00;00;06;26 [Jen]: From the California Prevention Training Center in San Francisco, this is Speaking Frankly, the State of Sexual Health. We know good sexual health doesn't just happen, it's created. In this series, we're starting the conversations we should already be having. We'll speak with experts in the field about sex, stigma, and all of the other factors that shape our sexual health and our everyday lives. I'm Jennifer Rogers. Today, we're talking with Dr. George Rutherford, professor of epidemiology at UC San Francisco. He's a trusted authority on the COVID-19 pandemic and is on

00;00;42;01 the front lines of fighting the virus. Today. He speaks with us about the Pfizer and Madeira and vaccines. The remarkable way China has worked to contain the virus and what key mistake the U S government made that could have saved millions of American lives. Thanks so much for joining us. I hope you enjoy the episode. Thank you so much for joining us, Dr. Rutherford, you have so many years under your belt of doing HIV focused

00;01;08;18 work, and I would just love to hear how you got to kind of where you are and about your background.

00;01;14;16 [George]: Sure. So before HIV, I trained sort of before HIV hit the news, although it was just starting at CDC when I was there. So I'm a physician I trained in pediatrics and then went to the epidemic intelligence service and was, uh, started in 1982, just as HIV was, was hitting. my first year in Atlanta, I worked in a group that worked on pediatric syndromes of unknown etiology, like rise syndrome and Kawasaki syndrome and hemolytic uremic syndrome, which we later found out it was a

00;01;44;28 bacterial disease, [Jen] interesting. [George] And then the second year I transferred in once in New York city and worked primarily in childhood immunizations, but also in the, I was the clinical director for the tropical disease service there, which was fascinating and got peripherally involved with HIV. And one day in 1985, I was sitting on the second floor of the health department building in New York at 125 worth street, looking at the latest group of people, shackled together, being brought back down to the Manhattan, Midtown women's house of detention in a sleet

00;02;15;11 storm.

00;02;15;23 [George]: And I thought, and the phone rang and they said, well, what would you think about going to San Francisco? I said, when does, when does that boat leave? So I ended up being transferred by CDC to San Francisco, to the department of public health, to basically set up the AIDS, epidemiology research programs, surveillance, variety of other things, and worked there for CDC for a couple of years, then for the city for three years. So I was there a total five years and then went over to the state as chief of ID and state epidemiologist for about three years. And

00;02;46;24 then about two and a half years as the state health officer over all of public health for California. So then I had a chance to go back to the university and I went back to the university. So I've been there ever since a couple of years at the public health school, mostly at the medical school and right now my, my. So I, you know, it's like typical academics. You do research, you do teaching and a variety of community service kinds of things, which are in public health or the equivalent of clinical work. So my research largely focuses on HIV, largely in Africa, but some in Asia and the Caribbean and

00;03;19;17 Eastern Europe, I do little bits and pieces of other infectious diseases as well that my teaching focuses mostly on global health. I teach a big survey class and foundations of global health. I also am the head of the residency in general preventive medicine and public health, which is how to teach physicians to become County health officers, basically. [Jen] Okay. [George] But ever since February, I've been consumed probably at least 16 hours a day by COVID. And so that's all kind of public service stuff, either helping to

00;03;48;05 support the San Francisco department of public health or the California department of public health, a little bit CDC, we're doing all the training for a contact tracing in Guam, sort of places you wouldn't normally go. [Jen] Right. [George] So that's kind of my portfolio right now, but it's pretty much all COVID right now.

00;04;07;12 [Jen]: Can you talk a little bit about the similarities and contrasts between HIV AIDS and COVID-19 and what you've seen?

