Call Date

08/19/2024

Call Agenda

Welcome
Sean Courtney, CDC Division of Laboratory Systems

SARS-CoV-2 Variants Update
Natalie Thornburg, CDC Coronavirus and Other Respiratory Viruses Division

OneLab VR
Joe Rothschild, CDC Division of Laboratory Systems

Dengue Update
Gilberto Santiago, CDC Division of Vector-Borne Diseases

Call Transcript

Sean Courtney: All right. We'll go ahead and get started. I know it takes a minute sometimes for folks to join since it's a Zoom call. But thank you, everybody, for joining us today. My name is Sean Courtney, and I'm in CDC's Division of Laboratory Systems. On the screen is the agenda for today's call. But before we get started, I want to cover some general housekeeping items and some announcements.

So as you've heard on previous calls, DLS is the CDC division that works closely with clinical and public health laboratories across the country to support laboratory emergency preparedness and response activities. And we've been hosting these calls since March of 2020. DLS supports this work across four goal areas: quality, workforce and training, preparedness and response, and informatics.

CDC's Division of Lab Systems has launched the ECHO Biosafety Program to develop and engage a community of practice to address biosafety challenges in clinical and public health labs. The next session is scheduled for next Tuesday, August 27, and will focus on *Operations: Planning and Maintaining*. These monthly sessions are tailored for laboratory biosafety professionals and provide a platform to bridge gaps, build a community of practice, and enhance biosafety.

You can scan the QR code on the slide to register for the next session. To view upcoming sessions and access resources from past ones, visit the ECHO Biosafety Program website. And for inquiries, contact dlsbiosafety@cdc.gov.

As always, we want to hear from you. Our Training and Workforce Development Branch is interested in hearing more about the education and training gaps you're currently experiencing. We invite you to send your feedback via email to labtrainingneeds@cdc.gov as shown on the slide.

We'll be sharing the slides from today's call along with the audio and transcript, and we'll post them online hopefully by the end of the next week. You can find them on CDC's Laboratory Outreach Communication System, LOCS, page, shown at the link at the bottom of this slide.

During today's call, if you have any questions, we'd like you to please use the question-and-answer function in Zoom so that we can address it during the call and to not use the chat function. We ask that you please also include your email address so that we can follow it up if we're not able to answer it during the call.

If you're from the media, we ask that you please contact CDC Media Relations at media@cdc.gov. Or if you are a patient, we ask that you please direct any questions to a health care provider.

And I'd like to remind everybody that these slide decks may contain presentation material from panelists who are not affiliated with CDC. Presentation content from external panelists may not necessarily reflect CDC's official position, please keep in mind when you go back and look at some of the slides that we post on our LOCS web page.

And with that, I'm going to introduce our first speaker today. We have Natalie Thornburg from CDC's Coronavirus and Other Respiratory Viruses Division. And she's going to provide us with an update on SARS-CoV-2 variants. And, Natalie, I'm going to stop sharing so that you can share.

Natalie Thornburg: OK, thank you.

Sean Courtney: All right. You should be good to go. Let me know.

Natalie Thornburg: OK. All right. Are you able to see-- OK.

Sean Courtney: Yeah.

Natalie Thornburg: Good. All right. So before I jump into the genomics, this is just a current picture of our percent positivity as reported by our NREVSS laboratory network, the National Respiratory Enteric Virus Surveillance System. This is the last two years. And the left y-axis is percent positivity.

So you can see these peaks and valleys. So last year, we reached a peak of percent positivity in the summer, right around August 26, at just around 15%. And we're a bit higher than that right now. And we're sitting at about 18% test positivity in the national picture.

There are some indicators that this may be hitting-- we may be hitting our peak. There are a couple of regions where we're starting to see decreases in percent positivity. So we're seeing decreases in percent positivity in regions 2 and regions 9. So hopefully, we'll be able to start seeing that in the national picture as well soon.

So what does that mean for our hospitalization rates? So this is hospitalization rate per 100,000 people. This is from COVID-NET surveillance system. The red line in the bottom is our current year, so '23-'24, starting in August-- or September last year. And here we are right now. We're a little higher than we were this time last year, but we're a little higher with percent positivity as well.

