AMERICAN PUBLIC HEALTH ASSOCIATION

and

THE NATIONAL ACADEMY OF MEDICINE

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RESPONDING TO COVID-19:
A SCIENCE-BASED APPROACH

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WEBINAR #5: COVID-19 TESTING:
POSSIBILITIES, CHALLENGES, AND ENSURING EQUITY

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WEDNESDAY
APRIL 22, 2020

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The webinar convened at 5 p.m. Eastern Daylight Time, David Relman, MD, Moderator, presiding.

PRESENT

DAVID RELMAN, MD, Thomas C. and Joan M. Merigan Professor and Professor of Microbiology and Immunology, Stanford University

GEORGES BENJAMIN, MD, Executive Director, American Public Health Association

ASHISH JHA, MD, MPH, Director, Harvard Global Health Institute and K.T. Li Professor of Global Health, Harvard T.H. Chan School of Public Health

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P-R-O-C-E-E-D-I-N-G-S

5:00 p.m.

DR. BENJAMIN: Well, hello. I'm Dr. Georges Benjamin. I am the Executive Director at the American Public Health Association in Washington, D.C.

I want to welcome you all the 5th webinar in the COVID-19 conversation series brought to you by the National Academy of Medicine and the American Public Health Association.

I'd like to thank my co-sponsor, Dr. Victor Dzau, who is the president of the National Academy of Medicine who are supports in this important effort.

We are also graceful for the input of our Expert Advisory Committee co-chaired by Dr. Carlos Del Rio and Dr. Nicole Lurie. And you can find all of our advisors listed on our website at covid19conversation.org.

Now, the purpose of this series is to explore the state of the science on COVID-19, to

inform policy makers, public health practitioners, healthcare professionals, scientists, business leaders and the broader public. More information on this series and recordings of past webinars are available at covid19conversations.org.

Now, today's webinar has been approved for one and a half hours of continuing education credits for CHEST, including medical education and CPH. This is the public health credential.

Now, none of the speakers has any relevant financial relationship to school. And please note that if you want continuing education credits, consider to register with your first and last name. Now, everyone who wants credits must have their own registration.

All the participants today will receive an email within a few days from CPD and confex.com. That's cpd@confex.com with information on how to claim these credits.

I'd like say now that if you have any questions or topics that you would like to

address today or on future webinars, please enter them into the Q&A box or email us at APHA at apha.org. That's APHA at apha.org.

If you experience technical difficulties during the webinar, please enter your questions in the Q&A box as well. Please pay attention to the chat for announcements on how to troubleshoot.

This webinar will be recorded and the recording, transcript and slides will be available also on covid19conversations.org.

Now, I'd like to introduce you to our moderator for today's webinar. It's really my honor to introduce Dr. David Relman.

Dr. Relman is a professor of medicine in microbiology and immunology and is senior fellow at the Freeman Spogli Institute for International Studies at the Stanford University. He is also Chief of Infectious Diseases at the Veterans Affairs Palo Alto Health Care System in Palo Alto, California.

He advised the U.S. Government on

emerging infectious diseases, human-microbe interactions and future biological effects. And is past president of the Infectious Disease Society of America.

He is a member of the Emerging Infectious Diseases Standing Committee and the Intelligence Committee Studies Board of the National Academies of Sciences, Engineering and Medicine.

He is also a fellow of the American Academy of microbiology and a member of the National Academy of Medicine. David, it's open to you to run through today's conversation. Thank you.

DR. RELMAN: Thank you, Georges. It's my honor and pleasure to join you for this webinar and to serve in this capacity as moderator.

The topic at hand today is both timely and important. My hope is that we contribute to national dialogue on COVID testing, help clarify some of the critical questions and issues at hand

and promote advances in this area.

I am particularly interested in hearing some of the questions and comments from attendees. And we'll have a chance to do that after the presentations.

Before we begin though, I'd like to offer just some very brief framing comments. First, let me just ask a very simple question. What are the purposes behind testing?

Next please. The answer, in some ways, is quite simple. It's situational awareness. Situational awareness about the virus in particular.

But there are actually two different kinds of motivations for trying to build awareness or for undertaking testing. The first of these is shown here. That's the purpose of diagnosis.

We ask questions related to diagnosis of multiple sorts. But in particular, we're interested in whether an individual has active infection, whether the infection is early or late

in its course and whether a person is in a pre-sympathetic phase. And in this particular infection this is a critical question that we would love to be able to answer with testing.

We also want to know who is contagious, not just how is infected with the virus. And who will be contagious if not now.

And then finally, in the realm of diagnosis we're interested in predicting both the severity of the illness, the complications that might arise, the kinds of clinical needs and resources that we may need to devote as well as the possibility of acquired immunity after the illness has transpired to some degree.

There is also a second motivation that frames the question about why we test. And that's shown here.

We're interested in the health of populations, it's not just the health of individuals. And this is a purpose that some call surveillance.

Here we're interested in, again, who

is infected, who is immune, who is susceptible, but now, at the level of a population.

We're also interested in where are these individuals who are either infected, immune or susceptible. And when are they present with one of these types of status.

We also want to know, what's the nature of the heterogeneity amongst people and across time. Why are some people infected or immune or susceptible at any given time.

There's also a question about heterogeneity with respect to the virus. And that too is critical to understand both across space and across time.

And then finally, within the realm of surveillance, we're interested in both designing and assessing interventions. And for this, the kinds of questions that I've posed here are important to be asked but asked again repeatedly, as interventions take place or are redesigned and reassessed.

Finally, there is one last basic

question that we want to ask, and that's really the question that our attendees and presenters here will want to address. And that is, how is it that we should undertake testing.

And there are at least two issues here. One is that we can ask, what is it that we wish to measure. What is it that we seek to detect. And then the second is, how do we deploy these tests at the sites where they're needed.

There are two kinds of measurements that we're interested in. One is the virus and one is the host. And within host response there is the question of antibody formation but lots of other responses as well that may have important predictive as well as diagnostic features.

So, these are some of the issues that I think we want to address here this afternoon. And now I think we want to continue on with the program.

So today, on this webinar, what we're going to do is examine the state of testing for COVID-19, the data that different tests provide,

how it is that we use these data to care for individuals and for populations, as well as examine the equity issues that we all must consider. Including the morale and health imperatives for equal access to testing.

So let me know first introduce our three speakers. The first will be Dr. Jill Taylor, who is the director of the Wadsworth Center, which is the Public Health Reference Laboratory for the State of New York.

In her current role, which she has held since 2012, Dr. Taylor oversees the day-to-day operations of the center and defines its future directions. Both as a state public health laboratory and as an institution for basic and applied research.

Jill has worked extensively at the federal level serving as a member of the National Library of Medicine Board of Regents and also the CDC Board of Scientific Counselors for the Office of Infectious Diseases.

Dr. Taylor will offer an overview of

the diagnostic and serological tests currently available and what each tell us.

Second, Dr. Ashish Jha is a physician, health policy researcher and advocate for global health care reform. Dr. Jha serves as the director of the Harvard Global Health Institute, a professor of international health and health policy at the Harvard Chan School of Public Health, professor of medicine at Harvard Medical School and a practicing internal medicine physician at the VA Boston Health Care System.

