr. Karen DeSalvo. She has served as Google's Chief Health Officer since 2019. Before that, she was acting Assistant Secretary for Health, the National Coordinator for Health Information Technology, and the Director of the Office of the National Coordinator for Health Information Technology.

Robert Pearl: Hello, Karen. Welcome to the Fixing Healthcare podcast.

Karen DeSalvo: Well, hello, Robbie. It's great to be here. Thank you guys for having me.

Robert Pearl: Karen, you've had at least five careers. You're a physician. You've worked for the federal government, even a health commissioner, been a professor, and you've worked in private business where you are now. Which of these have you enjoyed the most, and which has been most frustrating?

Karen DeSalvo: Oh, well, that's a great question. It is true that I have had a really interesting professional journey. I think all of it, as I reflect, is about trying to understand how to bring health to people and recognizing, especially as I grew in my career, that health is more than healthcare, and that it takes other sectors to make a difference. I would tell you that what I carry in my heart and my mind every day is the clinical work that I did. I loved being a doctor. I loved the trust and the relationship I have with my patients.

Karen DeSalvo: I think it’s all been my favorite. I think I haven't hit a least favorite yet in the healthcare world. I wouldn't want to call out any of the opportunities because they've all been interesting and important in their own ways.

Robert Pearl: Let me ask you about your time in the government, when you were the Assistant Secretary for Health, the National Coordinator for Health Information Technology, and the Director of the Office of the National Coordinator for Health Information Technology. What are these roles like? What were you able to accomplish? What are your perspectives on how the federal government can help address the healthcare crisis in America?

Karen DeSalvo: I came to public service as a very direct result of my experiences after Hurricane Katrina in New Orleans, where I began to understand that caring for my patients didn't only happen in a healthcare system, Robbie, but there were all these contextual and policy issues that needed to be addressed as well into before I went into federal service, I was Health Commissioner in New Orleans, as you mentioned, which was a good training ground for me to understand the ways that government can partner with the private sector and with healthcare.

Karen DeSalvo: I was able to carry some of that thinking with me into my federal service and try to apply certainly at a national level, and sometimes globally, this partnership idea between government and the private sector. I never thought that government was going to have all the tools in the toolbox. I should probably tell this part of the story, too, Robbie, which is that I very reluctantly went into federal service.

Karen DeSalvo: I loved being health commissioner (in New Orleans). Really granular job, where you see the impact of your work, literally in your neighbors, and you talk to them in the grocery store. Federally, you're more distant from the people that you're impacting. I think also for me, I had really thought of myself at the time as being public health and community health-oriented and not a tech person. When they asked me to serve as the National Coordinator for Health IT, I declined.

Karen DeSalvo: Because I just didn't think I had the background and it wasn't really how I wanted to go deep in the next part of my journey. But that Kathleen Sebelius convinced me and helped me see that technology is not the endgame but a tool to health, and also gave me the opportunity to go there at HHS and co-lead the delivery system reform strategy, which was really important to me to help the country move to value, because it was one of those contextual issues, those policy issues that I not only saw affecting my care delivery before Katrina, but very acutely after.

Karen DeSalvo: Because if people don't have insurance, and if that insurance is focused on doing more and not doing better, it's really hard to build a strong system that's outcomes-oriented and could get us, in the New Orleans context, for example, out of generations of bad health. Think about how we could do that at scale for the country.

Karen DeSalvo: I love my government service. I carry the stories of my patients, my experiences at local and local public service. But also I saw it as an opportunity to apply the

tools of technology in other ways to value-based care, and then eventually to public health.

Robert Pearl: For the past couple of years, you've been Google's Chief Health Officer, what does that job entail?

Karen DeSalvo: We are defining it as we go. It's a new job. I was recruited here principally to stand up a clinical team that could work across the Google Enterprise to build up authoritative health information on our ecosystems that are things like Search and Maps and YouTube, where literally billions of people are looking for health information, and we needed to have a way that we could create a framework that would provide clinically great information where we could and then address misinformation.

Karen DeSalvo: That was always part of the remit of the role. But COVID really accelerated and also expanded the role. For example, it expanded the responsibilities of the Chief Health Officer to be employee health and safety, and medical support for things like benefits. We've been addressing COVID around the world for our employees, but also for communities.