And the summer cases started a little bit earlier this year than they did last year, but still relatively low in comparison to previous years. So last year, this green color, this dark green color with circles. '21-'22 is this sort of smooth green line. And then 2021 is the blue line here. So in comparison to 2021, '21-'22, and '22-'23, generally low number of hospitalizations, although not zero hospitalizations.

All right, this is our current genomic picture on our COVID Data Tracker Nowcast. So just as a reminder, the graph that I'm showing here is the percent of viral lineages. And so it always equals 100. Even when we're in low cases, the percent will equal 100 because it's a proportion graph and not a numerical graph. The left side of the graph are weighted estimates, and those are calculated from sequences generated by CDC, for CDC, and they're deposited in public databases. And then we use those data for the weighted estimate for the actual sequences to calculate growth rates and use that to model into the present tense.

So the data here on the right side of the graph in the gray areas for these two reporting periods, those are modeled data modeling into the present tense. And we do that because it takes time for a specimen to get from a clinical laboratory to a sequencing laboratory, do the sequencing, analyze the sequencing, and get it uploaded or get the data to us.

And so our modeled Nowcast estimates are estimating the lineage KP.3.1.1 is predicted to be the most prevalent lineage, with somewhere between about 30% and 43% of circulating viruses are this viral lineage. This viral lineage descended from JN.1, which emerged last November-ish.

And all the viruses that have been circulating since December, January have been JN.1 lineage viruses. And the updated vaccines that will be released this year are JN.1 formulations. All of these viruses that are circulating currently, even though they have very different names, are very, very similar to each other.

So it is just a nomenclature issue, why you have these different-sounding names, like LB.1 one and KP.3 And it's just because when you get a lot of numbers on the back side of a lineage, it becomes very difficult to say. And so they're assigned an alias, which is why they have the different numbers. But in reality, all of these viruses are JN.1 lineage viruses, and they are very similar to each other, with a couple of amino acid differences between them.

And you can see on our COVID Data Tracker the lineage relationship of these viruses that are listed in Nowcast below the map. So if you scroll down here and you look at this dendrogram, this is not a phylogenetic tree, if you're an evolutionary biologist. The distance isn't proportional distance to relationship. This is just a relationship graph.

But you can look up here, up in this JN.1 branch. And every virus that is listed on the Nowcast currently is in these cluster of JN.1 viruses. So they're KP.2 viruses. There's some KP.3 viruses. And then there are some that are descended directly from JN.1 But again, they're all very closely related, with a couple of amino acid differences. And that's it for me.

Sean Courtney: All right, thank you for that update, Natalie. Really appreciate you joining the call today. There was one question that came in. Not sure if you can answer it off the top of your head. But it's if you can remind us what regions 2 and 9 are. It looked like region 2 was Northeastern states, and region 9 looked like it was Western. I wouldn't know what the specific states are off the top of my--

Natalie Thornburg: California. Like, California, Nevada, that's region 9.

Sean Courtney: Right. So that just aligns to the HHS regions, correct?

Natalie Thornburg: Yes, those are just the HHS regions. So region 2-- if you look on the CDC Data Tracker, you can see them in the map. I kind of scrolled past it really quickly. So region 2 is New York, New Jersey, New York, New Jersey. I think that's it for region 2. And then region 9 is, yeah, California. Oh, you're testing my geography here. California, New Mexico, Nevada.

Sean Courtney: Yeah, I was like, it looks like it's Western California. I'm not sure the other exact states, but—

Natalie Thornburg: Please don't ask me to name capitals.

Sean Courtney: There's a cluster there. Right? Perfect.

Natalie Thornburg: Yeah, thank you.

Sean Courtney: All right, well, thank you. I don't see any other questions at this time. So thank you for joining our call. And if you're able to stay around, if any questions pop up in the Q&A, you're welcome to go in there and type out the responses there if you can. But thank you for joining the call today. Appreciate you joining us as always.

All right. Should be sharing the slides again. And I'm going to welcome our next speaker. We have Joe Rothschild from CDC's Division of Laboratory Systems. And Joe's presentation is about our OneLab VR program. Joe?

Joe Rothschild: All right. Can you hear me?

Sean Courtney: Yes, we can.

