

Episode 33: The COVID-19 Vaccine Race and the Law

with Professor Ana Santos Rutschman

December 10, 2020

The race for a COVID-19 vaccine has captured the world's attention. Pharmaceutical companies across the globe are competing for a top spot that will pull us out of this pandemic. What does this mean for our immediate future, and what will it mean for vaccine development for years to come?

I'm Jessica Ciccone, director of communications, joined by Professor Ana Santos Rutschman.

Ana is a member of the Center for Health Law Studies and Center for International and Comparative Law. She is an expert in FDA law and policy and vaccine patents. She has been tapped by national leaders and policy-makers across the country for her expertise. Thank you for joining us today, Ana.

J: First, let's talk about vaccine development. In normal time this takes years, right? So what kinds of changes and what has happened to make this progress so quickly?

A: Right, so normally and this is not just vaccines, any drug you can think of that we have to develop basically from scratch, that takes years, and when we say years, we're not thinking 1, 2, 3, 4 years; we're thinking a decade or sometimes over a decade. It's going to be product-specific so some drugs can be developed a little bit faster, some might take up to 14, 15, 16 years. And vaccines kind of fall on the decade-plus side of the spectrum under normal circumstances.

Now there is very little about COVID and drugs and vaccines for COVID that is normal. The timeline is one of those things. So we're talking about vaccines targeting infectious diseases here, which is a particular type of vaccine. The pathogen is new, some of the vaccines that we're developing right now rely on pre-existing technology, so that's something that's we've done in previous outbreaks and from a science perspective, we're pretty good at developing vaccines just by adapting existing vaccine technology against a new pathogen. In the case of Zika and Ebola, for example, the vaccine development process was also pretty quick especially during those outbreaks, and then it did get a little bit slower but during those outbreaks we progressed pretty quickly. This is something we've done with some degree of success in the past. So as long as we're adapting pre-existing technology, we can shorten that timeline.

Something that's a bit different about COVID is that we have emerging vaccine technology. So things that realistically until about 10 years ago we were not pouring as much money and resources into as we were into other areas of research and development, but in the U.S., in Europe and a few other places, there was really big support for different types of vaccine technology. So if you've heard about Pfizer and Moderna having something called an mRNA technology, this is a type of vaccine technology, a way to make a vaccine work that we didn't have before. But about 10 years ago this became much more of a strategic priority in vaccine

development, and now we were just able, because there was money, there was pressure, there was a public health need, we were able to accelerate the development of a new form of vaccine technology. So we've done both. We've developed the old stuff and the new stuff very fast, faster than usual, but this is why it is scientifically possible to bring these vaccines to market as quickly as you're seeing them come to market.

J: That was one of my follow-up questions about that mRNA technology in vaccine development. That's pretty exciting. Obviously these vaccines have been known to have high rates of efficacy and of safety, so that's really good, too, but when it comes to that mRNA technology, why is this a big deal? And then from the law side, from the patent side, what do you think that's going to mean for the future of vaccines?

A: Yeah so, it is a big deal, first scientifically, right? We kind of are accustomed to the idea that a vaccine is pretty much — you get a shot, which has some version of the pathogen that has been killed or attenuated or something like that, so you get injected with that and your body will fight off that attenuated or killed pathogen and that will trigger an immune response that will protect you hopefully in the long term but at least for a period of time. So this is how vaccines have worked scientifically and that's the basis of vaccinology up until now.

So the idea that we can now develop vaccines that will not require the shot you're getting to be putting a little bit of the pathogen in circulation in your body, what these new vaccines are doing is basically sending a set of instructions on how to trigger that immune response but without the media we used before to achieve the same goal. So scientifically this is obviously very exciting.

It adds also regulatory implications. So one of the big debates right now both in the U.S. in regards to the FDA but we saw this happen even faster in Europe with the European Medicine Agency clearing one of these vaccines even before the FDA did, so from a regulatory perspective, if you think that now we've generated data about safety and efficacy of these vaccines — these are requirements that are pretty much the same all over the world anytime you want to bring a vaccine to market and the product is new, the regulatory agency is going to check for these two things.