00;04;17;11 [George]: So it's interesting. There are a lot and there aren't. to start with the dissimilarities COVID is a respiratory disease that can be spread predominantly spread by droplets. So it's fairly short range, but it can also be spread by aerosol. So it can be somewhat, and aerosol transmission, small particle transmission is pretty rare, but you don't necessarily know who you got it from. Right. And it could be somebody passed on the street or talked to, or sat across from the restaurant in or whatever. Whereas HIV beings predominantly sexually transmitted except for

00;04;49;19 needles and mother to child transmission. [Jen] Right. [George] It's somewhat more memorable. I would assume. So you get the chains of transmission are a little bit clear. in terms of mortality, You know when I started with HIV, it was a hundred percent fatal, maybe 99, 95% fatal, but with COVID, it's sort of the flip side of that. It's not that, you know, it's, it's, we probably have a one or 2% mortality rate associated with it, depending on how old you are. So that changes the equations too, in terms of how seriously people take it. And then the, you

00;05;21;15 know, the other part is, is that there's just so much more COVID than there is HIV. I could tell you back in the day, we did a paper on the first thousand cases of AIDS in San Francisco, we would have been 1985, which would have been seven years into the epidemic. You know, here there’re a thousand cases, a day, two days ago, there were 60,000 new cases in California. So just to give you an idea of orders, of magnitude difference, and, you know, yeah. There turns out to probably be, I don't know how many

00;05;49;06 cases there have been totally of HIV and in San Francisco, 15, 20,000, you know, statewide this, these numbers just dwarf anything else I've seen.

00;06;00;06 [George]: And, you know, and we've had some experience in my group working on other epidemics, principally Ebola, you know, one where you really play for keeps because that has an 85% mortality rate associated with it, but all sort of 75%, depending on where you are, but also Zika and congenital transmission of Zika and the, um, 2009 swine flu SARS in 2002 before that. So we've had quite a bit of experience with seeing waves of, of infection over the years. And plus tried to deal with more, you know, more endemic diseases like chlamydia and HIV, obviously, um, and

00;06;34;05 tuberculosis. So those are all different kinds of things I touch on,

00;06;38;12 [Jen]: Right. To your point, there's, there's been so many epidemics that you just mentioned that we've dealt with in recent history, the last, you know, 30, 40 years, how has that prepared us to deal with COVID and where are the gaps?

00;06;52;01 [George]: Well, it's prepared us to deal with COVID and in that it's not unexpected. And there has been a machinery set up to deal with these new emerging infections. And I don't know that they're necessarily, uh, you know, it's any different than it has been in the past. I think we may just be doing a much better job recognizing them, but there are a number of factors that lead to the spread of these diseases. We're in the, you know, 300 years ago, they wouldn't have spread at all, including things like modern airplane transport and the globalization of the food supply and

00;07;23;02 manufacturing, you know, therapeutic immunosuppression up to, and including xenotransplantation, which is where you transplant the organs of other species. I mean, that's not happening in the 17th century. Right, right, right. At least not having our own purpose. Um, and you know, I mean, we just have a lot more stuff going on and the human population is much bigger, so it creates pressure on relatively Virgin ecosystems.

00;07;46;26 [George]: So there's a lot of stuff going on that would say, you know, this is why these things were emerging. I think the current administration has done a particularly poor job of preparing, uh, as we've seen the, proof's been in the pudding, the white house office of pandemic preparedness was just established. And I think probably one of the, will to go down, It was one of the great crimes of the 21st century was that USAID defunded, the predict program, which was a viral surveillance program that was looking for new diseases saying it wasn't. And the reason

00;08;19;15 was why they never find anything interesting. They closed the Wu Han laboratory in October of 2019. [Jen] Wow. [George] Yeah. Can you imagine being that stupid? [Jen] Oh God. [George] Yeah. You know, so hindsight's 2020, but I think it's going to go down. I mean, that could have saved millions, you know, millions. [Jen] Right. Wow. Talk about timing. [George] Yeah. Timing

00;08;42;28 [Jen]: Poor. Very poor timing. So I want to talk a little bit about vaccines. So the Pfizer vaccine was obviously the first one that was approved by the FDA and Moderna is. so emergency. Do you want to speak to that a minute

00;08;57;19 [George]: Emergency? Yes.

00;08;59;02 [Jen]: Thank You. I appreciate that. And Moderna is following close behind. Can you talk to us a little bit about what rollout looks like for that and challenges and uptake?