Joe Rothschild: Perfect. OK, so my name is Joe Rothschild. I work for the CDC as a Health Communications Specialist. And I'm currently the Team Lead for our Virtual Reality Laboratory Training Team. And we're going to talk a little bit about virtual reality, primarily our-- oops, camera just died-- primarily our OneLab VR application. And so yeah. So let's get into it. Next slide.

So for those who aren't really aware the benefits of VR training, there's some bullets there. I'm not really going to go through them. But really, the thing to keep in mind is that VR offers consistent on-demand training that really doesn't require prepping a physical training area, and it provides learners with access to equipment that, really, they might not have in their current facility. Next slide.

All right. So a little bit of history. Our branch, the Training Workforce Development Branch, we really specialize in all things laboratory training-related. We do e-learning, webinars, all kinds of things like that. But really, we've been chasing virtual reality since around 2014, really looking for something to bridge that gap between e-learning and hands-on training.

And so we finally got the chance to in 2019, where we pilot tested a course on biosafety cabinet safety. And we learned from it that people really accepted VR as a really valid training modality. So we continued developing, and in 2020, we completed and launched the course LabTrainingVR-- we did the Biosafety Cabinet Edition, and then we did one on personal protective equipment.

We continually try to add additional components into all of our trainings, for example, multiplayer, where you can see each other and talk to each other. So in addition to creating that PPE VR course, we made the decision to switch to the OpenXR-compliant headset. So that's going to be like the Meta Quest, PICO, Pimax, that kind of thing, but ultimately much less expensive headsets because we know that training budgets and stuff are always hard hit. And we wanted to make these trainings as available to as many of you as possible.

So in 2022, in addition to all of that, we partnered with the Association of Public Health Laboratories-- that's APHL, and I'm sure many of you know them-- for a thing that we called the PushPack Program. And what that was is that was us sending out headsets around the country to clinical and public health laboratories. So yeah, we continued to build. Next slide, please.

All right. So 2023, we released OneLab VR for the Quest and, again, OpenXR-compliant headsets. And we included with it a tutorial scenario and a packing and shipping scenario. And then come 2024, we've released so far two centrifuge-specific training scenarios that really focus on properly balancing and loading centrifuge units.

By the end of the year, we plan on releasing a scenario on autoclave safety and a really more comprehensive tutorial section. So 2025, who knows? We're continuing to develop scenarios. Again, the goal is releasing one new scenario every quarter. Personally, I'd like to release a little bit more, but we'll see what we could do. All right. Next slide, please.

All right. So again, we released this LabTrainingVR Biosafety Cabinet Edition. It was released on both the CDC TRAIN and the Steam platforms. And in this first VR training, learners are taught how to properly set up, work in, and shut down a biosafety cabinet. If you hit that little QR code in the corner, it'll take you to a course page on REACH, where you'll be able to see a little promo video for it. Next slide.

All right. So I mentioned earlier about this PPE VR course that we released. Well, again, this is only available on the HTC Vive or a tethered headset. And in this course, the learners are going to go through a museum-like environment, learn about the different types of PPE, when you should consider adding additional or different types of PPE, that sort of thing. So again, QR code or link in the chat for more info. Next slide.

All right, so OneLab VR. So before I get into it, want to just talk a little bit about that that change to the less expensive headset. Our previous courses all required like an $800 headset and a gaming-style computer to run it. So you're looking at $2,000 to $3,000 for that. And really, again, knowing those limited budgets for training, we decided to switch our programming for this OpenXR-compliant headset, again, like the Meta Quest. So yeah, we really just wanted to make these as available to everyone. So next slide, please.

There should be a little video on it. So this is the little video walkthrough to give you an idea. We put it on the fourth floor of a fictitious building. It contains 50,000 square feet of laboratories, each laboratory with a different specialty, different hardware, different supplies.

All these different areas are dedicated to training clinical and public health laboratory professionals. This environment, it will provide a safe environment, and it includes 12 different laboratories, 100 different pieces of laboratory-specific hardware and equipment. And really, we work with a lot of experts to make

sure that these laboratories are correct, down to the placement of the fire alarms and the sprinkler systems.