Karen DeSalvo: The other big area that's evolved in the last couple of years is that now the Chief Health Officer has responsibilities not only for clinical, but also for regulatory and health compliance. I've built out a team that is addressing health equity as well. For me, it's a chance for us to provide company-wide support, and be the backbone of the strategic and operational thinking around the highest rigor, the most equitable, the most accessible clinical and health information for people, no matter where they are.

Karen DeSalvo: And to make sure that when they're coming to us, or when we want to reach out to them on various platforms that we're doing that in a way that certainly is a doc, I'd be proud, for the information I'd share with my patients, but I think certainly as a company, we want to make sure we're being trusted partners, for people and companies all over the world. It's a wonderful job. Can I tell you? I really have a great team. I'm really grateful for the work we get to do for people.

Robert Pearl: As you know, in season one of Fixing Healthcare, we had a variety of experts on the show, offering a broad set of solutions for all that ails our country. In the current season, we're asking individuals from each of the vertical slices to come here and explain how their piece is going to be a major contributor to solving the total, I'll say, portfolio of problems that our nation has. How will Google be that problem solver for the American healthcare system?

Karen DeSalvo: Well, let me start by saying that Google sees our opportunity in solving the challenges as doing that by partnering and by augmenting. Listening to your various podcasts, I would say that's been thematic through the way people have been thinking about the challenges that we face in health in America and really

around the world. I mean, it's that way we describe public health, Robbie, which is health is what we do together as a society to create the conditions in which everyone can be healthy.

Karen DeSalvo: First and foremost, for us at Google, we want to think about how we can be good partners to consumers, to their caregivers, and then to the communities in which they live. We want to make sure that we're providing information and insights, whether that's on their risk, in a hardware device, like a Fitbit, or more broadly through YouTube, we want to make sure that for caregivers, that they have the opportunity to take advantage of tools like HealthAI, to get to the diagnosis of cancer faster, or to the treatment of it better, or even the diagnosis of tuberculosis in Sub-Saharan Africa.

Karen DeSalvo: We can't do any of this work because health is more than healthcare without addressing community context. We also believe here that we have a partnering responsibility with public health, with social care, with other organizations that are thinking about how people understand the resources within their community for healthy food, or for green space, how we can be partnered to help understand the impacts of climate on health and disasters on health?

Karen DeSalvo: But also how do we provide tools to the public health enterprise to see the next pandemic coming and use novel signals for forecasting. Our expectation is that we will be addressing health broadly with healthcare, but also thinking about all the other inputs that affect people's lives, because at the end of the day, we're principally a consumer-facing company. It's the average person, and in their community that is coming to us for help, and that we also want to reach out to be helpful.

Karen DeSalvo: For us, I'll just say it again, it's not that we think we have all the solutions or tools, but we have some really good things that we can offer. We definitely want to do that in partnership with others, because it's going to take really all those sectors to make it work.

Robert Pearl: Can you tell listeners about a couple of the ... Say more details about a couple of the projects that you're working on today?

Karen DeSalvo: Yeah, I can. I will start just by giving you an example from COVID. Because it's been so dominant in the work that we've leaned in to do in the past couple of years, Robbie, I mean, everybody's been COVID focused. We're no exception. One of those things, for example, has been to help people get information, not only Blue Link, as we say, website information, but help them navigate when they want to say get tested.

Karen DeSalvo: We have been able to partner, for example, with the U.S. Government to make sure that free testing sites, they have available, show up on Maps when people are looking for testing near them. This is a way also that we can help with equity, Robbie, because it's not just going to be the paid retail or healthcare

sites that we want to show up. We need to make sure that people know there's tests available in libraries or federally qualified health centers.

Karen DeSalvo: It's an example there of how we would think about helping people navigate in other ways using those kinds of surfaces, like Search and Maps. One of the things that we've done recently, that's non-COVID, but related to helping people navigate is we're going to search for care near them. We've done things like show them telehealth options and put up the price points for the telehealth options as a move towards transparency.

Karen DeSalvo: We now can show people what kind of insurance different doctors and providers take in the community, Medicaid, Medicare. We're also starting an effort to help people just click on a link to get an appointment near them when they're searching for things on their surfaces. It's not a tool that we have to push out to people. I want to be really clear about this because these are billion-user surfaces. These are billions of people are using these on a regular basis.