00;09;14;18 [George]: Sure. So rollout is, uh, you know, it depends on where you are if you're at the federal level and you're just telling the drug company what to do at least smooth as silk, so if you're down in the trenches trying to figure out, you know, how do we get grocery workers, immunized, and who has a list of grocery workers and how exactly do we go about doing this? The logistics are very challenging, right? And there's a lot of uncertainty still. That's one thing with healthcare workers, you give it to the hospitals, the hospitals give it to their, to their staff. They make those decisions. So it depends on where you are kind of how complicated it

00;09;47;04 is, but having two vaccines is great. We have twice as much. They both work really well. And I think we're in quite good shape that, you know, there's been some push and pull about who gets at first, probably most blatantly played out at Stanford this week, where the residents said they want to get it first.

00;10;04;26 [George]: And now everyone else was clamoring to be first too. So it's not, you know, that sort of blew up. But, um, I think that it's, you know, each step to work it out. Um, and you have to work it out in a way that's fair and transparent. So, and sorry, the second part of your question was vaccine, Oh, in vaccine hesitancy in USA today, an August publication, that said 40% of Americans would take the vaccine today. If they, if they are offered it or they plan to get it, as soon as it was

00;10;34;29 offered and another, maybe it was 42, I would say added up to 76, 32% of Americans said that they would, they wanted to wait a couple of months, but then they would get it. It looks like three quarters. Right. And that's what bout what we need probably to get to herd immunity. So that's, that's all good news. And you know, the other 24%, you know, some of them, you're never going to persuade. These are the people who homeschool their children, so they don't have to get vaccinated to ever, you know, I mean, that's not a big number of people, but they're a vocal

00;11;05;05 number. And then the others are all kind of mixed up with, you know, sort of the polemics of masks. And this really isn't a problem and it's not going to affect me. And, you know, so it's, but I think I was really quite encouraged by that. I thought that was, uh, uh, you know, kind of the best bit of data I'd seen in, in a couple of weeks.

00;11;24;14 [Jen]: So when we're talking about uptake, how do you reach folks that are in more rural communities, folks that are unhoused or uninsured, what are the logistics around that look like?

00;11;34;29 [George]: It's, you know, we're going to have to set up in San Francisco. So San Francisco, 97% of people have health insurance. Okay. So we can say, this is your provider's problem. You guys figure it out, you know, yada yada, and then the 3%, you know, we're going to have to do some community vaccination. Now, assuming that some of those 97%, you know, the providers are going to say, you know, 70 minus 70 degree freezer, you know, no such thing. And you know, this is not going to be smooth. I can tell you that if you're in Kaiser. Okay. Okay. Okay. How's Kaiser supposed to look

00;12;09;16 up and, you know, look up in your medical records and find out that you're a, you know, that you're a cashier at Safeway, right. You know that, so you're going to ask you have some sort of piece of paper that says you're eligible, probably issued by your employer. But then at the end of the day, they're going to be people who don't fit into any of those systems, either they're unemployed or whatever. Now we're going to have to set up local immunization points for them. And immunization points are complicated, right. Because you don't want people milling around in some, in some big

00;12;37;06 crowd, it's going to take quite a bit of logistical work to get that part straight.

00;12;42;08 [Jen]: Yeah. I mean, I look at local testing sites, like free testing sites in Oakland where I'm at, and that's kind of what it's, it's become. There are tons of people who, around the holidays, especially who have come out and you kind of think like, actually, is this feeling safe? You know what I mean?

00;12;59;15 [George]: Yeah. I know exactly what you mean, but it's, you know, but it's, it's a question of scheduling and logistics and getting enough people there for crowd control and stuff like that. And, um, so it's, it's not, it's not uncomplicated, but it's not insurmountable either as for rural communities. I think, you know, I think people are probably going to have to come to the, come to, you know, whatever the towns that are nearby to, um, to get it and probably deal with the, through the local hospitals for, or, or the health departments.