So as I said earlier, asynchronous, e-learning, online training, that sort of thing, it's helpful, but really nothing beats hands on live training with an instructor who could offer immediate feedback and guidance. So the great thing about OneLab VR is it includes this multiplayer functionality where trainers can create their own OneLab VR environment, invite their students to join them in a virtual laboratory. And then these instructors could see, hear, talk to one another in real-time. The plan for this is to offer the option of single player or multiplayer. So really, these users can meet in the environment and get trained either by CDC SMEs or even your own local lab manager. Again, you could see each other, talk to each other, really be looking over someone's shoulder as they're doing a procedure and offering them real-time feedback.

So as I said earlier, currently in OneLab VR, we have a packing and shipping dangerous goods scenario, a micro centrifuge safety scenario, a swinging rotor bucket centrifuge scenario. And we're planning on releasing an autoclave training scenario by the end of the year. But again, we're just continually trying to add more functionality, so it really meets your needs. Next slide, please.

So, again, this PushPack Program that we've now renamed the VR-Ready Laboratories Program, we've partnered with APHL, where they're going to be sending out headsets with, really, all the fixing to clinical and public health laboratories all around the world-- or, sorry, around the country for VR training. We also include handouts and videos that show you how to set it up and locate the training, that sort of thing. So let's see. Next slide, please.

So yeah, as of now, we have around 400 headsets that we've sent out, over 100 labs, 41 states. I believe we're actually up to 46 states now have received the headsets. And we're around 1,200 staff that have received the training. So we're really excited about that. We're hoping to up those numbers. Next slide, please.

So again, our website's going to be this reach.cdc.gov. You could go there, click on the OneLab VR for more information. And again, if you're interested in OneLab VR or in potentially receiving some of these headsets via the VR-Ready Laboratory Program, shoot an email to vr@cdc.gov, and we'd love to chat and get back with you. And my next slide, I think, is a question slide, but we can maybe leave that for later. I'll let Sean make that decision.

Sean Courtney: All right. Thank you, Joe, for that presentation. It's fantastic and got a lot of feedback and a lot of questions, actually.

Joe Rothschild: Great.

Sean Courtney: A few of them are around headsets. I might leave some of that for you to jump into after this that you can answer. A lot of them are overlap, some. But the first question I'll ask you is, is CDC collecting any hard comparative data demonstrating the utility of VR-based training versus non-VR-based training for the same content?

Joe Rothschild: So I love that. And to be honest, I would love to be able to collect more. For our first pilot test, on the LabTrainingVR Biosafety Cabinet Edition, we were able to bring in 60 individuals. I believe 30 were actual day-to-day laboratorians-- or laboratory professionals, excuse me. And then the

other 30 were non-lab lab individuals. And we had them run through the course. We monitored their progress. We asked them questions and got some really good data on it. But ultimately, it's difficult for us to collect data. It takes a long time to get approvals, to do those sorts of things. So as of now, we don't have a ton of data on that.

But again, if you look at the military, if you look at most of the Fortune 100 companies, they're all using virtual reality for training. A lot of them are soft-skills-based training. But we've seen also large corporations, the Walmarts, the Volkswagens, that use VR for this step-by-step type of training.

Sean Courtney: That's great. And kind of a follow-up on that is, obviously, a lot of laboratory procedures require some of these fine motor skills and accuracy. And how do we account for that kind of missing component here in a VR training world?

Joe Rothschild: Yeah. So right now, you'd be surprised at exactly the level of fine motor skills that you can achieve in VR. Let's say just using a pipette. Yes, you're going to be using a VR controller, not an actual pipette. So there's going to be a little bit of a disconnect there.

But when it comes to that sort of reflexive learning, where you know, and you get used to injecting the pipette tip between each aliquot or working in a biosafety cabinet and moving your arms slow and at 90-degree angles, that sort of thing, it's perfect for it. So I think there's a little give and take. And again, remember, this technology is still pretty darn new. And so just as the technology evolves, I think the ability to really hone in on those super fine micromotor skills is going to be huge.

Sean Courtney: Fantastic. Thank you, Joe. Next question is a headset question. Is this able to be downloaded on the Oculus, or is it only available on the headsets that you're sending out?

