Fixing Healthcare Podcast Transcript

Interview with Eric Topol

Jeremy Corr: Hello, and welcome to the new Fixing Healthcare podcast Breaking Healthcare's Rules. I am one of your hosts, Jeremy Corr. I'm also the host of the popular New Books in Medicine podcast and CEO of Executive Podcast Solutions. With me is Dr. Robert Pearl, the former CEO of The Permanente Group, the nation's largest physician group. He is a best-selling author and currently a professor at both the Stanford University School of Medicine and Business. If you want information on a broad range of healthcare topics, you can go to his website RobertPearlMD.com.

Our guest today is Dr. Eric Topol. He is the Director of the Scripps Research Institute and Professor of Molecular Medicine. He has published over 1200 peer reviewed articles and authored three best sellers including, most recently, Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again.

Robert Pearl: Hi, Eric, welcome back to Fixing Healthcare. It's always great having you on the podcast.

Eric Topol: Thanks, Robert.

Robert Pearl: This season focuses on rule breaking and some of the people who have led the way in medicine. And a physician like you, with 1,200 scientific publications, an individual chosen as one of GQ's 12 Rockstars of Science, you certainly have broken many rules along the way. But I'm not talking about the formal rules and regulations. I'm talking about the unwritten rules, the norms and ways of thinking that we learn in medical school and residency and carry with us throughout our professional careers. So let's start with precision medicine. How is it different than the approach you and I learned in medical school? And what rules will need to be broken for it to become the way that doctors practice in the future?

Eric Topol: Right. Well, it's not a very good term, precision medicine. But what it's getting at is to get a much higher accuracy of diagnosis and treatments and prevention. So basically, if you do the same mistake every time, that could be considered precise. But what we want is to be accurate and precise. And when we were in medical school, and still today, largely, we don't have accurate ways to diagnose. We have a huge number every year of serious diagnostic errors. And our treatments are based largely in clinical trials, where maybe 10 people out of 100 in a really good trial

might derive benefit. But the 90 people who don't derive benefit, we give them the same therapy. That's not exactly a accurate and precise way of delivering care. So we can do far better, but it involves dealing with lots of data, a tsunami of data. And we aren't well equipped to do that yet.

Robert Pearl: I think when you start talking about data analytics, that doctors, the hair on the back of their necks go up a little bit, because they're afraid that somehow this is going to be cookbook algorithmic medicine, and it's going to make them average and on and on and on. How do you think we should approach that?

Eric Topol: Well, the way things are in medicine, we can't handle the data. So we need to acquiesce and we need to say, "We need help." You're well aware of the crisis, the global crisis we have of burnout, and disenchantment, and depression. Part of that is non-ability to care for patients because of being overwhelmed. And part of that being overwhelmed, besides being data clerks, which is another data story, but is not being able to get our arms around all the data of any given patient because it takes time.

Eric Topol: But that's what machines are really good for. And we're talking about many layers of data, not just what's in the electronic health record, and the images, and the labs, and pathology reports, and the genome, and the gut microbiome, and the environmental sensors, social determinants of health. I mean, a long list of data. It's no less sensors that more and more people have sensor data they can contribute to helping them manage a condition or even preventing a condition. So there's no human being that can deal with big data per individual. We need help. And that's what this is about.

Robert Pearl: How do you see AI contributing?

Eric Topol: Well, that's basically the analytic machine to do this. The good thing about deep learning or deep neural networks is it has insatiable appetite for data, which is the opposite of us. The more, the better. The more inputs, the more comprehensive they are, the better the outputs. So that's for images we've already seen across the board, whether it's a chest x-ray, or any type of x-ray, a CAT scan, a PET scan, I mean, you name the image. An ECG, a slide, a pathology slide. The machines have ways to see things and pick up things that humans can't. So that's dealing with data that we just don't see it because we only can take in so many pixels. And I think that's the beginning of this revolution of analytics to help medicine, help clinicians to be much more effective and accurate.