Karen DeSalvo: What we want to do is when they come not only give them information, but give them some tools that help them navigate more seamlessly and see that those tools are driving things like equity, and transparency in the healthcare system. Because that way, when they not only arrive in the healthcare system, but as they're getting there, we want them to be as eyes wide open and have as good of information as possible, because it's really empowering to people when they show up in the system.

Karen DeSalvo: I think those are some of my current favorite examples of thinking about how ... When 70% of people are searching for health information before they go to healthcare, how can we make sure that we're also helping them to navigate that journey in a way that makes it easier and faster and more transparent for them?

Jeremy Corr: I'm going to be a little bit of Devil's Advocate on this one. Experts don't always have the same thoughts and opinions on things. Sometimes when more information about a topic comes out, a consensus might change. What are your thoughts on the possibility of Google or YouTube mislabeling something as misinformation or censoring it or putting on a YouTube video, when you know, later, it's determined that it might have been correct all along. But there wasn't enough information at the time.

Jeremy Corr: Isn't one of the great things about science and about the internet, the ability to draw together a diverse group of thoughts and opinions and strategies about a wide range of topics, and at the same time, there are still the healthcare equivalent of a flat-earther. How will it be determined what isn't worthy of being labeled misinformation or who is a credible source? Don't you run the risk of the healthcare equivalent of down the road, someone that was convicted for murder and 20 years later, they found out they were wrongly convicted? What are your thoughts on all that?

Karen DeSalvo: Oh, I love that question, because we're wrangling with it. The pandemic has been such a real world, real time experience of the scientific enterprise at work. Everybody has seen it on public display, on YouTube and other places where we're learning and iterating about the right therapies, about vaccines, about masking, about social distance. All of this has been under constant debate in a scientific and public health community and the public at large.

Karen DeSalvo: We have leaned on consensus bodies, wherever we can. For example, the FDA or the World Health Organization, depending on the geography, and we often start with global consensus if it's a new issue, and then localized as much as possible, yeah, in the various countries or even all the way down to the county level for recommendations on things like masking, because we think that our role is amplification of information, not creation of the content, especially on surfaces like Search.

Karen DeSalvo: Now, there are some things though, that are clearly harmful, and is not the information that you would want to put out in the public domain. For the most part, those things have somewhat clearer to be able to define in COVID. They're certainly more clear in other sectors. Outside of health, some of the work of that we do and things like identifying videos that are pedophilia, even there, AI can't do it alone and even humans, when they watch the videos have to sometimes make some determination.

Karen DeSalvo: There's this, as I mentioned earlier, this space in between that is sometimes difficult, and you're touching on this really important component, which is there should be discourse and public debate about scientific issues. There some of the treatments, for example, for COVID are in the midst of clinical trials. We'd want to make sure people can get information on that and learn these drugs are under study.

Karen DeSalvo: On the other hand, we wouldn't want people to think that they're available for treatment right now, if they're not recommended by the current regulatory body, in the in those government areas. It's the reason that we have partnered with organizations, like professional societies in the U.S. And abroad. I mentioned the National Academy of Medicine to help think about this framework, because we definitely want to support scientific discourse, and the notion that people should have access to information.

Karen DeSalvo: On the other hand, we also know that we have some responsibilities about egregious or harmful misinformation that we wouldn't want to get perpetuated out into the ecosystem. It's an important issue. We work on it, and try to get better every day. We're working with partners to do better. I think you're right on that there's some important considerations that all of us have to think about in medicine and scientific enterprise in general, as the public is let in to what typically was something we did in grant rounds, and making sure that they understand how the scientific process works.

Robert Pearl: Google, on a couple of occasions, has stepped forward to try to take the lead in, I'll say, healthcare transformation, including creating an early electronic health record. Each time, it seems, to me, at least has had to back off. What do you see about the past to what's going to be different in the future?

Karen DeSalvo: Well, I think at the end of the day, the thing that I think about is trust. At the end of the day, for us, we as a company need to move to a place where people trust us in health in the way that people trust us in other sectors. We know that trust is going to be built not only with directly with consumers, but in partnership with healthcare and doctors, for example. We're thinking a lot about how we take steps that allow us to build that trust. You know this from medicine, that's job one with any of our patients.

