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GREG HORN: Hello, and welcome to *The Health Pulse*, a podcast exploring how analytics in the health and life sciences industry is growing and its repercussions in all our lives. My name is Greg Horn, and I am your host for this series. And as always, I'm joined by my expert guests to discuss a topical subject. And on this week's episode, I welcome Steve Kearney, and we turn our attention to vaccination and vaccination rollouts.

But before we get to that, last week we heard a little bit about bias and how that affects health care. And what we're looking for now is, again, more comments and questions through our email. And just as a reminder, that is thehealthpulsepodcast@sas.com. So we're looking forward to seeing comments on each of our episodes, which we hope to bring to you in a future edition.

So without further ado, I would like to welcome Steve Kearney to today's show. Steve, good afternoon. Please, could you introduce yourself?

STEVE KEARNEY: Hi, Greg. Great to be with you. I'm Steve Kearney. I'm the medical director here for health, life science, and government at SAS.

GREG HORN: Brilliant. And Steve, just tell us a bit about how you got to be where you are today. Tell us a little bit about the career and the steps you took to get here.

STEVE KEARNEY: Sure. So I'm actually a clinical pharmacist, so a doctor of pharmacy training in cardiology, a residency in cardiology. And so I actually had a joint appointment at Duke and UNC working in health outcomes, cardiology, working inpatient initially and then moved to the outpatient world. And inpatient, I actually worked in some of the new electronic medical record migrations then. And in the outpatient world, I worked with the new patient disease registries, and so had worked in that space for a number of years.

And then Pfizer had developed a medical outcomes, health outcomes group, and so I joined that group. And for 17 years, I worked in what we consider now real-world data, health outcomes looking at everything from what's pertinent today in vaccines and antimicrobials to cardiovascular disease, really using the tenets of what we

learned in cardiology to look at objective data. And so data was always my challenge if I worked with states or payers or providers. And so that's how I was able to join SAS and the amazing team here, looking at data and analytics. And if we give people the right data and the analytic expertise, they will make good decisions for our patients.

GREG HORN: Brilliant. Fantastic, Steve. And I think people will recognize that you being from a pharmacy background is going to have a lot to do with what we're talking about today. So I'm looking forward to getting into that discussion. But before we do, as always with our guests, we like to try to find something out that's not related to the world of work, something else that is relevant to you outside. So Steve, what's your thing? What do you do?

STEVE KEARNEY: Sure. So a little unusual here in North Carolina in the Research Triangle Park, so like I said, I was at Duke and UNC, and even though at Pfizer I was based out of the Manhattan office, I still lived here in North Carolina. And I live on what's called a gentleman's farm. So what that means is it's a farm that really produces nothing but enjoyment for me and my family. My wife loves horses, and so out my front door you can see a rolling pasture with horses and a lovely red barn that my neighbor has. Where my office is in the back, you can actually see water and our goats that are miniature goats that play and entertain me all day.

GREG HORN: That sounds fantastic. I think I would like a little bit of that as well. My daughter actually wants a couple of alpacas in our back garden, so we'll see where that one leads to. But anyway, so Steve, let's get into this subject today.

So we're talking about vaccines and coronavirus and the like. And I wanted to start by just asking you, what is the early data telling us about who is getting vaccines? And what are the attitudes that we're seeing around vaccination right now?

STEVE KEARNEY: Yeah, so I think that's a great question, Greg. And again, the data really is trying to tell us a story. We see right now that almost 28% of health care workers are not getting vaccinated. And in many instances, those are the workers that are on the front lines, that are working in environmental services, a lot of the groups, food services that interact with the patients every day, but they're very concerned about the vaccine.

And there's challenges with the way that the vaccines are being rolled out because we don't have enough vaccines. And so we're seeing across the board vaccine challenges in regard to where you can receive the vaccine, how you receive the vaccine, and then people like you and me receiving the vaccine versus people that look like the populations we're trying to represent. So people are very concerned that one type of vaccine is used in one area, another is used in another part of the world, for example.

And so we are seeing some real challenges. We see in Germany, for example, one vaccine is available, but people are turning it down. Matter of fact, they had slots for 3,800 individuals, but only 200 signed up, because they did not think that the vaccine efficacy was that great for that particular vaccine. So the data is trying to tell us a story, the populations that receive it, the locales, the logistics of how you receive it, and then just the populations that are underserved and the concerns about how do we get vaccines to those that normally don't receive vaccines if we're looking at flu vaccines and other things like that?