Dr. Jha's major research interests lie in improving the quality and cost of health care for the specific focus on the impact of policy efforts.

And finally, Dr. Georges Benjamin is known as one of the nation's most influential physician leaders because he speaks passionately and eloquently about the health issues having the most impact on our nation today.

As executive director of the American Public Health Association since 2002, he leads

the Association's push to make America the healthiest nation in one generation.

Dr. Benjamin is a member of the National Academy of Medicine and serves on the Emerging Infectious Diseases Standing Committee.

In April of 2016, President Obama appointed Dr. Benjamin to the National Infrastructure Advisory Council. A council that advises the President on how best to assure the security of the nation's critical infrastructure.

So, thank you all for being here. And let's turn first to Dr. Taylor to get us started. Dr. Taylor.

DR. TAYLOR: So, good evening and thank you so much for the invitation to speak at this really timely webinar. I'd like to thank both our host, the APHA and the National Academy of Medicine, for the invitation to essentially hope, what I'm hoping to do is give you testing 101. And I'm going to do it in relationship to the testing that we've been doing in our own laboratory at the Wadsworth Center.

So, could I have the first slide please? The second slide please. So, I clearly can't do this with, oh no, I'm sorry, can we go back one?

I just need to assure you that I have no relationship for either fiscal or otherwise, with any of the companies or products that I'll mention.

So next slide please. So, I think the FDA has been in a very interesting position over the last few weeks. And this website that I'm showing you shows the molecular assays, the diagnostic assays, that are approved by the FDA under the EUA process.

Perhaps it's important to give you a little bit of background about the EUA process. Once a public health emergency is declared, the FDA has a special mechanism that they use to provide their review and approval process under an expedited method. And that's called the EUA process.

So that any tests that are available

need to go through the EUA process. And in our hands we now mind, the FDA has been extremely rapid and responsive in their review process. Though clearly, as I'll talk about later, there have been some issues that you've seen in the press.

When I put these slides, gave these slides to the APHA there were 37 PCR-based assays that were available. Actually, there's 39 now so things are moving very quickly.

The majority of these are assays that should be used in a high-complexity lab. There are real-time PCR assays that probe for particular genes of SARS-CoV-2. Mostly they'll use the N, the nucleocapsid protein gene. But I have seen ones that are for the E protein as well.

There are actually three waived assays, which means that they can be used at the point of care. But the majority of them are laboratory assays that are used in a high-complexity lab.

There are, as you know, I have heard many, many supply chain issues for both the agents for use in these tests as well as for the supplies that you need before they get to the lab including swabs and viral transport medium.

And there is a great deal of ingenuity that I see in people finding ways to get around these supply chain issues, including the use of 3D printed swabs, saline or VTM and other approaches.

Could I have the next slide please? In our own assay, in our own lab we're using three EUA approved assays. We were able to develop our own real-time PCR assay quickly. And yes, it's EUA approved.

And this is a fairly typical, multi-process extraction liquid handlers for setting up the plate and then real-time PCR, multistage assay. We're also using the Cepheid Xpert Xpress assay which is run on the gene expert and the NeuMoDx SARS-CoV-2 assay, which is a highly automated assay sample to answer assay, which you

can continually load.

I think it's, we found its very important to use, to have available to you multiple assays. Because of the supply chain issues you can't depend on one assay. And I think that's been very problematic.

I have a colleague in public health, Joanne Bartkus, who uses the cookie analogy. So I want to make chocolate chip cookies and today I have all of the ingredients but tomorrow I run out of flour. So I found a substitute for flour, I could use maybe less flour, but now I have no eggs. And then tomorrow, hm, I found an egg substitute but I don't have chocolate chip cookies.

And this has been a problem, chocolate chip chips. And so this has been a problem that has affected all of us for many weeks now. And so, having multiple platforms available is really an absolute essential.

Could I have the next slide please? Which specimen to use is also a question that you

have to think about. The nasopharyngeal swab is taken as the gold standard but I think we need to be aware that we don't know what the, what level of sample we are actually missing with nasopharyngeal.

I've seen nasal swabs and I've seen mid-nasal turbinate samples taken. And then of course, a throat or oropharyngeal swab. And also, much discussion of saliva.

Given the paucity of swabs that are available I think it's important to look at saliva as a method. And we have done some work in our own lab.

Could I have the next slide please? We did a study in a high prevalence SARS-CoV-2 area and looked at 226 individuals and collected an NP swab, a nasal swab and a saliva swab. And the NP swab was clearly the best sample, but the nasal swab and saliva were quite good also.

So, at the moment we are looking at combining a nasal swab and saliva so that compared to the nasopharyngeal we would be close

to the sensitivity. So again, it's important to be flexible in terms of what specimen you collect, but also to be aware of potential for missing.

Next slide please. In terms of serology assays, which is the discussion of the moment. Again, this is the FDA website.

And when I, again, put these slides up they were 70 serology assays available. Now there are 125. So you can see, again, the field is moving very, very quickly.

This has been an area where I think there's been much confusion. The FDA has actually put up a list on their website. These 125 serology assays. Many of which have come from, being imported from China and Korea.

And what they're listed as is available for distribution. Many people have taken that to mean FDA, EUA approved and it is not true. They are not FDA reviewed nor are they approved, they are available for distribution. They're available for use in a high-complexity

lab.

And I think that the FDA took that approach because they knew that a high-complexity lab director would actually validate the assay before using it. But this is not happening.

And there are quite strong disclaimers that need to be used with these assays. But there are many questions about sensitivity and specificity, especially cross-reactivity with the commonly circulating coronavirus. So, serology is an area that is very unclear at the moment.

Could I have the next slide please? In our own laboratory we have used the New York State clinical laboratory evaluation program to help develop and approve our assays.

We have a microsphere immunoassay using the Luminex technology, using venous blood. And we have submitted this to the FDA for approval.

We have a microsphere immunoassay using blood spots as a sample source. And we're actually using this in a health care worker

surveillance study at the moment.

And we have the old gold standard, the plaque reduction neutralization assay. Which I think is really the closet you can get to a functional assay because the antibody actually binds to the virus and prevents it from getting into a cell. So that's about as close as you can get in an in vitro assay II showing that you are inhibiting viral replication.

I think it's incredibly important, and I'll say this again a little later, interpreting the results of these assays. Because somebody has either IgM or IgG means that they have developed an immune response, it does not say that they are immune.

And I think they're messaging, and the communication that -- that is used for these assays is a very sensitive area and something that I don't think we've got right yet.

Can I have the next slide please? With any of these tests you have to think about their positive and negative predictive value. So

I put the math up for this.

Positive predictive value is two positives over two positives and false positives. What that really means is, if you get a positive result, what's the likelihood that it's correct. And on the negative side, if you get a negative result, what's the likelihood that it's correct.

And really, positive predictive value and negative predictive value are dependent on the prevalence of the disease as well as the particular characteristics of the sensitivity and specificity of the tests that it's being used.