00;13;30;12 [Jen]: So how long, like all that said, how long is this going to take in your estimation? I mean, is it November of 2021?

00;13;38;23 [George]: I think it'd be much sooner than that. [Jen] Oh, okay. [George] I told my kids, we could have Christmas in Hawaii in July if they lay off this, this Christmas. [Jen] Well, that's hopeful. [George] Yeah. I, that might be a little bit, you know, it might be more like August, but it's something like that. And this is, you know, I think we'll have plenty of supply and I think we'll get the logistics worked out. And I basically, as the, as secretary Azar has said, and I think it was he who said it, you know, we have enough for everybody who wants to get it. And by the second quarter, [Jen] that's amazing.

00;14;10;18 [George] They'll also you know, also quote the vice-president or president elect Biden's new chief of staff. His name is Ron Klain. He said, vaccines, aren't going to save a single life. Vaccination is. so having all the vaccines in the world swell, but it's got to somehow physically find its way into your deltoid muscle in order to do any good.

00;14;33;08 [Jen]: Right. Yeah. Good point. So say we're in August or July and, and you do get to go to Hawaii. I mean, are people still walking around with masks? Is there still, um, social distancing happening? What does that look like?

00;14;48;18 [George]: It depends. Uh, and I think that people be, I think, I think people who have been cautious will be slow to let go of these things. You know, there's going to be, you know, there's 5% failure rate in the vaccine. Right. We know that part, you don't know who we don't know who the 5% is. Um, and so I think what's going to, people are going to be taking it still pretty cautiously, even if they have been, even if they have been vaccinated and, you know, but if we only ended up vaccinating 40% of the population, yeah. You're absolutely going to have to walk around with masks

00;15;18;26 on you get to 75, 76, 78, whatever it is. I think that we can, uh, we may be able to get away without them and you know, it's not going to be, but it's not going to be kind of evenly spread across the board. There are going to be hotbeds of places where nobody gets vaccinated like Marin, you know, just as a name. I mean, just to looking back at childhood vaccines, there are places where there are very, were that are more likely to not have kids immunized than others. And it's, you know, and those places, they might still have to wear masks and do social distancing and have a, you

00;15;50;05 know, and have closures from time to time. You know, the simplest thing is to say, just get vaccinated. And then we can, we can avoid all that stuff.

00;15;58;06 [Jen]: Is this the new normal doctor? Like, is this, should we be expecting, or how much should we be expecting epidemics like this on such a broad scale to be impacting our communities

00;16;12;03 [George]: It's probably once in a hundred year kind of thing, I think. Um, but I, again, you know, understanding that the size of the human population is growing by leaps and bounds. Right. I was in, so I can get this straight. I was in high school and the world population passed 5 million, it's now it's seven point something I've seen 5 billion, [Jen] almost 8 billion. [George] Yeah. Yeah. I was teaching my class in foundations of global health when it passed 7 billion. So that's within the last 10 years. So the

00;16;43;10 more people we have new, we get to kind of carrying capacity and, you know, Thomas Malthus and the, you know, the 18th century demographers who warned about this stuff, you know, there's a finite amount of carrying capacity and, you know, the population will spread out and eventually stop growing. But the point of, you know, which we can support a population is probably about 12 billion. And, you know, then you're really starting to squeeze into ecological niches and you'll start getting into problems with this sort of stuff. Especially if food’s maldistributed and people have to hunt, you know,

00;17;14;24 you know, they they've talked about bushmeat, we call it, we call it big game. You know, it's just depends on whether it's a sport or it's a, or it's for, you know, or if it's for survival. Yeah. Yeah. So it's just by way of saying is, well, this is a very rare event. I can tell you, there are four other beta bat-associated beta Corona viruses that have just as much potential for spreading through the human population. But now that we've had this event, maybe we'll pay attention to this stuff a little bit better to be able to get on it even more quickly than we did. And I think

00;17;45;26 that, you know, I think what you have to realize is that this did not have to happen. That the, the Chinese whom we love to vilify got on this and stopped it at about 70,000 cases in the space of about eight weeks, China today has 96,000 cases. There more cases in Denmark than there are in China. [Jen] Wow. Wow. [George] Right. We had two months lead time to get all this stuff

00;18;12;17 straight and it didn't do it.

