Call Date

10/21/2024

Call Agenda

Welcome
Sean Courtney, CDC Division of Laboratory Systems

Situational Update and Response to the Highly Pathogenic Avian Influenza A(H5N1) Outbreak in U.S. Dairy Cattle and Poultry
Todd Davis, CDC Influenza Division

National Wastewater Surveillance System: Monitoring for H5 Influenza
Rory Welsh, CDC Division of Infectious Disease Readiness and Innovation

Call Transcript

Sean Courtney: All right. Good afternoon, everybody. Thank you for joining us on today's call. 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 just want to cover some housekeeping items and some announcements.

And 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.

So coming up, we have the CLIAC virtual meeting on November 6 and 7th from 11:00 AM to 5:00 PM Eastern. The agenda will begin with agency updates from CDC, CMS, and FDA. Presentations and CLIAC discussions will focus on reports from two CLIAC workgroups, the Biosafety Workgroup and the Next Generation Sequencing Workgroup. And discussion topics will include cybersecurity requirements in the clinical laboratory, the determination of clinically relevant range of values for proficiency testing samples, and the utilization of remote technology for competency assessments.

We look forward to your participation. And please visit the CLIAC website to find meeting information and to contribute oral or written public comments to the meeting by October 29.

So the DLS ECHO Biosafety Program was created to address biosafety challenges in clinical and public health laboratories. The next session is actually scheduled for tomorrow, Tuesday, October 22, and will focus on biosecurity aspects of biorisk management. 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 this slide to register for the next session. And to view upcoming sessions and access resources from past ones, you can visit the ECHO Biosafety Program website. And for other inquiries, you can contact dlsbiosafety@cdc.gov.

And as always, we want to hear from you, so our Training and Workforce Development Branch is interested in hearing more about the education and training gaps that you're currently experiencing. And we invite you to send your feedback via labtrainingneeds@cdc.gov.

We will be sharing the slides from today's call, along with the audio and transcript, and we will post them online within the next week or so. You can find them on CDC's Laboratory Outreach Communication page at the link shown on this slide.

And if you have any questions today, we ask that you please use the Question-and-Answer function within Zoom so that we can address it during the call, and to not use the Chat function. When you ask a question, we ask that you please include your email so that we can follow up if we're not able to answer it during the call.

If you're from the media and you have any questions about the presentation or would like to follow up with a speaker, please contact CDC Media Relations at media@cdc.gov. And if you're a patient, please direct any questions to a health care provider.

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

And with that, I'd like to introduce our first speaker for today. We have Todd Davis from CDC's Influenza Division, and he's going to be providing us with an update on the influenza H5 outbreak currently going on. And so I'm going to stop sharing my slides so that Todd can share his.

Todd Davis: All right. Thank you, Sean. And thanks, everyone, for joining today. I'm just going to open this up. And Sean, I'll just double check that you can see that OK.

Sean Courtney: Still waiting. There it is. I can see it now.

Todd Davis: OK, great. So we thought we would use today as an opportunity to update on where we are with the current outbreak of H5N1 in dairy cattle and also in poultry in the United States, and talk a little bit about some of the strategies CDC's using to monitor human infections and strategies to contribute to additional testing across the United States.

So again, just as an update on where we are with the number of dairy cows that are infected by H5N1 virus, the USDA continues to confirm herds across the U.S. Most recently, there have been additional herds identified in California. As of October 17, this brings the total up to 319 dairy herds in farms across 14 states.

In addition to that, there have also been poultry flocks identified since March of 2024. This continues to increase as expected during the migratory season in the United States. We do expect to see additional poultry flocks that are periodically infected after contact with migratory birds that harbor H5N1 viruses. In terms of our monitoring, CDC uses both national flu surveillance, as well as targeted surveillance in individuals exposed to animals. For our national flu surveillance strategy, we've tested more than 54,000 specimens for both seasonal as well as novel influenza viruses. And of all of those testing, only one specimen from Missouri has tested positive for H5. I'll talk a little bit about that in more detail.

And then our targeted surveillance has included, again, individuals exposed to infected animals. And this has included 5,100 people monitored after contact with either dairy cows, birds, poultry, or other animals. And at least 260 persons have been tested for novel influenza A viruses. And of those, 26 exposed workers have tested positive for H5, 17 that had exposure to cattle and nine that had exposure to poultry. I'll focus specifically today on the latest updates regarding human cases in Missouri and California.

So to begin, I think many of you have heard about a human case from Missouri that had no epidemiological links or reports of exposure to infected animals. The investigations remain ongoing, but it looks like we will not be able to identify the source of exposure of the H5 virus that was identified in this case.

But we were able to generate sequences from the Missouri clinical specimen that tested positive, and CDC was able to generate genetic data from that specimen. We were able to get full-length sequences from the matrix gene and the nonstructural gene, and we developed partial sequences from the hemagglutinin and neuraminidase genes. And that data did confirm that the sequences were clade 2.3.4.4b and were very similar to virus sequences that were detected in dairy cow viruses.

And so further investigation into the HA also identified some unique changes in the hemagglutinin molecule. None of those changes were associated with increased infectivity or transmissibility among humans, but there were changes in antigenic sites that are predicted to impact the cross-reactivity with our available 2.3.4.4b candidate vaccine viruses.

And CDC has been working to develop a reverse genetic virus to demonstrate that reduced cross-reactivity, as well as to use that material for additional serology testing of the Missouri case and close contacts that were identified. And so more data to come to close out that investigation, but no concern about onward human-to-human transmission to date.