Can I have, that is being used. Can I have the next slide please? So, I think it's very important when you are considering bringing on a test to look at sensitivity.

Sensitivity is incredibly important because of the impact of false positives if you get false negatives. If you get a false negative, so you say somebody is not infected where they actually are infected and transmitting, then you're not able to do, to

prevent them transmitting, that person transmitting the virus to others in their community.

Specificity is incredibly important. As you know, there are four coronaviruses which circulate causes of the common cold. And they commonly circulate.

And many of the serology tests don't eliminate cross-reactivity. And so, somebody can think they have immunity when in fact they do not.

Reproducibility and ruggedness are very important.

Also remember that the timing of specimen collection in the disease state, we have had samples submitted from people who had, they were in a car with someone for half an hour and so they're terribly concerned and they want to have a test straight away. And this doesn't give time for the virus, if they were affected, for the virus to replicate. And so, timing of specimen collection is very important.

And when are rapid test systems appropriate. This is an interesting thing, question for me, because I have been a big proponent of rapid test systems and think that they are the future of diagnostics.

But I worry about them and the ones that are coming out now. Both for their sensitivity and the impact of false positives, their specificity.

But also for the fact that they are very problematic for the public health system in terms of being able to track positives and negatives and know what the prevalence is in the community.

So I am personally uncomfortable with the rapid test systems that are available because I don't think that they give us the information that we need right now. Though I think that technologically we are getting to the point where these are going to be very good.

Can I have the next slide please? So, in terms of interpretation of serology assays, I

think that there are good seroprevalence studies. And certainly they give evidence of prior infection.

But more study is needed. I don't think we can depend on them exclusively for returning to work without PPE, without protective equipment. And I don't think we can say yes, that a person is immune just because they have IgG.

I am much more comfortable using ELISA or quantitative, other quantitative cogitated serology assays because you can deal with the issue of cross-reactivity and you can deal with quantization to be able to answer these questions. And so I think this is a area where we need a great deal of discussion.

And I think we're next on the last slide. One more. Yes.

So, there are a lot of seroprevelance studies going on that you'll see in the newspaper. You know that the NIH is studying, is doing a seroprevelance study to look at

undetected cases of coronavirus infection because it seems that there are a large number of individuals who do not get disease and yet are able to transmit the virus.

There is a study in LA County, which is in the press at the moment. We're doing a small study in New York State at the moment testing out whether or blood spot method will work.

And these are going to tell us what the level of antibody is in the population. Ultimately we need to understand the level of herd immunity that's going to be necessary to provide protection.

And they'll help us plan to figure out how we start reopening the country and returning to work. So there are a number of these seroprevelance studies being used. Started at the moment.

And I think that these are going to help us understand what the next steps are. And I think at that point I can go back to Dr.

Relman.

DR. RELMAN: Thank you, Jill, I appreciate your comments. I would now like to turn this over to Ashish.

DR. JHA: Okay, thank you so much everybody. And special thanks to both the APHA and the National Academies for co-hosting this entire series, which I think has been remarkable in its quality and its instructiveness. So, I'm obviously very pleased to be here.

So what I'm going to do is something different. I'm not, I don't have slides, and I'm going to speak to you all about sort of the policy and kind of front-line experience around the issue of testing.

And as all of you surely know, testing has very much been in the news. And it really comes from the fact that for the first sort of six to eight weeks of this pandemic once the U.S. became aware of it. And we really did not build out much of a testing infrastructure.

And Dr. Taylor actually did a very

nice job of explaining some of the challenges. But it really does begin with the CDC initially foregoing the World Health Organization's testing protocol and working to develop its own.

Which they have been criticized for. I think it was not necessary unreasonable. The CDC has a long history of developing its own tests and generally doing a pretty good job.

But then there were a series of failures, both on the part of the CDC and the FDA, that really hobbled any ability of our country to build up a strong testing infrastructure.

And so, we wasted most of, the second half of January and all of February essentially blind to the spread of the coronavirus across many communities in the U.S. Certainly in northwest U.S.

Very good evidence that the disease was spreading in the community in the New York and other places. And now some emerging evidence that it may be even as early to mid-January there

was some circulation of the disease in northern California, in Santa Clara County.

So, moving forward, I think late-February into early March we start getting a lot of pressure to ramp up testing. And the testing really does begin to get moving.

And what I'm going to do is talk a little bit about where we are in testing today. What the estimates are of the kinds of testing we need.

Think about how we might get there, and actually walk through a little bit of, how, what are the ways people are making calculations about our need and try to kind of finish up with where I think the policy world is and where it's going over the next four to six weeks. To the extent that one can even forecast that far ahead in the middle of this rapidly moving pandemic.

So, through the month of March we've ramped up to a, sort of a height of about 150,000 tests a day. Which is where we have plateaued for about four weeks.

We have occasional days of ups and down, but on average, if you look over the last three and a half, four weeks, we've been averaging about 150,000 tests a day.

Our test positivity rate has hovered around 20, 22 percent. Which by most standards is way too high.

And to give you a feel for comparisons, South Korea, which has been widely touted as the country that did the best job of using testing, tracing, isolation, as its strategy, had a test percent positivity rate of around three percent. Between two and a half and three percent. Suggesting that they cast a much wider net and caught many more individuals.

Germany's positive rate has been around six to seven percent. There are many countries that have achieved rates under ten percent.

And that's the WHO recommendation. They have recommended that if your test positivity is over ten percent you're probably

not testing enough.

And I think there is plenty of other evidence that the U.S. is not testing enough when we look at its testing numbers from about 150,000 tests a day.

So, there are a whole series of things that hold us back from increasing testing numbers. And you heard some of them from Dr. Taylor. But they really range. And the way I think about this is they range from, there are literally places that don't have enough swabs.

Actually, to use your chocolate chip cookie example, I love that, I've not heard that before. So, right, so there are some places that are missing flour, other places are missing eggs, some place are missing chocolate chips. And some places just don't have ovens.

And so, that is the problem. And most states have some of those ingredients but not others, right? So it's swabs, it's transport medium, it's test reagents, it's PPEs for providers who would actually implement the tests.

Many places don't have infrastructure. So they don't want people going to the emergency department and they want to have people go maybe to a drive through or some other place. But they haven't built enough of those to really accommodate the needs.

And then over the last week to ten days a new kind of factor has emerged, which is very interesting and it suggests a different kind of problem. Which is, there are states where there is actually plenty of capacity but not enough testing.

And when you dig into that, and you think, well, what's going on there, what's happening is that states have put in highly restrictive policies about who is eligible for testing five, six weeks ago when tests were scarce. And so for instance, you were only allowed to do testing of hospitalized patients who are very ill.

And as testing has expanded in those states, those guidelines have either not been

updated or they have not been effectively communicated to front-line clinicians. And so there are many states where there was actually enough testing capacity and excess capacity but people are not sending samples in.

And so, a whole host of reasons why testing has not ramped up any further. I want to talk a little bit about how much testing do we think we need. So, there is no single number. And of course, when you begin the question with, how much do we need, it starts getting at some of the issues that Dr. Relman got us going with, which is, what's the purpose of all of this, what are you trying to accomplish with testing.