Karen DeSalvo: For me, especially as an internist, primary care doc. If my patients don't trust me, then we're not going to be on a journey together, that's going to allow me to help steer and guide them where it matters, and to hear them and their priorities, and their needs and wants. I certainly learned that very early in the exam room and at the bedside, and it's that thing that I carry with me into this work here at Google.

Karen DeSalvo: Robbie, I don't take it for granted. That's what I'm trying to say. I think what we're what we want to do is show that tools like HealthAI, tools that we can do for analytics through cloud, messages that we help lift up on YouTube, all of the ways that we're partnering and working with consumers and with caregivers, we want to make sure that we're showing that we're trustworthy with it and that we'll take the next step in that journey.

Robert Pearl: Both you and I have spent our entire professional careers trying to move American healthcare forward. Not by a little bit, but by a lot. I'm becoming increasingly frustrated, that the largest companies like Google, Apple, Amazon, they have the best engineers in the entire world and yet, they seem to keep taking small incremental steps, rather than leaping forward and really transforming and disrupting American medicine, given us their size and their technical excellence that they least I think they could do. What are your thoughts?

Karen DeSalvo: Oh, thank you very much. Robbie, try being a person like me, who also wants to see transformation at the public health sector, in addition to the healthcare sector. I have a lot of worries that the underlying infrastructure that's there to support people's health is really struggling in a lot of ways. Some mornings I don't feel very enthusiastic that we're going to get to this nirvana of a really person-centered healthcare system and health ecosystem.

Karen DeSalvo: But doesn't mean we shouldn't keep trying. Your question about big tech and other big companies, I'll just take the big tech piece and say, I didn't come to Google to disrupt the healthcare system, or to show the healthcare system how it should be done. I came here because I believe that there's a couple of key things that are missing in the work we've been doing.

Karen DeSalvo: One, is to say it for the 50th time, consumers are not empowered. They don't have a seat at the table in the way that need to. Two, we're not taking advantage of tools that can reduce cognitive load and improve the efficiency of care to pull cost out of the system. We've instead only, largely, in tech been trying to find ways to add new things to the system.

Karen DeSalvo: Yes, it's true that sometimes tech can be incremental. But sometimes that's okay. Because if you want to really do things like, make sure you build a HealthAI tool that serves as the second read for mammograms for the National Health Service, and allows them to be more judicious in the use of the limited capacity of radiologists that they have to read mammograms and shorten the time to when women can get the results of their mammogram. Those are good things.

Karen DeSalvo: They're at scale. They're for a whole nation's screening program, but it also has to fit in the workflow and the model has to be fair, and you're dealing with life and death, Robbie, and a regulated environment. It's not exactly that you can just press through with the technology. I know you know that. We have to be respectful of the current ecosystem, because there's some very good things in it, the humanity, for example.

Karen DeSalvo: We also have to be respectful that this is life and death. That for those reasons, there's a lot of oversight and regulation. The steps need to be, I think, respectful to something that touches everybody's lives, and that people care very deeply about, which is health. Look, we haven't transformed many things overnight. We being the U.S. Healthcare system, but we have made progress. I do think people need to keep trying, because we shouldn't settle for the fact that we have the richest, most amazing country in the world.

Karen DeSalvo: There's a lot by the way we can learn from other countries. We have to just keep everyday getting up and pressing harder.

Robert Pearl: You've worked on interoperability for much of your career, especially when you're at the federal level. Yet as a country was still pretty far, I think, from getting there. What's it going to take? When will it happen? What about forcing? I know it's been discussed, but it still hasn't happened. All of the electronic health companies to open their API's so that companies like Google or third party developers could create apps that we as clinicians could use, that patients would find user-friendly, rather than serving only as a billing focus?

Karen DeSalvo: Well, this is an hour-long podcast in and of itself, but be crisp, there is a policy expectation in America that companies open their APIs. There's now some not just expectation, but some sticks, the blocking rule, and some powers given to the Office of Inspector General. That work was done largely in Cures 1.0, work that my team helped inform when I was national coordinator.

Karen DeSalvo: Moving to a non-proprietary API system so that apps could be built with the data for consumers and that consumers could have a more app-like experience to their health not only for their record, but to potentially do things download an app, a HealthAI app, that could read a pathology slide from some of their tissue or read their mammogram.