GREG HORN: So there's a few things I want to pick up on there. Actually, the first one is a quick one. You talked about a large number of health workers not wanting to take the vaccine. But interestingly, I actually had a contractor in my house who said that he had been working full time in people's homes throughout the entire coronavirus issue and he had never caught it.

And so he was like, I don't really see why I would need a vaccine. And I think that attitude is seen in a lot of front line workers as well. I worked with patients for a year, I didn't catch it, I'm good. Any thoughts on that logic?

STEVE KEARNEY: Yeah, and we have that a lot. If you look at the data, we really need to look at the populations that are the most at risk, and we know that's over 65. And by the way, we knew this from flu as well, right? If you were over 65 and you caught the flu, you had poorer outcomes.

So again, I think we really have to look at the health outcomes data and then share that back to the populations. We also see that, for whatever reason, some people are, quote unquote, "luckier than others," but what we're finding is they're more resistant to COVID, whether it's blood type or other things that they take as part of

their normal preventative measures.

GREG HORN: Brilliant. And the next thing I wanted to pick up on is this whole discussion about efficacy, because I think this has been a very confusing thing. I read a lot of stories in the papers, and a lot of the comments are, I don't want the 64% efficacy jab. I want the 96% efficacy jab. Are people really understanding what that means? And can you help to explain what the difference is?

STEVE KEARNEY: Well, first of all, thanks for sharing the word jab because for our listeners here in the US, you may not understand, but in other parts of the world, that's what they call the vaccine. They call it getting a jab. So that's why we're taking a jab at the data today. And so thanks for sharing that.

And it really is concerning to some as we see the news media and we see the reports on the efficacy of vaccines. I think what we really need to focus on is what was the true health outcomes? And so if we look at that, if we look at hospitalizations, we look at folks that progressed to a ventilator, and, unfortunately, we look at deaths, we have found that all of the vaccines help in this area.

And so the efficacy may change based on exposures to populations. It may change on ethnicity. But right now the vaccines are the best way for us to prevent folks from having negative health outcomes. And that, right now, would be hospitalization progressing to a ventilator and then, unfortunately, progressing to death.

GREG HORN: So even in the example of a vaccine that's stated to have 64% efficacy, what you're saying is that it still has 100% efficiency in terms of keeping you alive. Is that basically what you're suggesting?

STEVE KEARNEY: And that's what we're seeing. We're also seeing some ministries of health that looked at the vaccine data and said, wait a minute, the populations didn't look like ours. Some of them looked at one particular vaccine and said the population that was over 65 was really small, and so we would like to see more data.

So they've made recommendations from some ministries of health. If you're below 65, you can have one particular vaccine. If you're over 65, you can have one of the other two vaccines. And so that has brought about some of the attitude that we see from these patient populations.

They're like, wait a minute, if I'm under 65, why do I have to take the inferior vaccine? And again, that's not the case. It's just that at that time-- that point in time if we look at data, the data was not there for those over 65. There are a number of trials here, for example, in the US that look at the over 65 population. And you're going to see a lot more data in the coming months.

GREG HORN: That's very interesting because, again, there's a lot of reporting about the fact that some vaccines are not suitable for older people and some are not suitable for younger people. So what you're saying is that that is based purely on the clinical trial that have been done so far. It isn't necessarily a case that the vaccine isn't actually suitable.

STEVE KEARNEY: That's right. And as a matter of fact, the markers that we have, if you look at the immune response, was very strong even for those that did not have the higher populations over 65. So if you looked at immune response, you would hypothesize that the immune response would be the same. You just don't have the data right now.

It's also the same with the variants that are out there. So some of the vaccines were tested later and exposed to more variants, and so then they have real-world data that says we're good for the South African variant or some of the other variants that we see. The others haven't been tested against that.

GREG HORN: And what seems to be a continual message right now has been this idea of one dose versus two doses and the time between them. Now, from my knowledge of life sciences, if I do a clinical trial on a drug, I get approval on two doses in three weeks, if I was to then go out and say something else, that would be an off-label use of the drug. So what's the difference here between off-label usage and current advice? And why are we in this big discussion right now about the length of time between vaccines?