And, fundamentally, if the goal is very narrowly that I would like to be able to identify all or most of people who are actively affected with this coronavirus, then currently today we estimate, and others have estimated that we need likely millions of tests a day. Which is unrealistic, even though we're stuck at 150,000.

The assumptions of people moving

forward, and we've done a modeling exercise where we've tried to model out how many tests we need but others have as well, is if we keep social distancing in place and look at the models that predict how many new cases there will be over the next two, three, four weeks, where we will end up as the curve has not just flattened but comes down, one can imagine that in about three to four weeks we'll be at a point where we might be having about 50 to 60,000 new cases a day.

Just to be very clear, right now we're identifying 30,000 new cases but no one believes that that's the actual number. Most estimates are that we have between 150,000 and 300,000 new cases a day happening in the United States. And there is a bunch of ways one can get there in terms of why those estimates.

So, if we decrease our new case incidents by about 60 percent, we may be down to about 50 or 60,000 new cases a day in a few weeks. The reason for that timeline is, of course, all of you know, the governors are

anxious to open up their states and start some amount of economic activity again.

And so, the exercise we have done is try to model, if you get to a point where, let's say nationally we're at 50 to 60,000 new cases a day, about how many tests would you need in a day to have a shot at identifying a vast majority of those cases.

And again, there's a lot of fuzzy language in my description because, again, if you want to be truly certainly we'd need astronomically high numbers. And when we have done walked through that exercise, our estimates are that we need about $500,000 tests a day.

Other people, like Paul Romer, Danielle Allen and others, have argued that actually, we likely need more like ten to 20 million tests a day. And the way I have seen this is, our approach is something one could achieve by essentially linearly scaling up what we are doing right now.

If you want to get to ten to 20

million tests a day, obviously you need a totally different strategy. And I'm not aware that we could do it through using RT-PCR.

And we'd probably need a different technology with other antigen testing or other things, again, that others have more experience and a more expert on. But there are a variety of strategies of how you could get to tens of millions today.

The philosophical difference between these two approaches is that the approach that we have laid out really has a very substantial role for contact tracing and isolation. The idea behind it is you start with mildly symptomatic, or more severely symptomatic. But any symptomatic people.

You identify all of them that are positive and then you do vigorous contact tracing. And through that, and then you test everybody who contact, who that person has been in contact with.

And using that approach you should be

able to get the virus reasonably well contained so that you could go about and have some amount of economic activity.

In that model we probably need at least 500,000, though I suspect probably more than 500,000, tests a day. But that's really the minimum floor.

That number, and all of the push towards testing I think has met initially, I think with resistance from the White House. But ultimately when I have spoken to people on the White House COVID Taskforce, there is really no disagreement. Everybody agrees that we need a lot more testing.

And despite, I think the comments of the president and vice president, there is broad agreement within the administration, but we substantially need to scale the testing. About 150,000 tests a day are not nearly enough to bring caseloads down now. And it's certainly is not going to be enough once we begin to open up our economy at all.

A couple of last comments and then I will stop and turn it over to Dr. Benjamin. The issue around serologic testing, which I think Dr. Taylor did a great job of explaining, are fundamental, and there is so much confusion, in the marketplace. In civil society, among business leaders.

They've really seen these two things as substitutes for each other. Testing for the virus versus testing for immunity.

Of course, we all understand that they are not and that they mean very different things. And the idea that what we're looking for is immunologic testing as a way to open up the economy, in my mind is a lot of fuzzy thinking.

Because, even if we assume that all of the central issues, again, we heard from Dr. Taylor around specificity, false positives, underlying prevalence, even if you had a completely specific, 100 percent specificity, which again there isn't, but imagine a very, very specific test.

Even in places like Santa Clara, Los Angeles, other places, chances are that the underlying prevalence is sort of two, three, four percent at most.

So it is hard to imagine how we open up our economy with two, three, four percent of people who are potentially immune. Now of course, having antibodies is not equivalent to actually being immune. Again, it's not particularly related.

So, the enthusiasm for immunologic testing, as the kind of panacea, and as the alternative to testing for acute illness by actually testing for the virus or an antigen, I think is very, very difficult and very troubling.

And a lot of the time I have spent over the last few weeks has been trying to explain to people that they are both important, they both give us critical information but they are different from each other. And that we continue to need to focus on RT-PCR or whatever mechanism we use to identify acute illness.

And long-term antibodies, IgG, et cetera, is really giving us some other piece of information that is not going to be particularly helpful for the issue of being able to control the viral infection in a short time.

I will finish by just saying, this is, I think, the number one issue on the minds of most governors and members of congress. I think there has been incredible bipartisan support for congressional leadership that you are seeing in the senate bill. $25 billion put in for testing.

The idea behind a national testing strategy is not that there will be a single new government agency that will run all the tests across the country. I don't think that's either necessary or nor a good idea.

But you do need some sort of a coordinating force so that if one state has plenty of chocolate chips but not enough flour and another state lacks chocolate chips but has plenty of flour, you know, plenty of eggs or whatever, then we can do exchanges. That we can

really use the federal government, the power of the federal government, to make sure we're making more swabs, that we're making more transport media, that we're making more PPEs that are important on this.

It is hard for me to see that of 50 states all competing for testing against each other is going to be the solution to get us to where we need to be.

So, we are, just to finish up, we are nearing that time where I think you're going to see states starting to open up and go through those phases of opening slowly and then more.

It is very hard for me to see how, given what we know about this virus, how the viral spread isn't going to sort of take off again in a way. That's really going to jeopardize our ability to take care of all the people who are likely to get sick, unless we have a very robust testing, tracing isolation strategy.

I didn't get all into the whole issue

of tracing and contact tracing, which is a different one, which we can get into in the Q&A. But I think what's really important about this seminar has been sort of teaching all of us and reminding us that testing really is at the central, is sort of at the center of the entire strategy for how we're going to keep the virus at bay as we open up our economy.

So let me stop with that, David, and turn it back to you.

DR. RELMAN: Thank you, Ashish, that's really helpful. I'd now like to turn it over to Georges. Dr. Benjamin. You're still muted, I'm sorry.

DR. BENJAMIN: Thank you. And you can hear me now. Thank you, everyone. So I want to just talk a little bit today about this whole issue of making sure that everyone has access to testing. So if you go to the next slide.

So, you know, I've always talked about there being four reasons for health inequities overall. And for testing I think they're also

relevant.

So the idea is, of course, having access to the test itself. As you know, simply having an insurance card doesn't give you access to good health care. There's all kinds of barriers to actually getting access to health. The same thing is true with testing.

Obviously differences in the quality of the test used. Certainly, you heard from Dr. Taylor the challenges with the quality of tests and knowing what are the right tests to use, and making sure that the plethora of tests that are out there that someone is encouraging providers, and health departments, and others to use are of a high quality and appropriately validated to make sure you're getting what you think you're getting.

A whole range of behavioral difference in how one's view healthcare. The same thing with testing, how we view testing.

