

EPISODE 38. DIALOGUES: A CONVERSATION WITH PETER HOTEZ

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Peter Hotez [00:00:00] To receive dark emails or tweets on a Sunday that ominously warn of patriots hunting me down, or if impending, "justice" is hurtful and jarring, hurtful because when I decided back when I was an adolescent that I would one day become a scientist, I never imagined a segment of society turning against me or my scientific colleagues. It is still almost unbelievable how many Americans now view us as enemies.

Garry Aslanyan [00:00:28] Welcome to dialogues. I'm Garry Aslanyan. This is a special series of the Global Health Matters podcast. In this series, I'll be blowing open some of the echo chambers that exist in global health. To help me in this quest, I have invited thoughtful and inquisitive individuals from different walks of life. Each of them has explored and written about global health issues from different disciplinary perspectives. I hope this dialogue series will give you, the listeners, an opportunity and space to step out of your daily routine and contemplate global health issues through a different lens. So, let's get started. For our first dialogues episode of season four, I am joined by Professor Peter Hotez. Peter is a vaccine scientist, biochemist, and paediatrician who has led development of vaccines. He is also a science communicator and author, and he is based in Texas, United States. Peter's passion for science and his commitment to serve humanity by addressing vaccine preventable diseases started at an early age. He became a renowned voice in the United States during the COVID-19 pandemic, and he has also become a relentless advocate, promoting the uptake of vaccines and addressing the global rise of anti-science movement. In this episode, I'll be discussing two of Peter's books, Preventing the Next Pandemic, as well as his latest, The Deadly Rise of Anti-Science. Hi Peter. Welcome to the show.

Peter Hotez [00:02:19] I'm so happy to be here and be part of this amazing podcast with the World Health Organization.

Garry Aslanyan [00:02:24] Thanks again and let's get started. I realize you have a very long, career, working as a physician scientist, vaccinologist. In your books, you mention the role your father played in your career choice. How are the principles you were taught as a child still influencing how you approach your work, Peter?

Peter Hotez [00:02:52] That is a great question, and I like to think there hasn't been a question yet that I haven't been asked, being on cable news channels for three years, etc. but I have to say, you came up with one and that is a good one, and I'm glad you asked it. I grew up in New England, the north-eastern part of the US, and my dad was not a physician, but he cared about the United States, and he cared about people, and our neighbours. I think one of the most important lessons he taught me was humanitarian values. For him it was always very important, to do pragmatic things, and do something to give back. I think that's has always permeated my science, I wanted to be a scientist that does things that benefit humanity. I think ultimately all scientists do that in one way or another, but I wanted to do it in a more visceral, tangible way, and for me, there was no greater humanitarian intervention than developing, making new vaccines for the world. That is what I committed myself to at a remarkably early age, as a young man in medical school and graduate school in New York City, I wanted to make vaccines for neglected diseases and global health and set out on this path, and now 40 years later, we're still doing it so very much, my dad, my family was very instrumental and instilling for me that the importance of giving back.

Garry Aslanyan [00:04:42] You rightly regard vaccines as one of the most powerful biotechnologies ever invented. It has not only had an effect on life expectancy as we know, but also, it's a vital tool for peace, global security and international cooperation. Let's listen to an excerpt from your book, Peter.

Peter Hotez [00:05:05] As U.S. Science envoy, I focus my energies on building vaccine capacity and joint U.S. vaccine development with Muslim majority countries in the Middle East and North Africa. I also hope to explore new vaccines to combat diseases arising from the conflict zones linked to the Islamic State and the war in Yemen. While the collapse of public health infrastructure and systems from war became the major driver of disease in the Middle East, it wasn't the only promoter. The human diaspora from the Islamic State introduced new infections into neighbouring Jordan, Turkey, Lebanon, and Egypt, in parallel the region now experiences unprecedented high temperatures, sometimes reaching regularly 50°C for long periods, together with floods and drought.

Garry Aslanyan [00:05:50] It is clear that the gains attributed to vaccines are now being threatened by several major forces. As highlighted in this segment of your book, Preventing the Next Pandemic. Could you share more thoughts on this?