00;18;16;10 [Jen]: That leads me into my next question. I wanted to understand how other countries responses have differed from ours.

00;18;24;11 [George]: All right. So, so China is the, is the prime example. And everybody will say Taiwan or South Korea, Singapore, it’sChina, that's the example. And China takes this stuff deadly seriously. Now they have a, a much more, uh, you know, they have a much more authentic authoritarian government system. They have a much more of a top-down approach. They have a much more social cohesion than other countries do, but you know, they basically, when they lock things down, things stay locked down. There's no support around there. There was, I have some drone footage of Wuhan

00;18;57;22 during the middle of the lockdown. There's nothing moving zero, not a soul on the street, not a car moving middle of the day, nothing. Right. And that's what lockdown means. Right. And you know, we do pretend lockdown, right? It's you know, and you know, yeah, we've turned it. We may have turned the corner in San Francisco over the last couple of days, but it's still pretend lockdown. And they had one case show up in a port city. They, uh, 11 million, they screened 11 million people in three days. That's the population of Los

00;19;26;03 Angeles. Everybody stopped what they were doing. And they all got screened. They found 20 cases, but all those in quarantine and isolation, done, done, done, end of outbreak, it takes that kind of organization that kind of, you know, single-mindedness in order to do this stuff, other places that have done, you know, that do well, are places like South Korea and Japan and Taiwan and Singapore, which are not quite that draconian, but are, you

00;19;56;24 know, are not without their draconian aspects of Korea. For instance, if you turn, if you're found to be a case, the Korean FBI comes and confiscate your phone and opens it up and finds out where you've been for the last five days, then they run your, take your picture and they run it through all this closed circuit, TV footage, find out where you've been. And then they do. What's the other thing they do. Uh, Oh, they, they run all your credit cards.

00;20;20;19 [Jen]: Oh my gosh. To see like where, what merchants you've been. Right.

00;20;24;11 [George]: Then see if, try and figure out whose is met up with you. And, you know, I mean, this is not some, you know, informed consent kind of thing. This is law, right.

00;20;32;27 [Jen]: It's very different than our contact tracing methods. It's like, can you please tell us?

00;20;39;13 [George]: Yeah. Yeah. Oh, we were really means something to me. If you would just answer these questions, you know, it's like, you know, you want to go to jail for the rest of your life, with your family. Okay. Good keep it up. You know, Singapore has done a pretty good job too, but those are the, those are the, the, the Asian countries are the examples or other places. So, you know, you can look to the Western European countries as well. And they've managed to have a kind of a long summer of non-search where in North America, there was, there were a huge surge in Brazil. There a huge surges during our summertime in North

00;21;10;29 American summertime, the Northern hemisphere summertime, and the others were, they were relatively quiescent. And, and, you know, and I think that was probably a lot of that societal and a lot of that kind of continuation of lock downs. And I think they did a pretty good job, but they let everything up. They let their foot off the, off the break in the summer. And by the fall, you know, everybody traveled all over to every other European country, not right, but that's what it seemed like. And they, all the cases started to go back up again, including places like Sweden that were touted as having

00;21;42;15 this great exam, the Netherlands over touted as having these great examples of how you could control this without having to lock down the economies, which of course, they're now locked down because it's not true. So those are the other things. And, you know, I, I, but we can look to Canada, who's done more lot, not modified lockdown, but you know, they're just more compliant societies, I think boils down to.

00;22;04;13 [Jen]: Right. And I've, I've had conversations with friends who are from like the Scandinavian area countries. And it's, it's really just reinforced this question for me about like, how much is it about these preexisting kind of like community ways of being versus an individualistic way of being, which obviously the United States is?