And then of course, the big bucket, the social determinants that impact testing

overall. Let's go to the next slide.

So let's talk a little bit about the access issue. So again, having the availability of tests. Assuming there is an abundance of tests in the community, where the test facility is makes a big difference. We hear lots of stories of people who find it difficult to get to wherever the test facility is.

Because it's -- obviously you're looking for someplace where you can get lots of people in, where there's throughput, where you can do physical distancing. But quite often, these are not located anywhere near the minority communities.

Drive-through versus walk-up. Everybody's excited about the drive-through testing. But, if you're not in a car, whether or not there's a capacity for you to get that test by simply walking up to someplace else at the testing site.

And of course, long lines. Particularly in inclement weather, it is a big

issue. So location and the mode of testing facility, does play a role as a barrier to making sure everybody has equal access to testing.

Messaging, you know, I'm always fascinated that we always told folks that if you think you're ill and you need to, you think you need a test, call your provider. Well, as you know, far too many people in our country, over 30 million, don't have health insurance coverage. Many of them may not have a provider.

So in some cases that provider becomes a gateway barrier to them actually getting tested, even if they're symptomatic. Of course, the other thing is making sure that that provider understands the symptoms and signs. And although the provider community is getting a lot better at this, that still remains a challenge for some of our patients.

The costs of testing. Now, granted the federal government is covering that cost now, but I was just looking, I saw the new saliva test is 118, 19 dollars, I think. And then you get,

if you want to utilize it, you will be able to then get reimbursed from your insurance company.

So obviously we have to work through that one. But obviously if you don't have insurance, you probably won't get the saliva test once it becomes more abundant.

And then the cost of care. The fact that obviously you can get screened is one thing. But if you don't have coverage for the care, that can make a big difference.

And let's say you go in, we found this with the Affordable Care Act and other insurance plans, that many people would go in for some other reason. While they're there, their clinician finds that they have a condition that needs to be screened for. And the screening itself might be covered, but the actual cost of that visit is not covered under this.

Now, obviously the new stimulus bill that was passed does cover some things, but not all the things that we need to make sure people have access to care. Next slide.

So as we talk about the quality of the tests used, I mentioned earlier trying to make sure that the test was of high quality, you noticed that Dr. Taylor talked about the difference between being reviewed and approved. And many of the tests out there are certainly not approved. Some of them have been reviewed. And some of them, depending on where you get the test from, may not be either.

We know that a significant number of tests that have been used have had issues around being high false positive or high false negative rates. In many cases they're not confirmatory.

So one really needs to understand the test that you're using. And we need to make sure that all clinicians that are using these tests understand what the rules are, and the parameters of the tests that they're using. And of course, you absolutely have to be sure you're using a reliable test. Next slide.

And then the behavioral aspects. So communicating to the public, of course, can be

very difficult. The complexity of these tests. There is sensitivity and specificity. When to take the test? Who's eligible for the test?

All of these things conserve, when the messages aren't clear, as to barriers to the public. Particularly around a public that doesn't necessarily get its information from the emails or from TV. They may not have a provider, again, that they're linked to that can send them the information.

We haven't used a lot of radio for example, to try to approach some of these individuals, particularly in vulnerable populations that may not get the information through the broad media that we have out there.

There certainly always is fear of discovery. We've seen this through the years with people for cancer for example. A patient who comes in with a lump in their breast or rectal bleeding, because, you know, they just really did not want to know that they had cancer.

Well, the same thing with COVID-19.

There are patients out there who probably ought to be screened, but just really don't want to know, because they're afraid of the result. And we have to work hard to try to convince them that that's not something they should be worried about. It's better to know right now, particularly if they're symptomatic.

Fear of stigma. You know, the fear that their family won't talk with them. That they can't go to work. That's a big one. I now am a little bit symptomatic. I'm not quite sure that I have COVID. But I really don't want to know because if I know, then I can't go to work.

Those are some of the barriers that people have. Particularly for those folks that are public facing, and unlike many of us, cannot work from home.

And ultimately the lack of trust in the system. People who just fundamentally don't trust the system. They don't trust doctors. They don't trust the system. They don't trust the system results. And they've not built a

relationship with a healthcare system that they trust for a variety of reasons. Next slide.

And then of course those broad areas of the social determinants. The fact that we really haven't had adequate amounts of tests. The fact that we have been really symptom and exposure based in most cases for the testing, but not job or risk based for the testing.

So now that will change as we get more tests out there. But just understand that we have created a barrier for many of the people who are out in the community, out working, who then get symptoms. Theoretically they should be captured under a symptom strategy. But for many reasons, they're not. And again, some of that is because they don't want to lose work days.

Testing times not being aligned with their front line job off hours. So if you don't work, you don't get paid. You don't get paid, you don't eat. So the likelihood of you going to get your test at a time when you're -- you have to be at work, can be a challenge for many

workers.

Not having paid sick leave is a part of that problem. Now again, not having a usual source of healthcare. Not really understanding where you go. And obviously the emergency room is not an option. We're not sending patients to the emergency room for tests. We are sending patients to the emergency room for symptoms, but only when they're really sick.

And as you know, far too often, patients wait until they're really sick, even to go to the emergency department. And of course the emergency departments right now are very crowded.

And of course high costs. Reminding you that if you go in with a sore throat, you may have COVID. But under -- even under EMTALA they have to do an evaluation that may not necessarily include a screening exam. And then, of course, you'll get hit with the high cost of that emergency department visit because it would be generally viewed as a non-urgent visit.

And then obviously we always have to think about bias in testing, racial and ethnic biases. I put possible, because we know it exists in other parts of healthcare.

We've heard lots of anecdotal stories of this. But we just have to, you know, someone really needs to do the science and make sure we understand that. And we have to call it out when we see it because it certainly does occur. As you know, a lot of it may be unconscious bias. But it's something that we just can't ignore as part of the social determinants of health. Next slide.

So let's talk about risk. Next slide. So I wanted to just talk a little bit about the Los Angeles Antibody Study, because I think it tells you some stuff. This study just was released yesterday. It was a drive-through antibody study done April 10 and 11 at six sites.

They had a universe of a little over 800 participants, using a proprietary database that was allegedly representative of the county's

population. They used a rapid antibody test that they felt was 95 percent, 90 to 95 percent accurate. And, of course, it was then verified again by a Stanford University lab.

And you see there -- I had the lead investigator. And again, most of this stuff I'm using, it's in the public domain. I don't have any secret information from them.

But this is an important study that was done because I think -- it just came out. And it gives us a sense of where people are going, particularly with these serology studies. Next slide.

So, interestingly enough, there was a range, as you see, about 2.8 percent to 5.6 percent, but on average, 4 percent of the county's adult population was antibody positive. And that means that if you extrapolate that to the whole county, that's somewhere between 200 and some and 442,000 adults at least are antibody positive, which would imply they've had the infection.

But I just remind you that, as Dr. Taylor said, that does not imply immunity. But that does imply at some point they were exposed to the virus, and they certainly mounted an immune response.