Peter Hotez [00:06:06] I once wrote an opinion piece called COVID-19 was just a warmup act. One of the things I talk about in my book, Preventing the Next Pandemic, one of the most common questions I'm asked, Garry, is something like this, "hey, doc, what the heck is going on?" What did they mean by that? The way I interpret that is this regular cadence that we are getting of pandemic threats, SARS, severe acute respiratory syndrome, in 2002 out of southern China affecting Canada and then Middle Eastern respiratory syndrome under the Arabian Peninsula in H1N1 and then Ebola in 2014, Ebola again in 2019, and then Zika and then of course, COVID-19, and by that same cadence, we should expect another major coronavirus epidemic pandemic before the end of this decade, before 2030. It is happening not by coincidence, as I point out in the book, Preventing the Next Pandemic, it is this combination of 21st century forces, climate change, urbanization, human migrations, animal migrations, poverty. People say, "why climate change?". There is something very interesting, and this was being studied by bat ecologists that with the changes in altered rainfall patterns, climate, new food habitats for bats, which are natural reservoirs for coronaviruses, as well as filoviruses like Ebola viruses. They are moving to new habitats, and in turn, human activity is causing more deforestation, urbanization. It is basically bringing bats and people together with secondary intermediate hosts closer together, and so you're getting this perfect storm of events and that's the cadence for it, that's why we're going to have to figure out a new way of doing things, which includes international cooperation for new vaccine development.

Garry Aslanyan [00:08:05] Another question I want to ask you. There is so many silos in global health. How can we do better in greater collaboration and maybe with non-health sectors to really support more vaccine development, vaccine diplomacy and all that we're going to face more and more?

Peter Hotez [00:08:25] I do worry that with increasing polarization, between nations, especially the big ones, China, Russia, Brazil, the US, and India and all the shifting geopolitics. I worry that people are looking inward when they should be looking outward, that there is this increasing nationalism around all science which should include vaccines. This is a time when we really should be promoting, cooperation and I remain committed to that. I have just returned from India, we partnered with colleagues in India and Indonesia for our coronavirus vaccines with, biological E for the scale up production of core B VAX, which was the prototype vaccine which was developed in our lab. Then we did the tech transfer with no patent, no strings attached to biologically India, biopharma in Indonesia, and that led to the administration aware that 100 million doses of our vaccines with no patent and at low cost, you know, \$3 a dose, and so provide a proof of concept that you don't have to depend on the

multinational pharma companies to still do big things. It is not to demonize the pharma companies either, I think that would be a mistake. They do a lot of good in providing vaccines for the Gavi alliance, but I think we have to explore alternative pathways that don't depend on, very expensive patent filings and all that. This is something that I'm very committed to working with the G20 nations on because they have vaccine producers that can do an enormous amount of good. Our collaboration between bioMerieux and Texas Children's Hospital, 100 million doses administered in India, I mean that proves that it is possible. It is an example of vaccine diplomacy, and this is something we need to continue encouraging. It can only be a win win.

Garry Aslanyan [00:10:29] Peter, let's listen to another extract from your book.

Peter Hotez [00:10:34] Throughout January and February, I would wake up each morning to review the latest information coming out of China. It revealed that the new virus age was closely related to the SARS coronavirus, and it was ultimately named SARS coronavirus 2 or SARS-CoV-2. SARS coronavirus 2 exhibited approximately 80% genetic similarity to SARS, the original SARS, and was bound to the same host cell receptor in the lungs. It quickly became apparent that the two viruses were similar enough that it was possible that our SARS vaccine manufacturing process could be repurposed to produce a similar vaccine, but one specific this time around for SARS-CoV-2. Our team of scientists worked long hours and often seven days a week, throughout the spring and summer of 2020 to make this happen.

Garry Aslanyan [00:11:19] How was it possible for you and your team to support the LMIC's with affordable vaccines, Peter?

