Peter Hotez, MD, PhD, on his new COVID vaccine

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In today’s COVID-19 Update, AMA Chief Experience Officer Todd Unger talks with Peter Hotez, MD, PhD, dean of the National School of Tropical Medicine at Baylor College of Medicine and co-director of the Texas Children’s Hospital Center for Vaccine Development in Houston, to learn about his new COVID vaccine and how it fits into our global pandemic response.

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Speaker

- Peter Hotez, MD, PhD, dean of the National School of Tropical Medicine at Baylor College of Medicine

Transcript

Unger: Hello, this is the American Medical Association's COVID- 19 Update video and podcast. Today we welcome back Dr. Peter Hotez, dean of the National School of Tropical Medicine at Baylor College of Medicine and co-director of the Texas Children's Hospital for Vaccine Development in Houston to learn about his new COVID vaccine and how it fits into our local pandemic response. I'm Todd Unger, AMA's chief experience officer in Chicago. Dr. Hotez, it's great to see you again. And first I want to say, congratulations. You were recently the recipient of the AMA's Scientific Achievement Award, which was presented just this past weekend at the Texas Medical Association's winter conference. It's so well deserved for all your leadership and throughout this pandemic and beyond. I like to think it had

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a little bit to do with the COVID-19 Update bump, but probably not.

Dr. Hotez: I'm sure it did Todd. I was thrilled to receive it and I really feel very fortunate to be honored by the American Medical Association. The AMA has stepped up big time during this COVID-19 pandemic and you've been great about giving me a voice during this time. So it has special meaning to be honored by the AMA for our work in COVID-19 vaccines and science communication as well.

Unger: Well, it's an honor to have talked with you so many times over the past couple of years, and speaking of scientific achievement and vaccines today, we're going to talk about your latest achievement—the COVID vaccine that you've been developing for years was recently authorized for use in India. It's getting a lot of attention and even being called a game changer in the pandemic. Let's talk about the gap that this vaccine fills and what authorization has meant for India.

Dr. Hotez: Well, Todd, we need vaccines for global health. We have nine billion people in the low, and I'm sorry are three billion people that need nine billion doses, six to nine billion doses in the low and middle income countries of Africa, Asia and Latin America. And the question is where do those doses come from if we do not have sufficient amount of mRNA or adenovirus vectored vaccines? So we began working on coronavirus vaccines about a decade ago, and I say, we, our Texas Children's Center for Vaccine Development is co-headed by myself and my science partner for the last 20 years, Dr. Maria Elena Bottazzi. And we've been mainly focusing on parasitic disease vaccines for the poor but also began working on coronavirus vaccines because they were orphaned as well and develop vaccines for SARS and MERS. That's how we showed that the spike protein is a target of vaccination, how to deliver the spike protein induced virus neutralizing antibody.

And then when the COVID-19 sequence came along in January, about two years ago in January of 2020, we realized that we could pivot to a COVID-19 vaccine and developed it. And used our experience over the previous decade to hit the ground running. And it was a vaccine that looks in many respects, as good as any of the others. But the difference is it's a technology that's been around several decades because it's a similar yeast fermentation technology to make a vegan vaccine. There's no human cells or animal cells or animal protein. That's used to make the recombinant hepatitis B vaccine. So, and people have been giving it to their kids, the hepatitis B vaccine for decades. And the great thing about that is it's that technology is in place locally and by vaccine producers in Bangladesh, and Vietnam and Thailand, and you name it China, and India, and Indonesia and Brazil.

So if you really want to make a vaccine for global health, COVID-19, that's the technology to use. And now we've made it. We've licensed it and helping the co-development to four vaccine producers, Biological E in India, Biopharma in Indonesia and Septa in Bangladesh, and ImmunityBio, which is working to build capacity in South Africa and Botswana. BioE, which is one of India's big vaccine producers is the furthest along. They've got 250 million doses already made with plans to make 140 million doses a month till they get to a billion. And they could go on from there. And it was just

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released for emergency use authorization at the end of last year, December 28, 2021. So we're hitting the ground running now. So to start vaccinating India, now in discussions with WHO, the World Health Organization, for emergency use listing and then Indonesia and the others will follow. So pretty exciting to help make a difference in filling this global equity gap.