And then this estimate is much higher than the almost 8,000 confirmed cases that had reported in the county in early April. And their deaths are over 600. So this would imply, also if you just do the math, and they probably have more cases out there than they could have predicted before. Next slide.

So if you think about the demographics in Los Angeles, this study found that about 6 percent of the men were positive. Two percent were women. So more men were likely to test positive. Those findings are a little unclear. They have not felt they could explain those yet.

But 7 percent of the African Americans were positive, 6 percent of the whites and 2.5 percent of the Latinos in their study. Next slide.

And I think it's important to understand that the percent of individuals who are African American in Los Angeles County are pretty much representative of the nation, it's around 11, 12 percent or so. So compared to whites, that's really disproportionate to the number of whites in the county or in the nation as well, which is around 60 percent.

And I think it's important that we understand these are, one, early results. And these are my interpretations and not necessarily theirs. But these are early results. And like any study, it needs to be repeated by folks using the same serology tests in a community very much like the one they tested. So we're looking at a big city, you know, Chicago, New York, someplace like that.

But it does confirm about the penetration of the virus into the community. Clearly well below herd immunity. Whether you're a 50 percent herd immunity person or a 70 percent herd immunity person, it's certainly well below

what we would consider herd immunity.

And that 4 percent is relatively consistent with the WHO estimates of 3 to 4 percent globally that they've articulated for the seroprevalence of people in other studies that they've looked at.

It also says that males, particularly black men, seem to have a risk of infection that is disproportionate. Again, early study. We need to know why. We do know that there's a disproportionate number of African Americans who get sicker, and a higher mortality rate, particularly if you have chronic diseases.

But what this all tells us, again, we need much more data. Much more studies to find out. And I know that they're doing other kinds of seroprevalence studies. So hopefully this will become more clear to us.

But I wanted to say this because I think this gives us an example of what we're going to see in the next several weeks as more people do these kinds of studies. And for all

practical purposes, this begins to give us a sense, begins is the key word, of what the denominator is.

And whether or not the mortality rate that we're looking at, that we've all feared, is different or not. Again, as you know, there are many species of coronavirus, and that's one of the challenges that we have, making sure that clearly the serology picks up exactly the virus that causes COVID-19. Next slide.

So I don't like to put out a problem without talking about some kind of solutions. So quickly next slide.

So, obviously, we need to plan our testing access with the underserved in mind. So, thinking about location, thinking about the cost issues. Again, recognizing that the tests may be free, but there may be associated costs that we have to figure out how we mitigate if we want to get access to testing for everyone.

Ensuring that the test is actually one that's -- I prefer an approved test. But

obviously, as Dr. Taylor pointed out, many of the high quality test sites, particularly academic sites, many of the public health sites may be reviewed. They do a lot of validation of their tests. And as long as the lab understands the reliability and parameters of the tests they're using, that's important.

And addressing testing education and communications in a culturally competent manner so that people actually understand what the tests are. Explaining to people what false positives are. Explaining what false negatives are. So that they understand, yeah doc, I'm getting the test today, but what does this really mean to me?

As Dr. Taylor pointed out, getting the test right after you've been exposed -- may be exposed to someone at work or a car isn't going to give you the result that you want.

You have to wait for some period of time either to become symptomatic. And then you know that's usually somewhere around three to five days, if you have a meaningful exposure to

that individual.

And of course using trusted messengers is very important so that all communities understand what's going on. And meeting the social determinants head on to make testing easier. Particularly dealing with unconscious bias or conscious bias because I think that's important for us to not ignore and continue to address as we go forward.

I think that's my last slide. But next slide. Yep. I want to thank you very, very much.

Okay. All right. I'm going to turn it back over to David.

DR. RELMAN: Thank you, Georges. It was a very helpful presentation as well.

We're now going to begin the audience question and answer portion of this program. We have just 25 minutes for what looks to be about 150,000 questions, which I think speaks to the importance and relevance of this topic needless to say. We've made some effort here to try to

bin commonly asked questions into -- into sort of general framework so that we can address as many of these questions as possible.

So let me just start now with a couple of questions for Jill Taylor. And these are questions that really have to do with how we can understand better the current performance characteristics of both viral detection and serologic tests and understand where is it we need to be with these performance characteristics.

What are the sensitivities and specificities that we might need, given a likely pretest probability, let's say, of a population with 2 or 3 percent seropositivity and whatever degrees of viral circulation you think there is? What are the test performance characteristics that we're looking for that someone who's taking a test might want to hear before being willing to trust the result that they get?

DR. TAYLOR: So, as a scientist, I can read the performance characteristics and

understand that, you know, I want to be able to detect ten genome copies for instance. But that's not readily translatable to a non-science audience. You want to know that it's high 90s sensitive, 90 percent -- 95, above 95 percent sensitive and well above 95 percent specific.

I think the -- with serology tests, which most people understand more, the issue is one of cross-reactivity. And I often think that being able to use a quantitative test, rather than a qualitative test, gives you more comfort in understanding the results.

But ultimately there is no perfect test. And that's why I agree with Dr. Benjamin, either approved or go to a high quality lab. And then you depend on the expertise of the lab director to validate and verify the quality of the test.

DR. RELMAN: Thanks. Let me also just ask a question about this cross-reactivity issue. A number of people are interested in what we know and don't know about the likelihood that a

positive could in fact be detection of antibody against a seasonal coronavirus.

How many of these vendors have actually not only done the proper controls with those sera but tell us about them in a credible way?

DR. TAYLOR: Very few to be perfectly frank. And that is a real issue, especially with the fact that we've all had colds, every one of us. And you never go to the doctor with a cold. You rarely get bled. So there are very few controlled sera available that you know is from somebody who actually just had a 229E. And that's one of the coronavirus infections.

So there are no control sera available. Very rare. And so very few of the manufacturers have done, especially of the rapid tests, have done the sort of specificity testing that is required to say, yes, I am positive to SARS-CoV-2, but not to 229E.

That's why I like the quantitative ELISA tests. Because you can set the -- you can

set the baseline well above detection of antibody to those viruses so that you know you've got positivity to the SARS-CoV-2. Unfortunately, they have to be done in a lab, those sort of tests. You can't do it in a rapid test.

But it's something that the public has to be really aware of because there definitely is cross-reactivity.

DR. RELMAN: Thank you. You and the other two speakers all pointed out the important distinction between presence of antibody and presence of protective immunity. A number of people have asked what will be the path to an understanding of what antibody means?

How will we be able to move quickly to either a test or an understanding of current tests, such that we can make some prediction about protection?

Yeah, for you, Jill.

DR. TAYLOR: So I think that there are studies that are being done in primates looking at the potential for reinfection. But primates

are not humans. And unfortunately, we are going to have to wait to look at the potential and frequency of reinfection, knowing the immune status of the person who was reinfected before we have that information. And that's unfortunate. But that's the reality.

DR. RELMAN: Thank you.

DR. BENJAMIN: And obviously you're going to have a population of people who have been infected, who we know have been infected, and doing -- in many ways this is a natural history study, and watching them over time.

Particularly if those people are going back into high exposure environments. And unfortunately it sounds like our health care workers.