00;22;24;24 [George]: Well, so I asked the question, you know, what's the most Scandinavian state in the United States? What would you guess? I don't know the answer to this, but [Jen] I don't either [George} like Minnesota or Wisconsin or something like that. [Jen] Not California. I don't think [George] certainly not California, except for Beullton and Solvang. I'll tell you that.

00;22;42;07 [Jen]: Oh, those are central coast. No.

00;22;44;14 [George]: Yeah. Santa Barbara with the windmills. leaving those aside, you know, Minnesota and Wisconsin had horrendous epidemic, horrendous epidemic. So it's not about the, it's nothing, nothing genetic and what the culture is least less cohesive here.

00;23;04;12 [Jen]: Right? Yeah. So, um, I want to talk a little bit about stigma. I was watching you in an interview you did last week, I believe. And just talking about how there's a, this won't happen to me, mentality that some folks may hold with HIV and certainly holds with COVID. And I just wanted for you to elaborate on your thoughts on that. Sure.

00;23;26;01 [George]: I think people are so, so COVID, um, is probably, I mean, I, I would have, I, I've never sat down and thought about this, but I think COVID may be more transmissible than HIV. You know, HIV, if you have anal sex with somebody who's infected, you have a 10% chance of developing infection, right? If you're the receptive partner, you know, COVID, if you have, you know, somebody gets in your face, you probably are, you know, have some elevated risk, but it's not a hundred percent that it's not a hundred percent risk of transmission. The are Sub-Zero in, in the

00;24;00;06 absolutely absolute open and, you know, open societies have a pre locked down China where it's 3.5. So I, that doesn't translate to what proportion of people get infected, but it's, you know, you're not infected everybody on site. And we know that most of the transmission goes on through super spreader events, probably at least half, if not more where there are more than, um, you know, their, their clusters with more than one person infected at the same time.

00;24;26;24 [George]: So there are certain, that's hard to, that's hard to imagine with HIV, unless you're doing needle sharing, or it's a blood Trent, you know, blood donation where they split the units. So a lot of people get the same exposure. It's just hard to imagine this as for a sexually transmitted diseases that you're going to infect large numbers of people at the same time, but be that as it may, I think that's a, that's another issue. Uh, finally with regard to stigma, there's HIV is very stigmatized because of the populations that infects SARS,

00;25;00;25 cov-2is much more, uh, ecumenical in the, in the people that it infects. Yeah. There's some, yeah, there are certain types of people are more likely to show up in hospitals, people who are older people with preexisting conditions, but it's, it can really, in fact, infect anyone, children may get a small pass, but it's, they can certainly certainly get infected in their families all the time. Schools are another issue. Schools might be a little bit less, less

00;25;28;13 worrisome than we make them out to be. But at the end of the day, you know, if you have, if you have SARS people, I, my impression is that people tend to think about you as somebody who's, you know, sort of, uh, you know, kind of unfortunate, whereas, you know, with HIV, it was sort of your own fault. But now, you know, I, there was some, there was some guy we saw some delivery, man. The other day, he came to the house, without him came to the door without a mask on him, my daughter, 25 year old daughter, you know, acted like, you know, there was some rapist on the doorstep. So it's, you

00;26;02;21 know, maybe it is starting to get a little bit more stigmatized walking around without them, without a mask.

00;26;07;25 [Jen]: Yeah. I mean, I think about it, like in the Bay area, I think it's very different than when I go home to kind of the suburbs of Sacramento in terms of who's wearing masks and you know, what kind of reaction that reminds me.

00;26;21;05 [George]: It reminds me of Berkeley in the 1980s where I said, you know, you know, you never see an American car and you never see anybody smoking. Right. And those are that's verboten. And in, in Berkeley, and I can remember going to Europe with my kids when they were little and, you know, people are smoking like chimneys in the, you know, in the, in the cafes on the outside. And they'd like, there, they thought it was like the most anti social behavior that like there's shooting drugs up right at the table. You and I are here, you get it. [Jen] Right. Right. Right. Yeah. When

00;26;54;07 just, you know, [George] it's like right up there with open defecation or something undesirable activity. [Jen] Yeah, exactly. Yeah. [George] Maybe we can move masks up there, but you know, [Jen] not wearing masks.