Unger: That is exciting. And I was always so interested when you first mentioned this story a few segments before, how long you've been working on this. And it was such a great answer to folks who were saying like this was kind of an overnight development. It's not, it's decades in the making. My question for you is given the kind of running start that you had with this and established kind of technology so to speak, why didn't it kind of catch on in the U.S. first?

Dr. Hotez: Yeah, it's a good question. We often ask ourselves is that, because we really were cut out of the whole Operation Warp Speed program. They were really not very interested. Well one, we were not a pharma company, so I think they didn't understand our role and how we could help in vaccine development. And second, they were so focused on speed and innovation, that you use a brand new technology like mRNA without the understanding that even though to make protein takes a little longer than mRNA, we make it up at the back end because we can hit the ground running, accelerating a vaccine for the world whereas, it's going to take years to learn how to scale mRNA.

So I think that was a failing of Operation Warp Speed and we're paying the price for it because Delta rose out of unvaccinated population in India at the beginning of 2021. Omicron out of an unvaccinated population out of Southern Africa, the end of last year. So mother nature's not being coy. She's telling us she's going to do. She's going to, as long as we fail to vaccinate the global south, meaning the low and middle income countries of the world, she's going to continue to throw terrible variants of concerns at us until we finally figure out how to vaccinate the world. Hopefully now ours can come in on that front.

Unger: Dr. Hotez, what do you know about effectiveness in terms of variants like Delta and Omicron?

Dr. Hotez: Well, in terms of virus neutralizing antibody, it's giving really high levels and it's holding up really well versus Delta and Beta. And we're just now looking at the Omicron data and I think it's going to hold up against that as well. And so that's one of the advantages. Not only is it no limit to the amount you could scale, simple refrigeration in terms of how you store it. So no freezer chain requirement. In fact, there's a lot of history and experience with it. One of the best safety profiles of any of the COVID vaccines because it's similar to the hepatitis B vaccine and how it's made. So similar safety profile. And holding up really well against the variants. If you go down the checklist, it really checks all the boxes for what you want out of a global health vaccine. And we think we could do this for $2, around $2 a dose, so the least expensive of all of them. So we're quite excited that it could have that kind of impact on diseases at the border.

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Unger: And that is huge impact. And as you said before, until we make progress in these under vaccinated areas, I think I read in an article about you this morning that we're over 60% fully vaccinated here in the U.S., but under 10% in a lot of these area. So there's really a long way to go to basically safeguard which, what could be another set of variants, so to speak.

Dr. Hotez: Well, as I've been saying to my colleagues, including the World Health Organization, there's another variant of concern brewing across the world's low and middle income countries right now. And we've got about six months to really scale up vaccinations for the world to forestall that are prevented from happening. And that has to be all hands on deck for that. The Biden administration announced that they're donating 400 million doses today, which is okay. But we're about to match that from our Texas Children's Center for Vaccine Development. So there seems to be this lack of awareness of the scale required. When you're talking about a billion people in Africa, a billion in Latin America and the Caribbean, a billion in the smaller, low income Southeast Asia countries, three billion people to multiply that times two or three, six to nine billion doses, that's where we have to get to. And so 100 million there, 100 million there is not enough. You need vaccines like ours that you can, we actually produce at the level of the billions.

Unger: Yeah. It's kind of like, "Hey, there is this other option out there now that has all these advantages" that you're pointing out. So hopefully that will get the traction that you're looking for. I mean, we're all hoping at some point to move, at least at this point into the post Omicron world. I'm curious, as you're thinking about it, what this world looks like, we see so much in terms of moving from pandemic to endemic, a lot of information out there. If you're successful in what you're doing right now, do we have a chance of getting there?

Dr. Hotez: I think so. I think Omicron is clearly starting to go down now in New York and Washington and hopefully it'll continue in that same steep deceleration as just as it went up, it'll come down as quickly and we'll see if that happens globally. And then we've got a few month window period where we start going back to cafes and restaurants and movies. But the history and experience tells us that we should expect another big variant of concern in the summer across Texas and the Southern states, unless we actually can preempt it by vaccinating all the world's low and middle income countries. And that's got to be where the big push should focus.