Karen DeSalvo: There, there's a future in there that really does start to open up a more consumer-directed and oriented environment. The policy has been laid. Congress being in a very bipartisan way supportive and pushing it. But you are correct. There's still a lot of pushback from industry, from the physician community, and from the business considerations of the healthcare system. I know it does sound cliche, but from a technology standpoint, Firebase API's are a reasonable and good way to share information.

Karen DeSalvo: There's a governance structure that's been stood up to protect people's information and their rights. Is all this enacted? No. A lot of that is because there's still a strong business driver to do more in the healthcare system to hoard data in the healthcare system. Until we can keep pushing that, and not step back, I mean, this is what I was so excited to see after I left office, the Trump administration carried forward this policy and really doubled-down on it was very excited to see ways that they were thinking about pushing healthcare towards this world.

Karen DeSalvo: This current administration is continuing to push that. The current national coordinator's been clear that in 2024, it's coming. We need to be ready that we're going to have to have the privacy and security and technology and business ways of seeing that consumers can have access to their health information, especially in a cohesive longitudinal form, and have a more app-based experience to their health.

Robert Pearl: Karen, in an article I'll be publishing in Forbes before this podcast airs, I describe an operating room success that Google helped achieve. This was a patient who had a complex next procedure. The operation went flawlessly. However, before the patient was taken off the operating room table, the patient started having trouble breathing, and was found to have the vocal cords almost closed off for reasons that seemed unclear since the surgery was not done in that area.

Robert Pearl: The traditional approach would have been to intubate the patient, passing a breathing tube down through the mouth, between the vocal cords into the lungs, then putting them in the ICU for observation overnight. But instead the resident opens her iPhone found that identical case in the literature, recognized that at least in this other case, the local anesthesia was the etiology, and said within 30 minutes this patient should be better. Rather than having to intubate the individual, patient was kept in the operating room for observation, less than half hour later was back to normal, breathing normally, and able to go home without that hellish experience of having had a tube passed through one's vocal cords into one's lungs. I could imagine Google creating a variety of tools beyond the search ones that exist today for doctors, anything like this on the horizon?

Karen DeSalvo: Almost definitely, we've done some work in this space already with systems like the NHS and the VA, and we're doing some work like this with other systems like Mayo. What you're describing is insights from health information. There's a number of ways that that can be useful for frontline providers. Some of it is the dramatic improvement, I'll use, of decision support.

Karen DeSalvo: Robbie, you probably trained in a time like I did when you had Washington Manual in your pocket. For those who don't know what that is it was little spiral bound book that we kept in our lab coat pocket. When we had questions we flip through the pages and look things up. It was often out-of-date by the time it was printed and in your pocket. You also kept another little notebook where you wrote things and you wrote things about patients you'd seen to help improve and iterate and learn so that you would go, "Oh, yes, when I see this, I should think of taking these actions."

Karen DeSalvo: Well, what you're describing for that woman in the doctor in the operating room is just this digitized version of a Washington Manual and your own experiential notebook, but done in a way that's so much more efficient and effective because it takes into account the learnings, not only of the literature, but of all the patients like that and in all the care experiences like that.

Karen DeSalvo: Not only is that work something that we're involved in and interested in, but it's also got implications for equity. If you can think about how do you create seamless decision support that works for this next back best action that is seamless in the workflow also, but helps also, that helps not only think about what's the right drug or what's the right way to save the patient whose airway is closing, but also make sure that we're not introducing implicit bias into the healthcare system.

Karen DeSalvo: There are, I think, a number of ways that we would think it would be interesting and helpful to the healthcare ecosystem, not only to save lives, but to reduce inequities. Yes, it's an area of opportunity.

Robert Pearl: As you say, the world is changing, the residents, I teach no longer read textbooks, figure out the operations that need to get done, they open YouTube, a Google subsidiary, and watch five of the world's experts during the procedure in great detail, narrating it. It just seems to me the opportunities are so massive, but it will require, I believe, a level of search that goes beyond that which is available today. What will search look like in five years?

Karen DeSalvo: Well, I think Search and YouTube and sister surface of Geo Maps are going to be much more omni-channel. You're already experiencing some of that when you seek and find information on any of those surfaces. By the way, Robbie, we experimented with a lot of that during COVID. What I mean is, if you search for something, you can also find videos. If you search for things on YouTube, the video surface, you can also find flat links to take you to the World Health Organization.