Robert Pearl: CRISPR, or more formally, the clusters that regulate dispersed short, palindromic repeats, as you know, because you've been leading a lot of the analysis of that is a powerful technology capable of altering the human DNA and potentially curing diseases like sickle cell anemia. And yet, it also has problematic and dangerous sides. Can you talk about both, and the unwritten rules that'll need to be broken to harness the potential while minimizing the risks?

Eric Topol: Right. So, Robbie, we're talking about two of the most powerful tools, really, in the history of medicine. One, we just touched on AI ,and the other is genome editing. And there with pinpoint precision being able to edit a person's genome. And as you say, that can lead to curative strategies like sickle cell or beta thalassemia or many other conditions. But it's a two-edged sword, just as AI. It can hurt people.

Eric Topol: We already saw the Chinese investigator a few years ago who was just released from prison, who did embryonic genome editing, long before it's ready for moving to that type of intervention. So this is an exciting area. It has unlimited potential in the years ahead. Right now, we're just talking about somatic cell, not embryonic germ-cell editing. But every week, there's more and more refinements of how to do that editing so that's not off target effects. That is, having some unintended editing in the genome different than what was designed with the CRISPR and related tools. So it's the biggest breakthrough in the history of life science, I think, to have this type of capability and we have to just make sure we use it right.

Robert Pearl: Eric, there's an unwritten rule that says the best way to diagnose a problem with the valves of the heart is by listening through a stethoscope. And you've pointed at the superiority of handheld mobile imaging devices. Most doctors that I see continue to carry a stethoscope rather than an ultrasound in their pocket of the white coat. What will it take to break this rule?

Eric Topol: Yeah, this is really unfortunate, and it bespeaks the unwillingness to change in medicine. It's such a sclerotic, ossified type of practice. Part of the unwillingness for cardiologists to accept smartphone ultrasound is that their first reaction says, "Well, I don't want have to do that. That's what ultra-stenographers are for. I don't want to have to acquire the images. That takes time and I'm not getting reimbursed for it," and every possible excuse. But in reality, every cardiologist should know how to acquire an echo. Just a screening echo as part of a physical exam and do a couple or a few windows. It takes just a minute or two. It's so

much more effective in time use than with a stethoscope because you're seeing everything.

Eric Topol: So for many years now, really a decade, I haven't used a stethoscope, because I think the smartphone ultrasound is an incredibly powerful tool. And I still don't understand all the excuses. We don't get reimbursed for using a stethoscope. So why should we for a smartphone echocardiogram? And of course, the good part is you share it with the patient. So it's kind of a bonding experience. You can send the patient loops. You can deposit those loops in the patient's chart. And moreover, you can preempt the need for formal echo studies or ultrasound studies outside of the heart by getting the screening as part of a routine exam.

Eric Topol: And so you save a lot of money to the health system, because that's one of the most frequent test that cardiologists even order, is as an echocardiogram. So every way I think of it is it should be the norm. It should be part of every cardiac exam. Ideally, whether it's family physicians, internists, emergency doctors, I mean, across the board, should be skilled in doing smartphone ultrasound because you can image every part of the body except the brain, and in exquisite detail, and get answers quickly, and limit the use of radiation and other tests that are expensive, that are inconvenient for the patient to have to get scheduled, come back to clinics and medical centers. I just don't understand, Robbie, how we just can't pivot to a much more effective way to do a physical exam today.

Robert Pearl: As you know Eric, I'm a big proponent that we have to break these rules. And I appreciate the fact that you and I are riding side by side in these efforts.

Eric Topol: It's not easy, right?

Robert Pearl: So let me ask you. In 2018, you wrote a report on how the British national health system would need to change to deliver a digital future. You've predicted that within a decade, most patients would be managing their own long term conditions with wearable devices and sensors, and that they would be much more effective than the occasional appointment with a doctor. And you pointed out that patients would no longer be monitored as often or as frequently in the hospital as at home. And that this rise in regular monitoring would necessitate new workflows and frameworks in digital healthcare. This sounds like a lot of unwritten rules that need to be broken and replaced. What are they and how will it happen?