Joe Rothschild: No. So if you-- so there were some QR codes earlier and some links in the chat. If you go to reach.cdc.gov and you could either click on the OneLab VR tab or on the Training tab, you could see where you could download them. They're available on the Meta store. They're available on SideQuest. Some of them are available on Steam. So it's really any type of headset that you have, chances are, will be able to run these applications.

Sean Courtney: Fantastic. A couple of questions came in around continuing education credits or PACE credits. Is any credits available with these courses?

Joe Rothschild: So for OneLab VR, presently, we don't have any CE credits because we've really made an intentional decision to keep our training sessions in there between 10 to 15 minutes long and because we know that most laboratory professionals don't have a ton of time to take training.

And so, for that short a period of training, we haven't been able to figure out a good way to put in PACE or CE credits. But I think the thought is, is in the future, we're going to try to maybe come up with some sort of curriculum that we can bundle scenarios together so it will be a half hour or an hour long total and then thus be eligible for some of those credits.

Sean Courtney: All right, great. Thank you. I appreciate that, Joe. So like I said, there's a few questions left, but I'll let you answer those in the chat. They're really around the headsets and I think more-- which you addressed, is like the where and how much they can cost. So I'll let you jump in the Q&A feature and answer those. But I want to thank you for joining our call today. It was a fantastic presentation and a

really great overview of the training material that you guys are pumping out over there. So I look forward to seeing more of these courses become available.

Joe Rothschild: All right. Thank you very much.

Sean Courtney: Thank you. All right. And we are going to move to our last speaker for the day. I'd like to please welcome Gilberto Santiago from CDC's Division of Vector-Borne Diseases, and he's going to provide an update on dengue fever. Gilberto?

Gilberto Santiago: Certainly. So hi, everyone. I'm Gilberto Santiago. I'm currently serving as the Acting CDC Dengue Branch Laboratory Team Lead. And thank you for the opportunity to address this group. So next slide, please.

Well, let's jump right in with a brief review. Dengue is a disease that's caused by any of the four distinct but very closely related dengue viruses, numbers 1 through 4. Infection of any one of these viruses gives you lifelong immunity to that specific virus but only short-term cross-protective immunity to the other three serotypes, meaning that the individuals can be infected up to four times in their life.

Most infections are asymptomatic, about 3 out of 4. Among these asymptomatic cases, the illness manifests after an incubation period of five to seven days. The early clinical findings are nonspecific, so it can be difficult in the absence of testing to distinguish them from other infections. Next slide, please.

These viruses are transmitted through the bites of infected *Aedes spp*. mosquitoes, such as the *Aedes [aegypti]* on top or *Aedes albopictus* on the bottom. However, there are other less common routes of transmission. As you can see, they're listed here in this slide. And others have been documented. Next slide, please.

So the ecological niche of the vector continues to expand. And these heat maps, like you see here, of the continental United States, show the probability of the vector presence, where you have the darker colors indicating a higher likelihood of the vector presence.

As you see on the left panel, *Aedes aegypti*, which is shown in blue. On the left is primarily on Southern states but actually moving across the continent where we have *Aedes albopictus* in green in the right panel covering large portions of the Southeast and the West Coast. As you can see, the component vectors are present across much of the continental United States. Next slide, please.

So for preliminary 2023 data reported by WHO, we know that there were more than 5 million cases that were reported worldwide. These occurred in more than 80 countries that were located in all six WHO regions worldwide and approximately 5,000 dengue-related deaths by that time. But by July of this year, in 2024, these numbers have increased significantly, almost double the number of cases in global reach. And more than 90 countries are now affected in all WHO regions. We're looking now more than 6,000 dengue-related deaths. Next slide, please.

So looking at the cases that were reported by PAHO, or Pan American Health Organization, for the Americas region specifically, we have seen a sharp increase in dengue cases in the incidents since the 1980s. As you can see on the right, in 2023 they had the one in the maroon bar there, the highest number of dengue cases on record. And that was until 2024, with more than 10.9 million cases have been reported as early August. Significant increase. Next slide, please.

Looking only at the United States, however, dengue is not considered endemic. We can appreciate the most cases, over 95% of the cases, are associated with travel to endemic areas. Next slide, please.