Now this data was generated really, really quickly in this particular vaccine race. From a regulatory perspective if we have an older type of technology we have a much better sense of what these agencies are going to be looking for. And we've discussed, we have a different type of technology emerging. So from a regulatory / legal perspective, this is really the first big discussion we've had. There is a traditional way of approving products, drugs and vaccines, and because in a public health emergency which obviously COVID counts as one, there are, I'll call them "expedited regulatory pathways," so instead of the usual standard of review the agency will use a lower one, because what we're witnessing right now it is important from a public health perspective to get these vaccines to people in need sooner rather than later.

And that's what's happening in the U.S. with these new vaccines, so we have, from a scientific perspective we have something new, meaning we've never really generated data for these

types of products and yet you see the FDA using the standard again, this lower data threshold, so that raises a lot of questions. And people oppose the use of that pathway, which is called the Emergency Use Authorization, so it's an authorization to use something that has not been fully approved. And then we'll wait on more data and the FDA can revoke that authorization at any point if data don't support that authorization anymore, but the point is we are bringing unapproved products to market and we're balancing that risk with the public health need.

That's the first one. And then there's the patent. Pretty much everything that's new right now can in all likelihood, or I shouldn't say can be patented, but there will be efforts to patent different components of the technology. What you are seeing with older forms of vaccines is that there was still a lot that we were seeing patents on, so if you think of some of the more modern vaccines like HPV for instance, they had dozens and dozens of patents, they still do, covering the technology, but the older vaccines, again, infectious diseases, there's very little intellectual property and it's not worth a lot, to the point that poorer countries are often told, 'if you can't buy the most recent one, just get the older one.'

And that's not going to be the case with these emerging vaccines, so new technologies means the likelihood we'll see a lot of patents in this area is a reality. They are going to be valuable because we're going to develop new vaccines based on this technology, and down the road that may make innovation by following companies more expensive. It may ultimately raise the price of vaccines targeting other diseases other than COVID, it might create some uncertainty for companies that want to come to market but now there's a lot of intellectual property to clear, so they might choose something else. So I would say those are two of the main things on the legal and regulatory side of things that I'm working on, and there's obviously a lot more, but on the FDA/patent side of things, those are the two biggest issues.

J: So are these patents going to be done from a national perspective, or are they going to be different for each country? How does that work since this is a global pandemic and a lot of the diseases that we're going to see in the future are going to be all over the world?

A: Yes, the answer is probably yes and yes, international, but there's a global implication. So patents — and pandemics don't change this — patents are always granted on a national basis. There are international laws and an international treaty called TRIPS that regulates how domestic laws have to operate, but as long as your domestic law is compatible with the minimum standard set in TRIPS then national jurisdiction, the legislature can set up the system at will. So what we have is a patent system that looks very, very similar to one another, but it still takes an act from a domestic, in this case agency in the U.S. for a patent to be awarded and it's just for this country. So a U.S. patent is valid here. It's recognized here but does not produce the exact same in France. You want something in Europe, you have to go to Europe and get your patents there. And Moderna, Pfizer, those companies just patent around the world. That's always been done like that, since the late 20th century, that's sort of the game, the way you play the game, you just patent everywhere. So each country will assess the validity for instance of a patent according to its own laws, but these companies that have a product with a potentially

global market will have patented pretty much anywhere where they think they will be commercializing the vaccine.

And then the other twist to this is that we know they're doing this, we just don't exactly know what the landscape looks like because in the U.S. and most countries there's a gap between applying for a patent and publication of the information that goes with the application. And we're squaring that gap right now. So we will not really know what's happening until a year, a year and a half from now, that's when the information will become publicly available. So the PTO here will start publishing the application and we can start looking at them. And we know some things indirectly because there have been skirmishes between companies and there were patents alluded to, we can guess some things, but we don't really know what the patent landscape looks like, and we won't, until these vaccines are already in the market.

J: So kind of on that line, you have talked a lot about vaccine nationalism. What does that exactly mean, and how will it impact the distribution of the vaccine once it's ready?

A: So that's sort of a gap theory problem. We suddenly directed a lot of resources to vaccine R&D which we normally do over a much more protracted period of time, but now everything is compressed, right? When there is such demand for a public health good, then it's economics 101 — if you have the money to secure a sizable amount of vaccine potential, vaccine doses, so we're still developing the vaccines, we don't really know which ones are going to come to market first, you can make an educated guess. Even though the vaccine race has dozens and dozens, actually hundreds, of candidates, you kind of know that pretty quickly the race is going to be narrowed down to just a handful, which is why for instance, Operation Warp Speed is working with less than 10 candidates. The European Union was also honing in on just a handful of candidates, you can make that educated guess.