Karen DeSalvo: We see that people are navigating those things, for example, in on the YouTube surface. When you put a flat link to ... Not a video, but just a link, people can click on for the World Health Organization about COVID, more than 600 billion impressions for that just in the first part of the pandemic alone. We also see that people want to engage differently on search, which historically didn't have as much of that live content.

Karen DeSalvo: I think what you'll see is that people are able to experience information in the ways they feel accustomed to. We're also working on ways that people can access that information differently. If you think about how you can use lens to take a picture of something, and only to learn what is that plant, but if you see something you want to purchase, we have that available for shopping.

Karen DeSalvo: We announced last year that we're working on a way to help people get a differential of what a skin condition might be with a dermatology assist tool that would be available directly to consumers. Thinking about how a search and our other information services become not only accessible for information in the ways people want to ingest it, but also how they want to seek it by voice, by picture, by typing, and then thinking of how to apply that not only to other sectors, but to health sectors.

Karen DeSalvo: People can start to get more of that information for themselves. Or, as you described, clinicians can use it to gain their skills.

Robert Pearl: Google has the engineers and technical expertise to address some of the biggest, I'll say, desires and pain points in medicine. I'm thinking about the difficulty physicians have charting and how AI could allow charts to be created through voice recognition, or using AI to be able to help patients to understand the problems they have to figure out the diagnosis they may be need to diagnose and treat.

Robert Pearl: Do you see this happening for Google in the near future? If so, when can listeners expect to have these tools available for themselves?

Karen DeSalvo: We are working on many of those tools. I suspect that you've done your homework. For example, we have a tool called Care Studio, which is not designed to replace the electronic health record. But to be that user interface that creates a more seamless and significantly better experience for the clinician, whether that's about searching for information, or about over time recording that information in a chart.

Karen DeSalvo: Just like I was describing that when we think about consumer search and how it's going to be a more omnichannel experience, it'll be like that increasingly for documentation and work in the electronic health record or other systems. Like most folks in the tech ecosystem, we understand that there's going to be a mix of voice and using AI for next best option or for auto-populate, those are all

things that the Care Studio team is working on or has been asked to think about with their partners in the field.

Karen DeSalvo: I would say also that as we're thinking about the opportunities going forward to use some of the techniques and tools that we have at Google, HealthAI, analytics, and some of the other tech capabilities. It's not only for the healthcare provider, probably, but we're also thinking of ways that is useful for the health system in general, meaning the back office.

Karen DeSalvo: We've been doing more work with health plans and healthcare systems to also improve some of those efficiencies and think about supply chain or physician payment. There's plenty of ways that people come to us and have problems to solve. We believe we've got ways that we can, we can help solution those. At the end of the day, a lot of it is taking the data and turning it into insights in a way that create ... that is leveraging HealthAI to create tools that are learning.

Karen DeSalvo: The learning piece, Robbie, is one of these missing holy grail things that people talk about in healthcare is creating this learning health system. Absent AI, it's really hard to do, because otherwise you're trying to do it with humans and with quality improvement systems that can be a little slower. HealthAI can significantly accelerate that and continue to improve current processes and/or find better processes that we may not have thought about if we were only using some of the cognitive capabilities that we have as humans.

Jeremy Corr: As you look around the healthcare landscape in America, what are some of the ways technology should be used or used more to improve healthcare outcomes or even whole health for patients, but isn't? What are the some of the things that you're seeing that perhaps we haven't discussed on this show, but are so obvious to a tech expert like yourself that it should be being used? What makes you bang your head against the all with frustration that is not already happening?

Karen DeSalvo: Is a really good question, because the obvious one is computer vision. I've talked a bit on the podcast about work we're doing for mammography readings, so that there's a suite of work in there for imaging and diagnostics that relate to reading pathology slides, or mammograms, or retinal images, tuberculosis work we're doing. These especially in areas pathology slides, it's essentially a picture. Computers and AI are really good at reading pixels, better than humans, and they don't get fatigued.