This slide here shows the number of traveler-associated cases reported by EpiWeek to the CDC. In lighter colors, you're going to see the epidemic curves that show the number of cases in 2019. You're going to see in 2022 and 2023 there as well.

But in the darker color, darker maroon color, you're going to see 2024 is looking-- how is it looking so far compared to previous years, even when breaking-- record-breaking numbers per week. Therefore, what this graph is telling us is that we should expect these numbers to continue this upward trend during the rest of the year, maybe next year as well. Next slide, please.

Historically, local transmission was only reported from Florida, Hawaii, and Texas, with the transmission manifesting in sporadic or single cases or in limited outbreaks. However, the past two weeks-- I'm sorry, the past two years, it has been quite concerning with two new states showing evidence of local transmission.

In 2022, there was Arizona, reported two locally acquired cases. And in 2023, we had California reported also two locally acquired cases. While we hope that transmission remains limited in the 50 contiguous U.S. states, we show that-- we know that the discovery of even one local acquired case can introduce a lot of heartburn for everyone involved, but in particularly the lab, as a public health leadership brings a pressure to confirm or deny this local transmission. And that's why we are here today, to make sure that we are ready to respond when we get the call. Next slide, please.

And due to this increasing activity in the Americas and in the region, the CDC has issued an official health advisory through the Health Alert Network, and the link here is shown below. Next slide, please.

So dengue infection occurs a series of timelines. First, you get infected by a-- be bitten by a mosquito that was infected by the virus. And you have an incubation period that can last 3 to 14 days. This is called the intrinsic incubation period.

Then when you start feeling the symptoms, we call this the acute febrile stage. That lasts two to seven days. And this is where you see most of the virus circulating in your blood. And you enter the critical phase, which lasts about 24 to 48 hours. And this is where either the disease will resolve itself or progress to a more severe form of manifestation. This part of the infection, you are not going to be viremic, but this is what we call the convalescent phase. There you go. That lasts three to five days. Next slide, please.

The testing during this, the first seven days of symptoms determine the virology and immunology of dengue. During the first seven days of illness, dengue virus RNA and the NS1 viral protein are high. So the IgM levels are not detectable initially at onset but will continue to rise and might be detectable several days after onset.

During this time period, we encourage public health laboratories to run PCR and IgM or a combination of NS1 antigen ELISA plus IgM ELISA in combination. Our studies show that using these tests together on the same sample yields a sensitivity of over 90% of the cases. Next slide, please.

So what happens after that? After seven days, you can appreciate that the IgM levels, as you see in this chart, will continue to rise and only start to fall months after the infection. However, dengue virus RNA and NS1 levels start to fall after seven days. This is why IgM is a recommended test after seven days of symptoms where we're considering IgM serology at this stage. And it's one antigen ELISA or RT-PCR can be considered optional, but their sensitivity is lower after seven days.

However, you can also consider running PCR in some patients to continue to monitor their positive results. Keep in mind that these tests have lower sensitivity compared to other samples that were taken before. And lastly, be aware that this testing guidance might be different according to the jurisdictional needs. So we're happy to consult with you if you have any questions that might work best in your context. Next slide, please.

So now that we have talked about how to test, let's talk about which tests are available. There are two PCR tests that are listed here, the CDC dengue virus 1 through 4 RT-PCR and the CDC Trioplex RT-PCR. And we have commercial InBios IgM ELISA and commercial also InBios NS1 ELISA test that are available.

So among the four FDA-approved dengue tests, who should be implementing them? For public health laboratories, we believe that the CDC PCR tests provided for free by the PCR and the InBios IgM are the best options. As you can see, they're listed here. The CDC tests, of course, are not commercially available, but the InBios ones are commercially available, and they can be purchased. You can also purchase NS1 test if you wish, but be aware that these only tell you that if the patient had dengue. It will not give you the serotype information. For serotype information, you will need the CDC PCR test. Next slide, please.

So if you get a question from your friends and colleagues in the private sector, you can tell them that the IgM and the MS1 ELISA are available for purchase from manufacturers and that when they're used together, these can fulfill the dengue testing recommended by the CDC. Next slide, please.