Eric Topol: Well, to start, I was commissioned by the UK government to do a review of the National Health Service. And they kindly assigned a team of almost 50 people, pan-disciplinary, to help in that review. And I have to give the UK enormous credit because, first of all, they're the world leader in genomics, but there's no other country is close to their leadership they've provided. The UK Biobank is just one of many, many examples. But beyond that, they want to be the leader in the world in digital and AI.

Eric Topol: And that's what this review is about. The workforce issues, of course, are centered around better use of digital and AI. And as you just mentioned, giving patients more charge. They want to be more autonomous than they are, not so dependent. And we have the tools to do that. Already, we have emerging tools to deal with very common conditions like skin rashes and lesions through a smartphone picture and AI algorithm, ear infections for children, UTIs with an AI kit, heart rhythms through a smart watch. I mean, we have a lot of common diagnoses that are not life threatening that can be screened by patients and that list is just going to keep growing. So that's just one way in which digital can be transformational.

Eric Topol: We've talked a little bit on the doctor clinician side of this as well, but the hospital at home is the most far reaching part, which is using sensors in a patient's home to preempt the need to put a person in the hospital. And the hospital itself should only be for intensive care units, operating rooms, emergency rooms, fancy imaging suite, but not for regular hospital rooms, because all those people would do far better at home, provided we develop and validate fully the algorithms that keep them safe, that predict when they are getting in trouble and intervene before that trouble actually manifests.

Eric Topol: So those are the things that we worked on and we mapped out a timeline, which you touched on. It's going to take a while to have hospital at home be the norm. But remember, Robbie, how long it took for inpatients to switch to outpatients back in the the '70s to the '80s? We're going to go through a similar transition of hospital to hospital at home for a lot of people.

Robert Pearl: Eric, you and I were both involved in pointing out the dangers associated with the pain medication, Vioxx, in trying to protect the lives of people you encountered many of medicine's unwritten rules and norms. And I think you paid a price for your efforts to save the lives of patients. Can you talk about what you learned from that experience, about the whole idea of breaking rules in order to implement change?

Eric Topol: Well, it was a very dark chapter that occurred because Merck basically was covering up a lot of important safety data of Vioxx with risk of heart attacks and strokes. And I was onto it and they tried to destroy me, and that was not a very good experience. And so what do you learn from that? Well, better to keep your mouth shut, then you don't have to deal with a company trying to destroy you. Fortunately, it was a long time ago, Robbie. I mean, we're talking about stuff that's back in 2004. It's almost two decades ago, so I've become largely amnestied to it. If I had to go do it over again, I'm not sure that I would've spoken out, because of the price you pay to try to alert a very serious safety matter is extraordinary. I wouldn't recommend it.

Robert Pearl: Well, I think you would because you always do the right thing. But I asked about that, because in 2020, you published an open letter to the commissioner of the FDA criticizing emergency use authorizations from multiple COVID-19 medications, several of which have been proven, as you said, to be of no value. There's an unwritten rule amongst physicians not to speak negatively in public about the FDA. Why did you do it? What changes are needed? And again, I think for rule breakers of the future, what can they learn from your experience?

Eric Topol: Well, this turned out to be a really positive experience. We're dealing with Stephen Hahn, who at the time was Commissioner of the FDA. And the letter I wrote in August of 2020 was right after he had stood up with then President Trump and Alex Azar, who was the Secretary of Health Services. They stood up and said at a press conference that convalescent plasma was a historic breakthrough, but they didn't have any data to support that. And remember, they had already approved hydroxychloroquine, and there were a lot of things that were very worrisome, not the least of which was the vaccines that was in August, but we knew the vaccine trials were ongoing. And what was going to happen with those if that got botched up and given false hype and claims that were completely baseless like with the convalescent plasma?

Eric Topol: So I took on, with that letter, the decision to have this breakthrough historic press conference and lie about the data. And turns out that, to Dr. Hahn's credit, he contacted me and discussed it with me and we actually became good friends. And he had a lot of respect for my input and others that helped provide some informal advice to him in the months ahead. And he did a great job with the vaccines. Had it not been for Steven Hahn and Peter Marks at the FDA, we could have had vaccines that were approved without data that is on the first interim analysis with 32 events. That would've been scary.