So if you're a country that has money, you use a very simple contractual mechanism that's used routinely, almost every day at the country level between individual companies. You think somebody's going to produce something of interest to you, of value, and you say 'Hey, when this is clear to come to market (because vaccines are regulated, you can't just start selling them without the nod from the regulator) but the moment you get your nod to go to market, I will buy X.' So again it's economics at its most basic level. If you have the money you place an order *before* the good is ready to be commercialized. So it's a pre-purchase, a pre-production agreement, so an advanced commitment, there's different names that we use to designate these types of agreements, but effectively it's a contract saying, 'I will buy X from you.'

In the current economy and political economy, you know that's not all countries, most countries can't really do this — it's the wealthiest countries that have been able to do this, not just during COVID, they did this in the previous pandemic the one we tend to forget about because collectively we barely noticed it, which was going on 11 years now, the swine flu one, that was the reaction of the wealthiest countries, so we're talking the U.S., we're talking countries in Europe, and, you know, a few other places in the world. And this is problematic bc as COVID has demonstrated this is not a U.S. problem, this is a global public health problem. So if there's

a way for some countries to contractually just make sure they get an enormous amount of vaccine doses, this is obviously problematic for countries that don't have the possibility of placing these advanced market commitments. So that's what a lot of people have called vaccine nationalism, so you're looking at vaccines as a commodity that can be privatized across national lines, so the U.S. buys X, Austria buys X, and then a poor country in Africa is left to either tap into some international mechanism — we now have one that *partially* helps these countries — or you're going to be dead last in the queue when vaccines are ready to be distributed. So that's a problem that's very hard to solve, but that's the problem of nationalism, and countries tend to overbuy vaccine doses.

J: So when it comes to the U.S., how do you think, or already know, the laws that are going to govern the distribution of the vaccine, and what does that mean for you and I and the general public?

A: So the U.S. has decided to go at this from a purely nationalistic perspective. Some countries have done what I just described: they placed those orders, but then they joined a pulled procurement facility which was created just for COVID-19 vaccines called COVAX — that one is a mix of developed countries and developing countries, so wealthier countries and not so wealthy. The U.S. and a handful of other countries chose not to do that. The U.S. pretty much decided we were going to have Operation Warp Speed and we are going to basically contract directly with private companies.

Now we heard from the EU that this clears one of the vaccine candidates to go to market faster; the U.S. at the time we're recording this is poised (we think) to have one or two vaccines getting authorizations from the FDA to come to market pretty quickly, so this scenario, even though we've done things a little differently, is not going to be very different from what you will see in Europe. There will be vaccine scarcity because one of these two vaccines that are sort of the leaders right now is very hard to distribute. It's hard to distribute anywhere in the world including even in a wealthy country like the U.S. or Western European countries. It is a super cold vaccine so we won't have enough of it, and it's going to be really really hard to get the vaccine where it needs to be particularly outside urban and suburban areas. So that is going to be just a logistical problem we're going to face everywhere. The other vaccine is not as problematic from a logistic perspective, but again we have not manufactured as much as we would ideally like to have.

I don't want to understate the point that this is all remarkable from a scientific and technical perspective, but when you look at the numbers people indicated for the vaccine, we are still going to go through a phase of scarcity. If you're not in the U.S. or one of the European countries that has also placed a lot of these advanced orders and is high up on that list, you are going to wait for these vaccines even longer, and if you're one of those countries with a weaker public health infrastructure, then obviously that is going to take a toll on your public health.

J: I can't even imagine trying to work that out. Power be to all the people trying to figure out those problems for us right now. As far as when we get to the point of having enough, fighting

off that scarcity, we're talking now about getting a great number of people vaccinated, we're kind of battling another whole thing, which is the vaccine misinformation, especially give the highly politicized nature of the pandemic. Can you talk about what vaccine misinformation is and what can be done to combat it?