STEVE KEARNEY: Yeah, again, I think if we go back to the basic immune response what you would see is you would first prime the immune system, so you give them a dose, a smaller dose many times or a similar dose, but it primes your immune system. And then the next dose you get, you're going to actually get a much more active immune response. And so that's what most of the vaccines were, a prime dose, whether it's

smaller or the same as the next dose. And then 21 or 28 days later, you want to get a full response.

And so the data actually shows that you had a pretty good response if you look at 60% or higher to all of the first doses. But if you want to get to 95% efficacy, which is what people were shooting for with their outcomes, then you needed a second dose. So the debate with ministries of health has been, should we wait and just give everyone the first dose?

So if we receive a 60% efficacy with the first dose for everyone, then what would that look like? To your point, though, the companies that actually did those trials can't put that information out there and change that emergency use authorization right now. Ministries of health can make those decisions, but the companies themselves can't make that without additional data.

GREG HORN: And thinking about the way that the media is portraying this story right now, are they data-driven in what they're doing? Where are the disparities between what the media tell us and what the actual data says? And how is that affecting the progress?

STEVE Yeah, I think we see a lot of challenges in the way the reporting happens.

KEARNEY: Everyone's trying to do the best that they can in a very fragmented health system that struggles with interoperability, struggles with being able to share information from provider to patient to insurer or to government agencies. And that's the same that we see with disparities, and I think we wanted to talk about that as well.

If you look at it, they'll say, well, a number of these marginal populations are not receiving the vaccine. But if you actually looked at the real data, you would see if the vaccine was provided at a site where they could have access, where they didn't have to take off work or where they were able to access it close by where they were working, then those folks actually did receive the vaccine. And so I think, again, the media is looking at points in time, and they're looking at very small samples to say this group is not receiving the vaccine when, in fact, we know that they are. It's just not rolling up to the national data sets, whether you're looking at here in the US or you're looking at other countries.

GREG HORN: Brilliant. And with regard to policy, I mean, we've seen some real swings in policy

around the world from governments and lack of consistency. Now, they would argue that they are science-based in their policy, but are we really seeing a lot of data-driven policy?

**STEVE
KEARNEY:**

Well, I think the challenge is that most of the data-driven policies are driven off of the data that they have. And we know even working with very advanced countries that had more hospital beds or ventilator beds or ICU beds per capita than others that they had very difficult times collecting data on patients. They had difficult times looking at mortality. And they had a really difficult time with health care diaries looking at symptoms.

And so we had to partner with a number of entities and ministries of health to help them collect that data before we could do the analytics on it. So many instances, they will have a report that's static and a report that is a point in time. And what you really want to understand is data that rolls up every day where you can make better decisions. The more real-time data, the better, and very few governments in the beginning of this pandemic had real-time data.

And I will tell you that's changing. If we look at governments in Spain and other places, they're saying, look, we're in the middle of the pandemic, but we really need to start looking at real-time data, how can we partner with you to do that and then put that in a consumable format? That's the other thing. We may have tons of data, but if you can't consume it and make decisions on it, that's the other challenge that we see with government entities.

GREG HORN:

And a bit of a positive on this as well. Where I live, I'm in Canada, we are seeing what's being described as very low vaccine rates. And compared to many, it is very low. But we still managed to vaccinate just about three times as many people than have actually had coronavirus already in just a short period of time. What positive vaccine stories are you hearing out there? Tell us a bit of something more upbeat and exciting.

**STEVE
KEARNEY:**

Right. So we are seeing a lot of positives. Again, everyone's trying to do the best that they can. We see people that are setting up sites at their local churches, that were setting up sites where people would gather, whether it's sporting events or other areas, and they're encouraging their neighbors. And the data is showing us

that when we set these sites up, people show up and they're enthusiastic about it.

And really, I think we need to focus on what is the positive of this, because people want to get back to normal. And the best way that you can get back to normal, open things up, get back to work, interact with your friends and neighbors is for right now the vaccines. That's the best option that we have. And so we are seeing a lot of positive.

We're also seeing a lot of changes within the health ecosystem. The way that we consume data, the way that our customers and our patients consume data has changed dramatically. Everyone wants it in the palm of their hand. And they want to be able to schedule an appointment, to have a virtual visit, whether it's testing or vaccines. We've seen a lot of changes in that space, and I really don't think we're going to go back to the way it was before.

GREG HORN: You just inspired me with another question there, actually. We talked at the beginning a little bit about the fact that people don't understand what efficacy numbers really mean. We talked about the fact that there's confusion in the data and the like.