Karen DeSalvo: Yes, all of those images and the pathology slides have to be put into context. I do understand that. It's to me, again, not supplantation, but significant augmentation. Getting to a place where we expect that your prostate tissue slide is going to be read by AI and a human is so necessary. Getting there, though, is the barrier, isn't only about the AI model. We've done a lot of good work in that space and have advanced imaging reads in that area.

Karen DeSalvo: It's also the fact that it has to be in the workflow. We're doing work with healthcare partners to understand when and how it makes sense to for the AI to pop up. A lot of radiologists and ER docs already know that their radiology hardware is using HealthAI and popping up extra reads. That's starting in a world where they're still interested and understating how from a human factor standpoint. It makes the most sense. It makes the most sense, like floating all the abnormal stuff to the top of the queue.

Karen DeSalvo: When you're fresher, that's what you read, and maybe the person's still in the exam room. That's the work we're doing with Northwestern around mammography. And with NHS, Also, to understand not only how the pixels can be read better, but how it can be used in the workflow in a way that's meaningful for the doc and also for the patient.

Karen DeSalvo: I think the other part just flipping back to pathology is we haven't digitized pathology. We have digitized radiology, and in many ways retinopathy work, but we don't have the way to actually implement a tool like that that would be, in many ways, an incredible advancement to create access to the best quality pathology no matter where you are. Or you could say that same story for radiology or for ophthalmology or for dermatology.

Karen DeSalvo: These are the ways that I think about using pretty straightforward tools that we know are quite good. But we don't have the enterprise itself across the world isn't set up to have that information digitized so that AI can be helpful to the system.

Jeremy Corr: Are there any technologies out there, being Google, you're probably exposed to a lot of things that the rest of the country isn't, that are either in the early stages of development or that haven't widely been adapted, maybe something that's being used in another country that hasn't been used here yet, that you're super excited about? Is there anything out there that you see that you look at that you're like, "Wow, this is really going to change healthcare in America in the next five years."

Karen DeSalvo: It's not just a technology. It's a way that the digital health sector has built a sticky relationship with some consumers. That's home-based diagnostic testing. I am fascinated by how hungry people are to have convenient, in-home diagnostic tests for COVID and beyond. It was I'd say a lead subgroup of people who were using some of these companies. It's increasingly widespread. The part that's interesting to me about it is laboratory is something that often does require a biologic specimen.

Karen DeSalvo: It's not something that can be done completely virtually. There has to be some an interface with the diagnostic tool. The diagnostics in the COVID time have gotten much more sophisticated. The work of the RADx team at the NIH, this billion dollars they received to advance technology for COVID testing, they're seeing that it's applicable in other areas of diagnostic testing for convenient at-

home tools. It's like having the Keurig in your kitchen for different kinds of coffee, the pathway to seeing that it's there for diagnostic testing now.

Karen DeSalvo: I don't think we're there yet. But we've seen really significant technological advances. If people are interested, they should go to the RADx side and NIH start to learn about some of these new, lighter, faster, probably less expensive technologies that are more stable and can be deployed in the home. The reason that's interesting to me is not just the diagnostic piece, but because so much of healthcare, and tech companies want to be with people in their everyday lives, in their home, being helpful.

Karen DeSalvo: These testing tech companies are. Now they're building on top of their stack. Not only proctored tests for COVID. But they're adding telehealth and not just for COVID, but for other kinds of care. They're beginning to think about other ways to add to their stack, to build upon that trusted relationship they have built with people during the pandemic. It's a to-watch for me, because I think they're filling a need that goes beyond telehealth or the digital first solutions that the traditional healthcare system has been engaged in.

Karen DeSalvo: They have found a sticky sweet spot for some segment of the population. Now, the goal, their end, is shouldn't just be for people with great insurance or money or whatever it should be for everyone. But I think that's possible, especially some of these newer, really inexpensive technologies continue to advance in the way that they have.

Robert Pearl: You and your colleagues in Google have a wonderful and very promising agenda. What are the company's biggest risks and challenges?

Karen DeSalvo: Well, I think the reality is that we know healthcare is complicated. That there is a need to make sure that we're putting customers first and customer is also consumer. That means that we have to be a good partner. It means we have to be trusted. That's job-one challenge. We've been able to grow that trust very significantly throughout the pandemic. Now, we got to build on that and can't take it for granted.