A: That's a tough one, as well. I would frame it perhaps in terms of vaccine trust, to which vaccine misinformation is a huge feeder, I would say. The words and the concepts we use in this area are sometimes a little bit misleading. We talk about trust in vaccines or lack thereof, we talk about vaccine hesitancy, we talk about people who are pro- or anti-vaccine. I'm not even sure these concepts are the right ones to explain what's going on, but basically we've known that in recent years, confidence, public trust, people holding favorable views on vaccines and vaccination, all of those things have started to go down.

Just to put things in perspective, many of the vaccines that you and I are now familiar with and possibly we've gotten a few of them, they were developed in the mid-20th century and then perfected after that. And that's sort of the same period of time in which you see a lot of vaccine-preventable diseases either disappearing or the levels get well under control. And in recent years, just the last couple years, you saw things like measles making a comeback even in the U.S., we had multiple outbreaks across the country last year, so the WHO put out a report saying 'Hey, we always list sort of the top 10 threats to global health; yeah, vaccine hesitancy is now one of them.'

Hesitancy or lack of trust is deciding if there is a vaccine available to you and you're indicated for it and there's no cost or no significant hurdles for you to get it, so say the FDA has authorized the vaccine which is what we expect with COVID-19 and you don't have to pay a dime and you're now indicated to get the vaccine, so it's available to you. But you either decide to wait a little bit longer because you kind of want to see how your friends and neighbors are doing after getting the vaccine so you delay vaccination after what's recommended, or you say 'I don't trust it, I'm not getting it,' so hesitancy, which then gets conflated with being anti-vaccine which, I would argue, is slightly different, but these are all things that have happened with vaccines that we've long been familiar with, and current surveys indicate that the levels of mistrust or doubt about COVID-19 vaccines are going to be pretty substantial.

They're going to be substantial overall, so across all sectors of the population, but obviously they're going to be even more pronounced when you talk about populations that have traditionally either been neglected during clinical trials in general, vaccines and beyond, or directly harmed in clinical research, and we're talking primarily of racial and socioeconomic minorities, and these are precisely the communities that have been most affected by COVID-19, so the picture is not looking very good once we get past the logistics and the scarcity problems we've talked about because people just don't trust the ways these vaccines have been developed. And some of these reasons are historical and some of these reasons are newish. And one of the new components is this idea of misinformation, which in the field of vaccines has long existed, it's been documented centuries ago, they've gotten more ground in the 20th century with a study that was discredited and retracted. So one of the things that has made this

problem worse is the advent of social media has made the circulation of vaccine-specific content much easier. And we know that a lot of this content made available online in general but particularly through social media, when it comes to vaccines it's inaccurate, a lot of it, a substantial portion of it and it's inaccurate sometimes on purpose and it's called disinformation, so these are social media accounts or people behind these accounts, they have an interest in promoting inaccurate information about vaccines, so saying they're not safe, saying that there's some sort of deep state conspiracy behind public health authority's support for vaccines, etc.

And then there's what we already have seen in the years leading up to the proliferation of social media which is a certain trust of vaccines, or I should say pockets of distrust in vaccines. Those have made their way to social media platforms where they are incredibly loud, which are one of the words used to characterize small numbers of people or groups that have a message that travels disproportionately faster and to large numbers of recipients. So that has aggravated vaccine misinformation, disinformation, whether it's been on purpose or not, that has aggravated this debate on vaccines, and all of this is making for a very, very messy situation when we do have those vaccines available for the population in general.

J: Wow. Well, there is no shortage of things to talk about when it comes to vaccines in general, and in particular the COVID-19 vaccine, but I know we're all anxiously awaiting it (well not all, but I am, for certain!) So I'll just be here waiting for you to let me know which one and when, Ana. So thank you for your expertise and taking the time to talk to us today.

A: Sure, I'm very happy to do this. And I'll just add, I'm just a lowly law professor. So I can talk about regulatory and legal tools, but as with anything that's public health related, the public health authorities are in the best position to advise vaccine-specific entities but the public at large on what they should be doing. I know 2020 was a crazy year in many ways. I'll keep saying that anything socially or politically divisive has been, I hope, maxed out and has been really, really explored throughout 2020. So I really hope that there's a return to science and to some degree of trust in public health and positions that can dispense that advice with regard to vaccines. And I look forward to following the moment those vaccines are available and that advice is made available to all of us.

J: Absolutely. Thank you, Ana.

A: Sure! Thank you for having me.

Thank you for joining us for SLU LAW Summations, produced by Saint Louis University School of Law.