We can now take a closer look at the CDC PCR test. These are intended to be run in specimens from symptomatic patients. There are two tests, like I mentioned. There is the Trioplex test and the dengue virus 1 through 4 test. The Trioplex test is intended to detect Zika, chikungunya, and dengue virus RNA only without information on the dengue virus serotype. However, the dengue virus test will only detect dengue virus, while it will give you the serotype, the present information on the dengue virus 1, 2, 3, or 4.

Now, there are quite some differences I'd like to point out. The two different tests use different validated specimen types. Serum and plasma are valid samples for both tests, as you can see in this table here, four, where it can be is valid, in the preferred sample type for Trioplex and for dengue virus as well. Although the rest of the specimens listed here are valid with the Trioplex test, urine and amniotic fluid are valid only for the detection of Zika virus, and they must all be tested alongside a case-matching serum specimen for valid diagnosis. They should not be tested by themselves. Next slide, please.

On this slide, which we can provide after this presentation, you can see a list of the equipment that is compatible with our current PCR test. I won't read the list out loud, but I do want to bring your attention to the star symbol here that indicates that much of this equipment will be discontinued by the manufacturer very soon. Next slide, please.

So to make sure that PCR testing can continue without hitch in our public health labs, our lab team here at the Dengue Branch is currently working to validate our assets and currently available equipment that is now planned to be discontinued. Our lab is currently working to validate our assays on these equipment listed here. We will keep you updated when this is ready. Next slide, please.

Test results can be interpreted as follows. As you see in the first table to the left, for PCR tests, a PCR test that is negative will be properly listed as negative for RNA detection or is interpreted as the virus RNA was not detected. On the right side, you're going to see that a positive PCR is interpreted as a current dengue virus infection at the time of sample collection. On the bottom, you will see that for the IgM test, a negative result is interpreted as no anti-dengue antibody detected. However, if positive, we interpret this as evidence of a recent virus infection. Next slide, please.

So to order these tests, you can contact us directly. There are two separate email inboxes, depending on which assay you want to request. But I have provided both addresses here on this slide. For Trioplex kits, you contact triplexPCRordering@cdc.gov. And for dengue kits, you can contact denguePCRordering@cdc.gov. But you might request, don't forget to include your name, address, and the point of contact phone number, email, and shipping address. Next slide, please.

And while the PCR and IgM test will fulfill most of all your dengue testing needs, we realize that there may be some situations where you need to send samples to us. And I want to give you some general tips on sending samples that are common to all CDC labs. And the first is to always visit the CDC website and use lookup for the Test Directory. This website is super important. It will give you all the information you need to make sure you're sending the samples correctly and informing the right people.

You can see many, many of our testing options if you type in "dengue" or "arboviral testing." Next, for those of you who are in public health labs, please request the testing using the CSTOR portal. The link to this portal is on the left-hand side of the website. And once you fill in the sample and then testing information there, it will generate a barcode and paperwork that you can send with the sample. It will also automatically alert the CDC lab that the sample is coming.

And please don't forget to complete the form. Because if you leave the request incomplete in draft mode, a valid barcode will not be generated. However, if you're not using CSTOR, you will have to do some extra work to completing the CDC Form 50.34. The link to this form is here on this website. And completing this form, you can print it and send it with the sample.

But most importantly, contact us before you send a sample, like CSTOR before you send a sample--unlike CSTOR, where you automatically notify us when you complete the form, using this method, we will not know when to expect the sample unless you tell us. Let's work together to save some samples from unexpectedly sitting in the warehouse over the weekend. And this concludes my best practices for shipping samples to the CDC. Next slide, please.

So in summary, I hope I've convinced you that dengue cases are rising globally in the U.S., with Puerto Rico declaring an outbreak and CDC standing up an emergency response. Lastly, I hope that you will incorporate these tips on dengue testing, which include using an FDA-approved dengue test, testing samples currently with PCR and IgM, and you can send samples to the CDC for testing or order PCR test kit from CDC. And thank you very much, and I'll take any questions. Thank you.

Sean Courtney: All right. Thank you for that update, Gilberto. That was fantastic. While we're waiting for questions to come in, I actually had a few myself that I think you kind of touched on as well during it, but maybe we can go over it a little bit. You mentioned here on one of these last few slides about getting the dengue 1 through 4 test or, I think the Trioplex test, as well. Is that for any laboratory, or is that for only public health labs? Or can private laboratories have access to them as well?