DR. TAYLOR: Yes.

DR. BENJAMIN: We have to protect them. But that is going to help us what's going on.

DR. RELMAN: Right. And maybe just to underscore, natural history experiments

essentially of that sort, which are going to be so important, necessitate periodic repeated testing of the same individuals, which is how we get to these very large numbers of tests needed.

I think a lot of people, you know, look at the population of their county or the state or the nation and ask well, once we get to that number, aren't we done. And I think what you're just pointing out is exactly the kind of experiment that's critical that in fact requires sequential, frequent testing, retesting of the same people.

DR. TAYLOR: Yes.

DR. RELMAN: There are a number of questions, and not surprisingly, about how do we get to the place that we need to be in terms of numbers of tests, as well as the key people that we need to be testing. And so this is really a question about deployment. And I think probably all three of you might have some very useful things to say.

Perhaps starting with Ashish, you've

mentioned some numbers that we might need to try to attain. And the question is how do we get there. And in particular, what do you think is the most effective blend of national role and responsibility versus state, versus local?

How do you properly empower and resource each of those authorities to work together towards, you know, the ideal solution?

DR. JHA: So thank you. And that's a really fabulous question. And I want to make kind of two points about testing numbers.

There are right now, I think broadly in the kind of ether, two numbers, two sets of numbers in terms of what we want to target. There's a 500,000 a day number that we have been arguing for, which is really a linear scaling. And then I alluded to Paul Romer, Danielle Allen, others who have been arguing for 20, 30 million.

There's a new Rockefeller Foundation report that I think says 10 million a day. You don't get to 10, 20, 30 million by linearly scaling. So you just need a total leap of

technology. And I think I mentioned that earlier.

And that's going to require a bunch of investments on the part of the, I think, the federal government to create incentives for new technologies. And then obviously deploying a totally different testing framework.

So I'm going to leave that aside for a second, and talk about in the next four, six, eight weeks if we're going to be able to do -- get up to 500,000, how might we do that? And then that mix of federal and state.

So I actually think it is achievable to get to 500,000 a day. It does require a very substantive role for the federal government. And the federal role -- the role of the federal government has to be certainly to provide financial support to states. I think a lot of states are starting to financially get into struggles with obtaining all the equipment.

The coordination is really about making sure we have enough supplies. Deploying

the DPA to the extent that, the Defense Procurement -- Production Act, to the extent that that is needed. And then really coordinating supplies across the country. I think those are very, very appropriate roles for the federal government.

So the way I have seen this ideally play out is that states, one of the things that states have to do, some of the most successful states have -- all have testing czars. Again, I don't love the idea of putting a czar on everything. But, and you can call it something else, a testing coordinator.

But if you look at states like Utah and New Mexico, which have actually done a very good job on this, they have a testing czar, whose day job, every day they wake up, go to bed, thinking about how do you get testing up and running.

So I think states should really take ownership. Do that. And then the federal government should be getting involved with

technical support, with financial support, and with logistics and supply chains, and all the things that states cannot do.

That's, in my mind, the kind of ideal public -- I'm sorry, the ideal federal/state partnership, especially under the current circumstances where I think a large role for the federal government is unrealistic. But that kind of partnership could be something that could work out.

DR. RELMAN: Thank you. Georges, could I ask you the same question, but with the focus on the large populations for whom contact with the testing infrastructure is simply not, you know, a current common occurrence?

Do you see a path towards, again, deployment and dissemination out to the critical people that need to be tested? These are both the medically vulnerable, but the economically vulnerable as well.

DR. BENJAMIN: Yeah, absolutely. And so we're going to have to take what we learned

during the HIV/AIDS epidemic, and put it on steroids. And that means we're going to have to use a range of community health workers, outreach workers. We're going to have to build on the disease intervention specialists that each state or local health department have.

And we're going to have to build call centers so that we can manage the input, so that we can leverage the knowledge we have around testing with who do we have to go out and test. And that's particularly important around the contact tracing. I know there is a coalition of many of the public health groups that are working with CDC now to try to put that together.

But it's going to take a real herculean effort to make that happen. You saw that Massachusetts has talked a great deal about doing this, as an example.

But it creates -- the systems exist for us to do that. We understand how to do it. We're going to have to do a lot of virtual training, for example.

And I also think that spending some time over the next few weeks, in fact days to weeks, getting the communications right and figuring out how do we communicate and who do we communicate?

As I mentioned, it's nice to have the Ad Council's ads on TV that talk about physical distancing. But I think we're also going to have to have radio. We're going to have to get the media involved. We're going to have to get some of our sports heroes involved in order to reach the population, so that people understand where they go, what the value is with that testing.

And then we're going to need to wrap all of this around with an effort to get rid of a lot of the misinformation and disinformation because I can see it right now. People saying that if you get tested, you're going to get some disease that you don't like. We see that with vaccines. When people want to, you know, undermine the vaccine effort.

And in Washington, D.C., we spend a

fair amount of time talking to beauticians and barbers and faith leaders, and getting them to be part of the trusted messengers that I talked about.

DR. RELMAN: Thank you. I want to ask all three of you a similar question which is how do we think out of the box right now.

All of you have alluded to challenges that are in some ways challenges that we as a nation or as local, you know, communities have not yet been able to accomplish. And yet we clearly see that we have some challenges that have to be addressed now.

So in each of these three ways, I'd like the three of you to think about how do we -- what to you seems to be the most promising out of the box set of opportunities.

So maybe starting with Jill, if you could just talk about some of the technologies that you think are most promising that would allow for, you know, rapidity, flexibility, forward deployment, ease of interpretation, et

cetera. Are there any that you'd like to highlight, just as generic technologies?

DR. TAYLOR: So I'm not going to answer your question. I'm sorry. I'm going to do -- I'm going to talk about a gap that I think I see, and that is electronic communication.

You know, as I mentioned, I'm a big fan of the point of care tests because ultimately I think getting them into the home, getting them into the pharmacy, is absolutely the way to go.

And, you know, with the CRISPR-Cas type approaches, you know, high sensitivity, we're pretty much there on the technical side of things, I think. But the issue is that, you know, if you do a test at home, the public health system has lost that data.

And so, to me, it's the connectivity of the system. And every urgent care center, every physician office lab, every LabCorp, Quest, every big hospital, it all has to be communicated.

And so I -- but, you know, the

Microsofts of the world, the Amazons of the world can connect everything if you're buying something. So why can't we connect everything if you're having a test?

So, you know, one of the good things that might come out of this horrible time might be that we're accelerating the development of interesting solutions. And that would be a good thing.

So I'm not really answering your question. But I'm hoping that somebody comes up with a wonderful solution for that because that's what we need.

DR. RELMAN: Well, I think actually you did answer it very well and, in fact, maybe one-upped the question.

Ashish, let me just ask you. From the point of view of data collection and data sharing, do you see some interesting opportunities that you would like to see promoted? Some of the people sending in questions have asked about crowd sourcing as kind

of a generic concept.