Peter Hotez [00:11:26] It is a great story that really needs to be told. My passion had always been new vaccines for parasitic infections, the one the big pharma companies would probably not be interested in. We started developing a Hookworm vaccine, Schistosomiasis vaccine, Chagas vaccine, and then about a dozen years ago, we got approached by two scientists, Shibo Jiang and Lanying Du at the New York Blood Center. They said, you're really committed to making vaccines that are orphan that nobody else wants, can you help us with coronavirus vaccines? because nobody wanted those either. This was back in 2010. We started collaborating with that group on making new vaccines for SARS, severe acute respiratory syndrome in MERS, Middle Eastern respiratory syndrome, providing our same approach, low-cost scale up production. We had already more than a decade of experience making coronavirus vaccines when the SARS-CoV-2 sequence came online in January of 2020, that was put up on bio archive. I remember looking at the sequence and I said, oh my God, we can make this. I remember calling my science partner, who co-heads the Texas Children's Hospital Center for Vaccine Development with me now, Dr Mary Elena Bottazi and Mary Elena I think we got this, and we started contacting various people, got special permission from Baylor College of Medicine, Texas Children's Hospital to start making this vaccine. We were cut out of the US program, out of Operation Warp Speed for mRNA vaccines and others because they only wanted big pharma companies. Their thinking was only the big pharma companies, the multinationals have the chops to pull this off, and we disagreed. We were able to raise some funds in Texas, not billions, but enough to get started. Then by 2021 we were getting frantic phone calls from ministers of health and ministers of science in many countries because they realized the mRNA vaccines weren't coming or not coming any time soon. We said we were going to try to help fix this, we began working with any country that had a proven track record of making vaccines, and we worked with India, Indonesia, Bangladesh, and it was very successful. We would send the production cell bank from our laboratories, because we actually make vaccines in our labs to these countries, and then it was getting up at 4 a.m. in the morning to start doing zoom calls with them for the tech transfer, and how to scale up production. We got a lot done. That was very meaningful to see that our idea that we had conceived decades ago for making prototype vaccines for neglected diseases and then transferring it, the idea was actually sound, it worked. I will never forget the day when the first vaccine started going

into arms in India. It was just one of the most moving things I've ever seen, and the same with Indonesia. With Indonesia, it was also interesting because our technology is a vegan technology in the sense that, no animal cells, human cells, no animal protein, human protein. They came into our labs and confirmed the source reagents for everything we used in the vaccine, confirmed it was indeed non-animal, non-human source. By having what is essentially a vegan vaccine technology because it is made through microbial fermentation in yeast, just like the hepatitis B vaccine, they work with their clergy and got it certified as one of the first Halal COVID vaccines. It is fascinating what happens when you start going to scale, things start to happen that you could never have predicted, that was amazing to be able to make the first Halal COVID vaccine for the world against, just meaning on top of meaning, and of course, it's all vaccine diplomacy.

Garry Aslanyan [00:15:37] A new threat has gained more prominence and you won't be surprised that I mention misinformation and also inflammatory anti-science movement. How has this personally affected you as a scientist Peter?

Peter Hotez [00:15:52] That is an important question. Developing new vaccines, which was by design since I was a teenager and became a young medical student and graduate student. That is what I wanted to do with my life. I never thought 40 years ago when I embarked on that journey that I would ever have to defend vaccines. That was inconceivable. I grew up at a time of when people like Albert Sabin, Jonas Salk and Stan Plotkin were lauded, were celebrated for making vaccines for the world, and I wanted to be part of that. But then there was the false assertion that came in the late 1990s, it came from a paper that was ultimately retracted from the British Medical Journal The Lancet, that falsely claimed the measles mumps rubella vaccine could cause, pervasive developmental disorder, autism, and here I was in a very unique position because I have four adult kids, including Rachel who has autism and intellectual disabilities. I wound up writing a book called Vaccines Did Not Cause Rachel's Autism. That made me public enemy number 1 or 2 with anti-vaccine groups, which was scary at times because there was a lot of aggression, online attacks and I was even stalked on multiple occasions. I said to myself if I don't speak up about this, who does? and so this became then a kind of an unanticipated parallel career for me becoming a very ardent vaccine advocate, defending vaccines against an accelerating anti-vaccine movement. I think the scary part is how it became a political enterprise in the United States, linked to far right extremism, "You can't tell us what to do", but then it became deadly during the COVID pandemic because in the new book I wrote The Deadly Rise of Anti-Science what you saw starting in the summer of 2021, there was a call to be defiant against vaccines, so what happened was that under the banner of health freedom, medical freedom, elected leaders from a political party were telling people, we're railing against vaccine mandates pushing against the idea of vaccine mandates, but they took it a step further. They not only tried to discredit vaccine mandates, but they tried to discredit the effectiveness and safety of the COVID vaccines themselves and by crossing that line, they basically convinced hundreds of thousands of Americans, millions of Americans, predominantly in conservative parts of the United States, Texas, Oklahoma, Arkansas where I am, not to take a COVID vaccine during the Delta wave. So, they were unvaccinated. The results were again, predicted and predictable. My estimate is 40,000 people in my state of Texas needlessly died because they refused a COVID vaccine. Then here is where it gets hard to talk about, because as physicians and scientists, the whole ethos of the WHO says, we don't care about politics, we are above this, we don't want to talk about politics where this is more important. This is saving lives. I haven't found a way to talk about it other than to talk about it, so I talk about it or I wrote about it. Not that I care about your political views that you write as an American citizen, as a global citizen, as far as I'm concerned, but don't adopt this one because it's going to kill you, and it did, and it was so heartbreaking to watch it. I think one of the big questions is how do we walk that back now? How do we uncouple the anti-vaccine sentiment from American politics. When I talked to colleagues, there was someone you probably know pretty well Heidi Larson is an important officer of medical anthropology at University of London, London School of Hygiene, Tropical medicine. She's seen