Eric Topol: Fortunately, Hahn and Marks and the FDA made sure that the data were sound before we got the first approval, which only was a matter of weeks to get that trial, Pfizer and then Moderna, finished. And I think then we can have complete comfort and confidence that the vaccines were approved properly. So I was glad to have not only the chance to weigh in, but also the great response from Dr. Hahn who really had a lot of great input and conversations throughout the months from that time I first had contact throughout the rest of his time as Commissioner.

Robert Pearl: When I think about you, Eric, and I try to come up with adjectives. Ones like objective, honest, trustworthy appear. And I think you earned all of those during the COVID pandemic with your comments in the public arena and what you've been writing and speaking about. What else did we get wrong besides these issues specific to the FDA?

Eric Topol: Well, those were about approval of things, either prematurely, or without data, or concerning what could have happened. The biggest thing in my concern about the way the pandemic has been managed actually with the boosters, Robbie. I think this has been a fiasco. I think that we, as a country, are ranked 70th in the world for boosters in our population. We're only at 30%, whereas most countries that you would consider peer in Europe or Asia are 70, 80%. And most importantly, in people over age 50, where in the US, 1 out of 125 Americans have died over age 50. And that's for confirmed deaths, not even excess mortality in the COVID era.

Eric Topol: And we know that booster shots reduce death. They also reduce hospitalizations. They reduce long COVID. And they're essential with Omicron, because the virus has evolved so extensively. It's not the problem with the vaccines. We're lucky the vaccines have held up with a booster. It's the problem with the virus that's had well over two years and gone through a large proportion of the species, including a lot of immunocompromised people where it's evolved in an accelerated way. So basically, we have a situation where boosters are our best defense against hospitalizations and deaths, and the people who need them the most haven't gotten them in this country. We're at 58% of people who've had one booster age 50 and over, which is incredible.

Eric Topol: In many of these countries, we're talking about 90% in that age group. So we are sitting ducks for people in age 50 and over, no less, across the population. And we are going to face more variants. We already have one that's worse than Omicron BA.2. And that's just BA 2.12.1, which is much more transmissible as BA 2 was to BA 1, at 30% or more. And it's taking over in this

country, and it's having a big effect, along with other Omicron variants right now in Puerto Rico, which is really going through explosive growth in cases and hospitalizations. And there's probably going to be other parts of the country that are affected in this wave as well.

Eric Topol: So we just have a gaping hole in our prevention without the proper use of booster shots, no less of course, primary vaccinations, where we have, because of misinformation, because they're not countering aggressively all the purposeful disinformation that we have not done well in terms of getting a high proportion of Americans vaccinated.

Robert Pearl: Are you recommending a second booster for people who are relatively healthy?

Eric Topol: Well, I think if you're over 60, for sure, because you're talking about a mortality reduction that's published in Nature, in Nature Medicine today, of 75%. And that's four shots versus three shots. That's not against placebo, to see that type of reduction mortality. We don't have many interventions that reduce mortality 70 plus percent. So yeah, over age 60, and if you're already 50, I would strongly consider it. The reasons not to, if you already had Omicron, or you had a really bad reaction to the third shot. But otherwise, I think it should be considered, because if something saves a life to that extent, that means it's also having other effects that are beneficial, including, as I mentioned, prevention of hospitalizations and deaths. And again, taking the hit of a booster in terms of the side effects of feeling lousy for a day or two, relative to what could happen in our age groups, it's a really important trade off.

Robert Pearl: Eric, you have a grant from the NIH to promote innovation in medicine. How will you do that? And what unwritten rules will you need to break?

Eric Topol: Well, it is about breaking a lot of rules and not accepting dogma. But for 15 years, we've had a so-called Clinical and Translational Science Award, which is a flagship grant of the NIH. There's about 60 of them throughout the country at a lot of the leading academic centers. The one at Scripps Research that I've headed up is basically using what we've discussed today, digital and genomic tools to individualize medicine, to make it far more accurate to preserve human health and hopefully also lower costs and make lives better for clinicians as well as for patients. So that's what we work on. We've been working on it for 15 years and we're about to put in our renewal for another stretch. And hopefully, we'll be successful.