DR. JHA: Yeah. So let me say a couple of things, and then I'm going to talk about one of the things that worries me as well about this idea on data sharing and data fragmentation.

So I think Jill is right. Dr. Taylor is right that -- in that -- that this virus and the way it is playing out may in fact do enough kind of jumbling up of our healthcare system and all the sort of traditional boundaries we've had around data sharing that it may sort of push those enough.

So, for instance, I think over the summer as we gear up for the fall and get ready for what will almost surely be more waves of the virus, assuming that we get through the summer reasonably okay, I think there's going to be a lot of pressure to create a lot more connectivity across health systems to be pulling out data, to be sharing data. And now the business model for that is very, very different than what it was

five years ago or two years ago.

So I see that as the upside here. That it may make the sort of traditional data blocking, we're not going to share with these guys because they're our competitors, those feel really anachronistic in the context of a pandemic. And so I hope that maybe some of this pushes us and our healthcare system to be much more integrated from an information point of view.

The part that worries me, the fragmentation, is, and this really gets at the heart of a lot of what Georges was saying as well, is that what you're seeing now is entire industry come up that will go to companies. And I actually have had a bunch of them approach me. And I'm not part of any of them.

Basically going to businesses and saying we'll sell you the ability to bring all your workers back because we will test them on a regular basis. We will provide the PCR test. We'll provide the immunology -- immunologic

tests. We will make sure that all your workers are safe.

That is a very interesting business model. Those companies are going to get access to tests that maybe states will not have access to. And they will deploy them not based on risk or who's clinically most likely to suffer if they get the disease, but who is the most economically, who can kind of pay for it.

And so when we saw NBA players getting access to the tests, where really sick people in hospitals couldn't, now we're going to see healthcare executives and lots of people who are in higher SES status, socioeconomic status, being able to access tests and get tested regularly.

And I worry that COVID test negative or immunologically positive becomes essentially a status symbol and becomes a way to be able to work in a way that really is going to be harmful.

And also, all those tests happening within companies will create a fragmentation because public health will never access to all

that data. So there's a set of policy challenges that we need to start thinking about now because the marketplace is moving extremely fast in this area.

DR. BENJAMIN: And, you know, that brings us to the issue of these immunity certificate idea, right? You know, getting a card, right? Just like your credit card, it has its privileges. Having a little card that says boy, I am, you know, seropositive.

In the past that would not have been something anyone would have wanted to say to one another. But now it sounds like that's okay. I'm seropositive. And I've got a green card, blue card, purple card, which proves that I have that.

And the problem with that is, of course, is that it becomes extraordinarily discriminatory. And then, you know, you can make a lot of money on the black market selling that fancy card to folks. And so you basically build a black market. And so immunity in terms of the

validation becomes not very helpful.

And then we run the same risk as we saw with people being concerned about HIV. Now not wanting you to know whether or not you are -- you're not seropositive, for example. Because that could mean that you don't work. You know, right now we're leaning on that now by telling people we're going to take your temperature, right?

And that has some clinical value. But it's -- I worry about that. And I do worry about it being misused.

Now, having said that, I think we're absolutely on a new curve of technology. We can do -- we can get an EKG, I mean, we can get money out of an ATM machine anywhere on the planet 24 hours a day, seven days a week.

And yet we can't exchange some of the basic information around seropositivity across all our healthcare system. And so we're going to have to -- we've got to protect people's privacy. That's for sure.

But we've to find a new way to make these boxes talk to one another. The technology is there. Amazon does it. Your local grocery store does it. They know exactly what's coming off the shelf.

And now that the federal government is beginning to put a little money into HIT for public health, we need to once and for all build a robust surveillance system that's national in nature that gives us real-time information.

And I've got to tell you, when I was the health officer in Washington, D.C. many years ago, and I was looking at infant mortality two years in the rear. And the fact that even the opioid epidemic now, we were still looking at data many, many months in the year -- in the rear. Sometimes a year in the rear. We can fix this. The technology exists.

DR. RELMAN: Great, great. Those are really helpful insightful comments. I think we're close to the end of our time.

There are so many more questions here.

I'm hoping that there is an opportunity to have them addressed, to engage all three of you further in this conversation because there's so much more that could be said.

Let me just offer a few, just a few concluding remarks. First of all, I think it's really important when we think about testing and the current conversation about testing that we step back for a moment at first and ask what is the question. What is the question that we seek an answer to, for which we think testing is the right approach?

Because until you've defined the question, you don't really know how it is that you should be deploying a technology or framing a study or interpreting the data.

Second, I think we've heard from the three of you, and from actually the attendees as well, that there are still some important tactical or technical needs that are important and probably should be high priority right now. One is that we don't yet have one test, one

testing kit that clearly outperforms others. And so for now there may well be value in deploying multiple platforms that seek to do the same thing.

In this case, you could say that redundancy can be useful. I think there are -- there is value in targeting a virus as well as host response. And, again, by host response we mean serology. But not just serology and antibody, perhaps other host makers that tell us who is incubating virus and not yet sick, who is sick and destined to need a ventilator, who is resolving their infection and is likely to become immune.

That kind of capability would be really impactful, and I think is possible technically, through a whole variety of interesting science and technologies that we haven't really had a chance to discuss all that much this afternoon.

Third, from a tactical point of view, all of this has to be scalable and to, you know,

varying degrees depending on who you listen to right now, perhaps massively scaled in some cases. And so we're going to have to think, I think, in ways that are nontraditional, technically nontraditional in terms of infrastructure and organization to be able to make that happen.

And really deployment is the critical need right now. Because probably a number of good enough tests right now that we'd love to see much more further deployed and then penetrated into various, you know, aspects of our societies, and we're just not. We weren't prepared to do that, and we still haven't quite figured out how to do that as well.

And then finally, there are the issues of governance on testing that we touched on this afternoon. We could talk about, further about what the right kinds of partnerships might be between federal and local, between private and public, and between all the other kinds of sectors that have very useful things too

contribute.

But right now I think we certainly need a more effective organizational scheme for taking advantage of these different kinds of skills and expertise and capabilities, so that we can leverage and synergize rather than simply add or, at worst, compete.

And then finally I think we certainly don't want to forget the questions of equitability, of data sharing, of these more meta features that are so important to taking advantage of whatever information and knowledge we have gained from testing so that we can make good public health decisions.

So let me just say that concludes today's webinar. The next webinar will take place next Wednesday, that's April 29, at 5:00 p.m. Eastern Time. It will focus on COVID-19 and health equity, exploring disparities, and long term health impacts.

Everybody who registered for today's webinar will receive an invitation to the next

webinar.

And just to remind you, this webinar has been recorded. The recording and a transcript and the slide presentations will all be available on the covid19conversations.org web page. So look for those items there.

I, again, from the bottom of my heart, and from the APHA and National Academies of Medicine, want to thank the three panelists for really wonderful presentations and comments.

I want to thank the two sponsoring organizations for their efforts to make these webinar series possible, and this one.

And, finally, I want to thank all of the listeners who joined us today. Please stay safe and healthy, and take care.

(Whereupon, the above-entitled matter went off the record at 6:30 p.m.)