this now as well, that US style anti-vaccine rhetoric, pop into low and middle income countries. You are seeing it in on the African continent, you are seeing even in Latin America, it is not staying within U.S. borders. It is already up in Canada, it is in Europe, it is going to contaminate low and middle income countries. This is a full on negative global force. I worry now that it's not stopping at COVID-19, it's spilling over into childhood immunizations. During the COVID pandemic, inevitably there were diversion of resources, there were social disruptions and vaccinating the world's kids, it went down from 86% to 81%. It may not sound like a big drop, but it's the first time it went in the wrong direction. I worry now we don't bounce back because we don't come back to baseline because of this anti-vaccine movement. This has become a dominant political force now that we're going to have to find ways to manage.

Garry Aslanyan [00:21:15] Peter, you mentioned this in the book and of course, anyone working in this area knows that really the history of the movement goes back to this article in Lancet about MMR and how that affected and how, as you mentioned, many LMICs as well now are getting into more complicated situation when it comes to vaccines. Just to play the devil's advocate, do you think that in a way global health community has inadvertently contributed to this mistrust in public in science?

Peter Hotez [00:21:50] This comes up a lot, I think because people who go into global health are very thoughtful, caring people, the first reaction to any crisis is we want to blame ourselves. That's always the first reaction, and it's somewhat adaptive too, it says that we're humble, we're honest people. Here's one of the things that I see happening, and not everyone will agree with me, so think of it as a kind of an iconoclastic view on this point, I've called out people on the far right for basically contributing to the unnecessary deaths of 200,000 Americans for political reasons, it's not misinformation or the infodemic as though it's just some random junk on the internet, it's organized, strategic, deliberate, well financed, politically motivated and it's killing people. Now that I've pointed it out, we're starting to see the next phase of this, and the next phase is kind of a doubling down, rather than having pause for self-reflection, those same bad actors who caused people to die, convincing them not to take a COVID vaccine are now shifting this around, and it's coming in three forms. Form number one, they're trying to say it was the COVID vaccines that killed people, not COVID-19, which is absolute nonsense, it's trying to say the scientists created the COVID virus through gain of function research, which is also absolute nonsense, but the third piece was the public health community that screwed up because they miscommunicated about vaccines. What's interesting about the third one is, the communication around vaccines was imperfect and the communication about many aspects of the pandemic were imperfect. I could do a whole hour podcast with you on the ways which we could have communicated better, but that in my view accounts for 10 to 20% of the problem at most, because what was really going on were bad actors weaponizing all of this, any time there was imperfect communication, they weaponized it and blew it up. A lot of the discussion that we've got to use more social science to improve science in health communications, yes absolutely true, and I welcome it. I think it's going to be extremely useful. We have to revise how we communicate to people and take lessons learned; all of those things are true. That will improve things by about 10 to 20%. Because the real culprit here remains this very aggressive anti-vaccine movement and that's where our focus has to be.

Garry Aslanyan [00:24:53] Let's listen to another excerpt from your book.

Peter Hotez [00:24:57] Tragically, this situation is not the beginning of the end, but more like the end of the beginning. Currently, little prevents this anti-science juggernaut from expanding, although it reached critical mass during the pandemic. This movement is no longer only about COVID-19, and we should expect it will spill over to other areas with the resulting drop-in immunization rates for all childhood vaccines and interference with many other aspects of public health, including global efforts to combat HIV Aids, malaria, tuberculosis and neglected tropical diseases. Anti-Science has begun to contaminate

other cutting-edge fields of biomedicine, including gene editing, bioinformatics, stem cell research, foetal medicine, systems biology, transplant biology, and modern neuroscience. This will only get worse.