00;27;08;11 [Jen]: Exactly. So I just have one question left. I like to ask all of our guests this, what conversations should we be having, whether it's about sex and HIV or COVID-19, or other, other kinds of epidemics or anything around that, what should we be talking about more?

00;27;31;20 [George]: I think people need to understand that we live in a microbial St and we think of ourselves as these big, all powerful organisms. And, you know, we're surrounded by, you know, sort of down the food chain, animals, like, you know, dogs and cats and, and livestock. And then we got some nice gardens in the backyard, but we don't think that we really live in this kind of total stew of microbes that can come and bite you in the ass. Um, you know, in a variety of any variety of circumstances, like, I mean a contact with someone who's actively shedding and you're not

00;28;02;29 immune or eating the wrong food, or, you know, having sex with an infected person or, you know, there's, there's just so much stuff around us or avoiding vaccinations and getting a cut and then you get tetanus, you know, stuff like that. You know, we we've, we've developed reasonable defenses now by the 21st century, but there for hardly foolproof stuff will keep happening and, you know, there's, uh, so that's, that's the thing to understand and also understand is there's not always a drug for everything.

00;28;35;11 And we've had real problems with anti-microbial resistance. We're going to start seeing antiviral resistance. We have antifungal resistance right now and just understand that the power of antibiotics and antiviral drugs and all that stuff is not limitless it's. And we're, you know, kind of close to the bottom of the quiver.

00;28;55;02 [Jen]: Do you think that this event has, will cause the federal and state governments to put more money in investment into our public health system, given what you just said?

00;29;06;27 [George]: I think to a certain extent. Yeah. But you know, the, the money should be out on the front end trying to do surveillance and early containment that that's where I'd put the money for kind of this viral stuff. Um, and you know, we have, we now have the MRNA vaccines, which we hadn't before we can continue to screen antiviral drugs. Great, great, great. But, you know, the, the coming crisis in the U S was anti-microbial resistance and that's really something that we need to pay very, very, very close attention to. And I think that's a, it should be a major focus. You

00;29;40;01 know, public health is a lot more than infectious diseases, but in the world of infectious diseases, you know, we've got vaccines, we've got all this good stuff, you know, we have, you know, we, we have water treatment, we have sewage disposal. We have all these great stuff since 1860s. That's what they have cut down infectious disease deaths massively, but things like this come along from time to time. But the slow moving thing that we're not keeping our eye on is anti-microbial resistance and running out of antibiotics.

00;30;06;12 [Jen]: And how do we do that better? How do we track that better?

00;30;09;29 [George]: Uh, well, first of all, we have to stop feeding them to animals just to make them fatter, because that just creates a lot of, a lot of, um, uh, you know, unnecessary pressure on microbial evolution. And we have to be more, you know, we have to be more, more careful with their use, more prudent with their use being better stewards of, of the antibiotics we have when I was a kid, every anytime we'd get my, get a cold, my mother dragged us into this poor pediatrician and, uh, you know, pass out penicillin, like, you know, like Popsicle candy, like do nothing, right.

00;30;42;19 Nothing except create resistance. So anyway, I think that's, that's what I, I think that's the other thing you really have to keep your eye on this stuff is spectacular. Obviously it's the stuff I've trained for my whole career and I've done it a bunch of times, but I still have in the back of my mind, you know, from as somebody who does infectious diseases, that's where the, that's the, that's an underappreciated problem. That's going to bite us in the ass.

00;31;07;15 [Jen]: Thank you so much for your time and for being so generous and answering all of these questions. And, um, I wish you a wonderful holiday.

00;31;14;18 [George]: Thank you very much. [Jen] A special thank you again to our guest, Dr. George Rutherford, professor of epidemiology at UC San Francisco. Speaking, Frankly is a production of the California prevention training center in San Francisco, California. It's produced by me, Jennifer Rogers and Laura Marie Lazar and is edited by Nils Myers at 152 West productions.