Karen DeSalvo: We got to keep up that good work of putting good information out there, being a good partner to healthcare and to public health and health plans, and build upon those relationships in that general trust. The second big area that I think all of us face, not just Google, is that people's data is the underlying engine of the world today. It's the fuel, and it's the thing everyone wants, which means that there are really important privacy and security expectations for anything that we would want to build.

Karen DeSalvo: We have privacy by design. We're cybersecurity by design. We know at the end of the day, things have to be accessible, but people have to know what their choices are about sharing and be able to consent to that and have some

transparency if things change. The third thing that I want to say and because it's very top of mind for all of us is equity.

Karen DeSalvo: Building tools for some segments of the population isn't good enough. We cannot leave anyone behind, anywhere. Our expectation is that we're going to build health for billions, and that billions is everyone everywhere on the planet. This is no small task, But it is our responsibility because we're a global company. Because digital could exacerbate inequities in ways that none of us would want. Really the opportunity is to find a way for digital to drive equity.

Robert Pearl: One last question. You're a visionary. You're a futurist. Can you see a time, a decade from now, when a product of Google, an AI driven solution, will actually replace what a doctor does today, rather than just augmenting it?

Karen DeSalvo: Those are kind words coming from you. That's your whole world. I'm just trying to do my thing every day. But here's what I would hope. I'll go back to a story, which is, I'm an internist. I saw a lot of people with chronic disease like diabetes, hypertension, and hyperlipidemia. I took care of low-income patients in New Orleans at the public hospital here. They had to take off work, take a couple of buses to get here to the clinic, and it was inconvenient for them.

Karen DeSalvo: So much of what I was doing for them for their chronic disease management was somewhat routine, and could have been done either virtually or asynchronously. But none of the tools existed then. I pulled up their paper chart off the wall, and scan their labs and their current blood pressure, and make a care plan, and then go in the room and talk to them, and figure out what else was going on that I need to know with respect to things like had they lost their job, or was there a reason that they hadn't been able to take their meds, or something new that was going I needed to know about.

Karen DeSalvo: But often, Robbie, it was a ballet that we had created in medicine where people had to come physically in and I had to do some part of the dance and then they had to take their two buses to go back home. It was a world that I even then in the '90s thought, "God, we could do better for these folks." There's so much of what I'm doing that's kind of routine. I'll give you the specifics of some of those things.

Karen DeSalvo: Yes, you could do that through telehealth. We can communicate through chat bots. We have so many of those tools available now that make care more convenient. Yes, people really want that. But also, there's some of the decisions that I was trying to remember to make about a flu shot or scheduling a mammogram that we can automate. Those are the really important cognitive loads that I hope we can begin to continue to pull out of the work of the docs, and the nurses, and others in the care system.

Karen DeSalvo: That they can focus on how's your kid, how's your heart, the things of humanity that aren't just soft and fluffy, but actually really do affect allostatic load and

people's overall health. Allowed me as a doc to begin to see ahead in their health and the future their health needs. But those very routinized things take up a fair amount of time in practice. That's where I hope that we'll do a replacement.

Karen DeSalvo: The rest of it is very much about augmentation, because I do firmly believe that health is human and that we have to keep that part of ... We have to keep relationships. We have to keep trust. We have to be thinking more broadly than just the healthcare tools but all the inputs to people's health.

Jeremy Corr: Robbie, what do you think about what Karen said?

Robert Pearl: Jeremy. Karen has done remarkable work both through her time in government and over the past three years as Google's Chief Medical Officer. She understands the incredible role that information technology can play in helping to transform the American healthcare system. She and I are fully aligned when it comes to the potential technology has to advance medical practice for the benefit of both patients and physicians.

Robert Pearl: It is one place of disagreement. It's that I don't believe that we will make the sufficient progress needed if our steps are incremental, rather than disruptive. If the problems in American healthcare would stay static, small steps could work. But is the current Corona virus pandemic as proven, the problems are growing too fast for that strategy to be successful.

Robert Pearl: I have massive respect for Google, and the incredible advances the company has made in revolutionizing how billions of people around the globe search for content and solve problems. I look forward to seeing the next suite of tools the company will be making available to doctors and patients to prevent chronic disease, avoid their complications, and help people to live a longer and more healthy life. I'm hoping that Google, with Karen's leadership will begin to break healthcare's unwritten rules.

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