Garry Aslanyan [00:25:44] Over the years you have had to invest time in parallel career and communication, as you just mentioned, and advocacy. How do you think current and future global health scientists, a lot of them listening to our podcast, practitioners as well, need to be equipped to effectively combat anti-science?

Peter Hotez [00:26:05] There is the big answer that we are not in a position to do, and then there is another answer on things that we can improve on and things we can do. The big issue is because in my view, the anti-vaccine and the anti-science movement is first and foremost a political enterprise. There are limits to what the health sector can do with this, and the fact that it is become a killing force means that international agencies need to seek advice from other international agencies to deal with political threats. I think of the anti-science, disinformation, health disinformation in the same context as I would think of cyber-attacks, nuclear threat or military invasions. I have said to the Biden administration in the White House, we are going to need help from Office of Homeland Security, even State Department, because of the foreign actors putting out disinformation. I would say the same to the WHO, seek input from other global security agencies, because that's what this is, you can throw all the health communication that you want at it, but that's not going to help you defeat this political monster. People are often surprised that I have that as an answer. We are going to need to recognize that it's political enterprises, uncomfortable as that makes us feel and take it on. There are things that we can do to improve, we don't have good science in health communications imbedded in our training. I had to learn it all on my own through trial and error, so I like to say more error than trial, but I think there is a way to improve communication. We need to start providing that instruction in our medical degree training, our PhD training, our doctoral training, our postdoctoral training, our residency and fellowship clinical training. Not everybody wants to do it, and they should not be forced to do it, but especially among young people, their commitment to public service is very high. We should give them that opportunity for the very simple reason, most people in the United States and probably globally have absolutely no idea what most of us do on a daily basis. We are not seen as people. We are not seen as humans that struggle, they do not understand what it means to revise scientific papers or get turned down for grant applications or what goes on at a scientific meeting. That is our fault, so instead we are seen as these kind of dark, lurking figures hiding in the shadows with white coats on and plotting all sorts of nefarious deeds. We are not seen as authentically caring individuals, which we are, and I think that has to be a big push. Part of the problem is in the US, the university leadership's, the academic health leadership's like to control the message, and they do not necessarily like their doctors and scientists speaking out. We have to change that culture and make it part of career advancement too, that you are doing that public engagement. I think that will help a lot. I think another problem that we have is the disappearing science journalists. They are all gone, from major news outlets, we do not have science journalists anymore, and we have to figure out a way to restore that or take scientists and help retrain them in knowing how to do journalism, if that is what they want to do. We have created vacuums that allow the anti-science forces to roll in, so number one is recognized as a political monster, number two, there are incremental things that could be done that I still think would make a difference.

Garry Aslanyan [00:30:13] Just to wrap it up, anything else you would give as an advice to our listeners within their sphere of influence that would help?

Peter Hotez [00:30:23] I think we just went through one of the worst pandemics in modern times, and there is a lot of handwringing and concern about what went wrong during the pandemic. But some things have gone right as well. In the US alone 3 million lives were saved through COVID vaccines. That is an estimate from Alison Galvanis group at Yale School of Public Health, we are working with her

colleagues. We have seen dramatic declines in the number of people dying every year from childhood preventable diseases since 2000. I mean, what an extraordinary public health victory, reducing measles deaths from half a million deaths a year to under 100,000. I think we are going to have new vaccines coming online, we are excited about our human hookworm vaccine, there is a new malaria vaccine. In some ways it should be as much a time for celebration.

Garry Aslanyan [00:31:28] Thank you Peter, for joining us at this dialogue and for the time and great conversation.

Peter Hotez [00:31:36] Thank you so much.

Garry Aslanyan [00:31:39] Peter provides an optimistic yet sobering perspective on the significant progress we as a global community have made to reduce vaccine preventable deaths, while also calling out the emerging threat we face. He regards the anti-science movement as a strategically coordinated and politically motivated endeavour that has resulted in a significant loss of life. Never did Peter imagine a career in science will be one that carries significant personal and professional risk. May Peter's courage to use his voice as a positive force be an inspiration to all of us to do the same. To learn more about the topic discussed in this episode, visit the episode's web page where you will find additional readings, show notes, and translations. Do not forget to get in touch with us, via social media, email, or by sharing a voice message. And be sure to subscribe or follow us wherever you get your podcasts. Global Health Matters is produced by TDR, a United Nations cosponsored research program based at the World Health Organization. Thank you for listening.