Robert Pearl: A final question from me, what's made you such a strong and dedicated rule breaker across your entire career? And how will we make sure that the next generation of physician leaders are as courageous?

Eric Topol: Well, I wouldn't necessarily characterize it as a rebel rule breaker. It's more just seeing where there's opportunities to improve medicine. And sometimes, that means challenging the way we have done things, habitual things, but it isn't always breaking rules. It's more trying to tap into our innovative spirit because we can always make things better. So that's been the philosophy.

Robert Pearl: Well, let me expand that a little bit. I don't mean the legal rules or the regulatory rules. These are the unwritten rules. Rules like carrying a stethoscope, or rules like intuition is always better than data analytics, or rules about care being best in the hospital rather than at home. These are ways of thinking and norms, and just what's accepted. And you have a way of splitting it apart and letting people see to the future. I'll ask you the same question again. What's allowed you to do it? And I think more importantly, what can we do to make sure the next generation has that same vision and courage?

Eric Topol: Well, I mean, I think it gets down to just questioning things, not just accepting that's the way we do it. And I've always thought that way. And I encourage the people who I get to work with and train to think that way as well, because a lot of things that we do habitually are not the best way. Especially today, we talk a lot about new technologies that have such extraordinary potential and why we don't at least test them and our willingness to embrace them and adopt change. And unfortunately, medicine is an ultra-conservative community profession that has got a lot of unwillingness to change. And hopefully, that itself will not be the same look over the years ahead.

Jeremy Corr: Lately, free speech versus what some label as disinformation or misinformation has been in the news a lot lately with the news of Elon Musk purchasing Twitter. How do you feel health information fits into this when it comes to social media? Free speech is essential to democracy and the American identity. Yet, social media has censored and the media has smeared those they deem spreading misinformation during COVID, and often rightfully so, even those that had very respectable credentials and were considered healthcare experts before the pandemic.

Jeremy Corr: If you look back at the rule breakers of the past, though, for example, Semmelweis, Galileo, Mendel, and many others, they

were often disregarded and ridiculed in their prime by the scientific community at large, and then later proven to be correct. Even on modern social media, we have seen stories that were considered disinformation and then later proven to be correct. What are your thoughts on free speech versus disinformation in the social media age? And are we at risk of potentially censoring or canceling the modern equivalent to the great scientific rule breaks of the past?

Eric Topol: Yeah. Interesting question. I'm very into free speech. However, we need to, in my view, at least draw the lines about when there's clear, unequivocal, medically harmful disinformation, lies, misinformation, fabrication, because we're talking about people being hurt or dying from it. And so that's different than expressing opinions or providing data that's real instead of just making things up. And there's been a lot of that. We're not talking about Galileo here. We're talking about people who apparently are purposefully, if not unwittingly, trying to hurt a lot of people. So whereas free speech is something that's vital to support. When it's killing people, harming people, getting unnecessarily sick, that is unacceptable to me. And that's where I think we have to have a red line that we have to censor. We have to suppress, because otherwise, what we've seen is this can go on unmitigated. It can get funded. It has people that are truly adversarial to public health, and it can't be tolerated. I don't know any other way to deal with it outside of not allowing it to proceed.

Robert Pearl: Eric, thank you so much for being on this show today, providing such a clear view of the past, the present, and most importantly, the future. We can't wait to have you back as a guest on Fixing Healthcare. Thank you for your contributions to American medicine.

Eric Topol: Thanks so much, Robbie and Jeremy. Take care.

Jeremy Corr: Thank you so much. That was awesome. We hope you enjoyed this podcast and will tell your friends and colleagues about it. Please follow Fixing Healthcare on iTunes, Spotify or other podcast platforms. If you liked the show, please rate it five stars and leave a review. Visit our website at fixinghealthcarepodcast.com. Follow us on LinkedIn, Facebook, and Twitter @FixingHCPodcast.