People are now being bombarded with data around infections, and pharmaceuticals, and vaccines, and all these things that many people have never studied and being asked to make opinions on it. In your mind, what can we do to educate people to be more data literate? And how do we get that into a very broad population?

STEVE KEARNEY: Yeah, I think there are a number of entities that if you look at, depending on the country that you live in, obviously those ministries of health, if we look at the CDC here in the US, they're trying to put out really good data-driven policies. We go to that all the time when we're trying to work with provider networks or payers, what is out there that you can use that's public-facing that's trusted? And we hope SAS is that trusted brand as well.

That's why so many people came to SAS to say, look at your epi models. Look at the way that you would approach this, including partners like Cleveland Clinic and others, who said, let's go together and put good information out there, good models, compare them, put them in an environment where people can consume it.

If you look at the opinions, for example, we trust groups like the Kaiser Family Foundation. They have a vaccine monitoring system that you can look and see where people are getting vaccines, and it's really good data.

If you look, again, at CDC, ministries of health, the World Health Organization, I refer people all the time back to those publications that they have, and then specifically to your local ministry or your local provider. We always say, health care is local. You really should talk to your provider about your particular situation, then make the best decisions. So I live here in North Carolina, and our rate of positive tests were around 25% several weeks ago. On a positive note, what we're seeing now is it's around 5% of those tests that are coming back positive.

GREG HORN: See, that's a really interesting question, because positivity test rates are being used in many jurisdictions to justify not opening economies again. But surely, positivity rates is a fatally flawed statistic for anyone to be using because unless I test everybody every day, that number really is fairly meaningless. It really would depend on the sample size and the population, things like that. Can you comment on that at all?

STEVE KEARNEY: Yeah, that's a great point, Greg. Again, you need to go back to the data, the data telling the story. And we really think the data will tell a story. But unfortunately, most states, like mine, the testing data is all we have. We have those folks that have symptoms, they went to receive a test, and of those, that's what we can measure.

If we look at Southeast Asia, we know testing entire populations is much better. You get a better result as far as the hot spots. You get a better result as far as what can open and what can be closed based on true data-driven policy. And so ideally, we would test based on populations.

And so a lot of the times when we look at data-driven policy, so what data do you have, and most want to do it on sample size, but we would rather do it on the entire population. And for many of our large endeavors, that's what we do, the entire population. And you really couldn't do that without AI and machine learning in the past, but you can now.

GREG HORN: Brilliant. Now, Steve, just switch it up a little bit for our last question here. One of the things we're trying to get everyone to think about is throw the ball forward a bit on

this subject and think about the future. What kind of big changes are we likely to see in the next year, five years, or whatever? And how might that impact us as we move forward?

STEVE

KEARNEY:

I really do think it's an exciting time for health care. The technology, obviously, is changing pretty dramatically, the crowd sourcing. We have been thrilled by the number of groups coming together to say, let's solve for this problem.

If you look at everything from the DNA sequencing of COVID-19 to the teams working together, Pfizer and Moderna or Johnson & Johnson, AstraZeneca are saying, all right, bring everyone into a room virtually and see how do we tackle this problem? And so we've been asked a number of instances if you had unlimited capacity, how would you tackle this? If you had the way to look at all the studies, which, by the way, we've done with text analytics and other things, how would you tackle it?

So the questions we're asking, the impediments that we're taking away, I think it's going to change not just the way we approach vaccines, but the virtual interface between the patient, the providers, the health ecosystem. And then the way we work together to solve these problems is going to change dramatically. We can't go back to the way it was before.

We are going to demand, as the health care partners, that there's better data, there's operationalized data. And then the consumer, the patient, is going to demand more from their system. And they want it to be able to consume it, again, in the palm of their hand or in their home.

GREG HORN:

Brilliant. Thank you very much, Steve. And as always, that was just a really interesting discussion. So thank you very much for taking the time to join us today. And I'm sure our listeners are going to have a lot of feedback on this, particularly thinking about how things will progress into the future and in terms of are we moving away from a system that we won't ever go back to?

So please send those thoughts through our email, thehealthpulsepodcast@sas.com, and we look forward to reading those and bringing them to you in a future episode. So thank you very much for joining us today. This has been *The Health Pulse*

podcast. I've been your host, Greg Horn. Please like and subscribe to receive feature episodes. And I look forward to joining you again in the future. Thank you very much.

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