Gilberto Santiago: This is for public health laboratories. Private laboratories can use the NS1-- the InBios commercial tests, the InBios NS1 ELISA or the IgM ELISA.

Sean Courtney: OK, that's helpful. So I guess if they don't have access to that test, I mean, would the recommendation to be for them to pass those specimens onto their state public health labs? Do state public health labs have this? Or I guess, like you just mentioned, they have access to it now.

Gilberto Santiago: Most public health labs have implemented dengue testing. All of them have access to these. They can either send samples to their public health laboratories or contact us to send as a sample for testing.

Sean Courtney: Great. Do you have any-- I guess, what is the-- I guess it would be the case definition or, like, flagging specimens for sending to CDC or to their public health lab. Do you have any information on that?

Gilberto Santiago: Yeah, for United States, it's mostly going to be people that are traveling from endemic countries, have visited recently endemic countries where dengue transmission has been reported. Probably going to present with fever, body pain, and similar symptoms that are described also in the CDC website for dengue.

Sean Courtney: Great. Thank you. That was super helpful. Thank you. One question came in, and it was around, are there any recommendations for routine testing of returning travelers from endemic regions as part of surveillance efforts?

Gilberto Santiago: That's a great question. The CDC Epidemiology Team-- and we're working on a guidance that's specific for the U.S., for U.S. public health lab. And that should be released soon. That will provide guidance for regions and laboratories that are located where-- in instance for travel-associated cases where they don't have a lot of transmission and for other laboratories that are located in endemic transmission. And hopefully that will be released very soon, and you'll be informed about this.

Sean Courtney: Great. Thank you. Next question is, do DOD laboratories have access to these tests as well?

Gilberto Santiago: That is correct. We have to supplied DOD with these kits.

Sean Courtney: Great. Thank you. Another question came in around Mississippi reporting zero dengue cases and what your thoughts are as to why that is. Any ideas? Or is that just reporting at first?

Gilberto Santiago: As local cases, it's hard to tell there. Mississippi has a lot of mosquito population. So I'm not sure if they actually sustaining transmission of populations of *Aedes albopictus* at the time, or they have *Aedes aegypti*. That will also depend on viability of the mosquito vector in the area and, of

course, of the people that are infected because you need to have people that are infected to spread the virus.

Sean Courtney: Great. Thank you. Next question was, how does the prevalence of dengue serotype change over time? And what affects the dominance of a specific stereotype?

Gilberto Santiago: That is a very good question. That is actually something particular to every region that is endemic for dengue, of course. It has also to do with epidemiological background of the population that influences and shapes the susceptibility of the region. For example, in Puerto Rico, we have had experienced dengue 1 transmission for many, many years.

And then all of a sudden, the population becomes resistant to dengue 1, and the transmission of dengue 1 succeeds and opens the gateway for the new serotype to come in. And that's when we see a resurgence of other serotypes. It's just dengue 2 and 3 happened recently in the past few years, where the population is more susceptible to this virus and is open for transmission.

Sean Courtney: Great. Thank you. There was one question that came in. I'll respond to it. It's actually about the Oropouche virus being included. And unfortunately, due to the late nature of that announcement, we were unable to get anybody on today's call. But we are working on getting speakers for our September call to provide updates around the Oropouche virus outbreak that's going on. So hopefully, we'll have some information out to you guys as soon as we can. So thank you.
I do not see any other questions at this time, Gilberto. So I just want to thank you for joining our call, providing these—

Gilberto Santiago: All right, thank you.

Sean Courtney: --testing updates. And yeah. And yeah, we'd love to have you back anytime. So thank you, Gilberto. And thank you to all of our speakers today. That concludes our call for the day. Our next scheduled call is scheduled for Monday, September 16, from 3:00 to 4:00 PM. And you can follow CDC across social media on the various social media accounts shown here on this slide.

And again, want to thank all of you for joining today's call and for joining all of our calls. And we really appreciate it. And we look forward to seeing you guys in a month. So thank you, guys. Have a good one.