Unger: For those that are actually watching this video, you can see the look of dread on my face when I think about that for the summer but so important as you're pointing out to head these off, we've got to be on the vaccination front. I'm curious, I've read some of your statements about immunity and about what we can expect from people who get Omicron and move through that, whether breakthrough case. What do we know about where we're heading on that front? What can we expect for people that have had Omicron in terms of herd immunity or future immunity, reading stuff like super immunity, which I was hoping to have, but what is the truth there?

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Dr. Hotez: Well, I think if you've been infected before and vaccinated, I think you'll have pretty strong and durable immunity. And that may also be the case if you've been vaccinated and had some breakthrough infection. I think with the immunological memory, as it is and broadening of epitopes, you may be in good shape. But I think for individuals who've only gotten Omicron, recovered and not vaccinated on top of it, I do not think the immunity's going to be very durable at all. It could resemble one of the upper respiratory coronavirus infections, which has only very short term immunity. So what I'm worried about is there's too much complacency. There's a lot of happy talk saying that Omicron is going to be the end game because then it's going to induce herd immunity and that's finally how all this ends. I don't see it that way. I don't think the protection afforded by Omicron infection is going to be all that durable and we're going to be vulnerable yet again now. Again, not consensus in the scientific community but I think that's where it's going to go.

Unger: There's been a lot of confusion I think, from people saying it's quote "less serious" but when you look at the math, I just saw we've exceeded deaths, daily deaths relative to Delta, which is a big surprise. It is very serious.

Dr. Hotez: Well with so many people getting infected, even though on a per person basis, it's not as severe. There's still enough severe cases that were up over 2,000 deaths a day, once again, and headed towards 900,000 American deaths pretty soon. So again, almost all of those preventable for people who were unvaccinated.

Unger: You've been constantly dealing with misinformation and being a leading voice in correcting that. Are you still facing that kind of tsunami of misinformation out there?

Dr. Hotez: Oh yeah, it's getting worse. And it's now been so linked to far right wing extremism in this country. I mean, you even had a big anti-vaccine rally in Washington over last weekend and it was reported, the Proud Boys were there. So that's where it's gone now. It's now become fully adopted by far right wing extremists. And that's been an evolving or devolving story for the last decade. And now you're seeing it with, even far right members of Congress and podcasters and things like that.

So it's gotten to be very rough waters and I don't know how we start to dial it all back but it's going to be absolutely critical for the health and safety of our country. Because I'm worried this anti-vaccine movement's going to spill over not only from COVID but into childhood vaccinations, for HPV vaccinations, for measles vaccinations. And we'll know because with measles, breakthrough measles is pretty quick to show up if you've got a decline in vaccinations, that's a good bellwether. So we'll know that soon enough because historically when we've had measles epidemics in this country, it was late winter, early spring. So I'm kind of holding my breath for March and April to see what that's like.

Unger: Well, last question, we've talked a lot about the global frontier. Let's turn to kind of the local issue. Any advice you can give to physicians to help play a bigger role in helping us get out of this pandemic once and for all?

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Dr. Hotez: Well, I think providing sound vaccine advice. And right now, unfortunately the Centers for Disease Control is still calling two doses full vaccination and it's not. I mean, we need to get everybody triply immunized if we're going to whether new variants because the double vaccination is not doing well versus Omicron in terms of only 57% protection versus hospitalization, 38% protection against ER visits if you get COVID. Much better if you get three doses, 90 and 82%. So making certain that your patients have three vaccine doses, making sure your patient's kids are vaccinated, or if you're a pediatrician, making sure your patients are vaccinated. If you're an obstetrician, making sure your patient who's pregnant is vaccinated. That's really going to be important as well. And remind people that if they've been infected and recovered, but not vaccinated, they're still very vulnerable to severe Omicron infection.

Unger: Absolutely. Dr. Hotez, thank you so much for being here with us today. And again, congratulations on your award. That's it for today's COVID-19 Update. We'll be back with another segment soon. For updated resources on COVID-19, visit ama-assn.org/COVID-19. Thanks for joining us and please take care.

Disclaimer: The viewpoints expressed in this video are those of the participants and/or do not necessarily reflect the views and policies of the AMA.

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