We also identified that the neuraminidase was an N1 and that there were no markers of reduced susceptibility to neuraminidase inhibitors in this case. And no markers of mammalian adaptation were identified.

Recently, our attention has been focused on California. As of this past Friday, there have been 13 confirmed human cases. All of these cases are among adult dairy workers from multiple farms with confirmed H5N1-positive dairies. All of the individuals reported exposure to close contact with cows, and included milking cows, working in milk pens, and several that had reported milk splashed to the eye. All of these reported mild illness, including conjunctivitis, with onset dates beginning in September 28. None of these individuals have been hospitalized and all disease remains mild illness. So we're continuing follow-up investigations. But to date, there's no evidence of any person-to-person spread in California.

We've also conducted genetic analysis of several of the human specimens received from California. All of these have been confirmed as clade 2.3.4.4b, as well as having an N1 neuraminidase. And all of these have been confirmed to be very closely related to dairy cattle viruses as well.

We've been able to generate whole genome sequences from two of the cases, and these have been confirmed as the B3.13 genotype, which is also found among dairy cattle. And then other cases, as you'll

see on this slide, had a variety of different genes that were successfully sequenced. All of these have been submitted to public repositories, and we continue to conduct additional sequence analysis of additional cases. And we'll continue to update public databases as that data becomes available.
But to date, our genetic analysis has shown that there's no HA changes associated with increased infectivity or transmissibility among people. We have continued to identify sporadic amino acid changes in the hemagglutinin that are occasionally found in antigenic sites.

So we've been working hard to isolate virus from clinical specimens. To date, we've been able to isolate virus from nine of the 11 cases with antigenic testing compared to our candidate vaccine viruses that is ongoing, and hope to provide updates on that as well.

Additional analysis showed that there were no mutations associated with reduced susceptibility to neuraminidase inhibitors or polymerase inhibitors, and we have not seen any mutations identified in the California cases that would indicate increased mammalian adaptation. And more details around the genetic analysis can also be found at this link provided here. That's a spotlight from this past Friday.

CDC is also continuing to conduct seroprevalence studies. So there's two studies that have been conducted, one in Michigan, one in Colorado. The results to date from Michigan have shown the negative in the first round of testing with additional results to be reported out soon. And then Colorado has also completed enrollment of their study, and CDC is now testing specimens from the Colorado seroprevalence studies as well.

Another serology study that's ongoing is a partnership between CDC and the American Association of Bovine Practitioners. There was a meeting in early September in Columbus, Ohio, where CDC and the Ohio Department of Health conducted a serosurvey in bovine practitioners, including veterinarians, farmers, and others that had contact with infected animals.

There were blood draws and samples sent to CDC, and CDC is currently assessing the blood draws from those individuals to look at the possibility of seroprevalence among bovine practitioners. That data will also be shared as soon as it becomes available.

On the diagnostic testing side, we continue to see the majority of the individuals that are infected with dairy cow exposure after H5N1 infection having conjunctivitis as a primary symptom. And so that continues to be a specimen where we're identifying the majority of these positive cases.

And as you may know, the FDA granted enforcement discretion for the use of conjunctival swabs when using CDC's H5 subtyping assay. This is done when a conjunctival swab is also tested in parallel with a nasopharyngeal swab. And so we're currently working with FDA to extend the enforcement discretion for the use of CDC's assay to test conjunctival samples.

Currently, that will expire in November 1, but we have confidence that FDA is working towards an extension of that date. So that'll be really helpful, again, because of the high proportion of individuals that have tested positive based on the conjunctival material that's tested.

As part of that, CDC has also developed a number of different protocols and some graphics to help clinical care providers to collect conjunctival samples. So we've developed a desk reference graphic, a job aid, that describes how to properly collect and transport conjunctival specimens for testing. So this is available online at this link.

And there's also a detailed protocol description that's available to partners from CDC and APHL. So please reach out if you'd like a more detailed protocol for conjunctival sample collection.

And something else that also has helped in our approach to enhanced testing for novel influenza A viruses, including H5, includes a change to our instructions for use for CDC's H5 assay, as well as our influenza SARS-CoV-2 multiplex assay, that now incorporates universal transport media as an approved media for collection of samples that will be tested with these assays.

And so previously, only viral transport media was an approved media for transport and collection. UTM is now part of the IFUs for both the H5 and the flu SC2 multiplex assay.

Finally, I'll just close by saying that our seasonal influenza updates indicate that influenza activity at this time remains low. So as you can see from the graphics, the percent of specimens testing positive for seasonal influenza remains stable at very low levels nationally. This includes also the percent of individuals reporting to emergency departments with influenza.

So although we are just likely to begin our influenza season, currently influenza activity remains quite low. And with that, I'll stop, and happy to take any questions.

Sean Courtney: All right. Thank you for that update, Todd. Really appreciate you joining the call. There are a few questions that came into the Q&A while you were presenting, so we'll go over a few of them. I think the first one you may have covered a little bit, but I'll still ask it again. It's around any H5 serology results from the Missouri patient and the other health care workers who had symptoms.

Todd Davis: Yeah. Yeah, so those are still pending. So one of the unique things about the Missouri virus was those amino acid changes that I mentioned. And we do have some preliminary data showing that when a virus does have those mutations, that we see reduced cross-reactivity with our candidate vaccine viruses and ferret antisera.

So we've developed a reverse genetic virus that's being used in those serology studies. That's taken some time, but we do expect those results to be available soon.

Sean Courtney: Excellent. Thank you. All right. The next question was, regarding the virus isolation, what type of sample was used for those?

Todd Davis: Yeah. So like the PCR positivity, we're primarily able to isolate virus from conjunctival specimens. So we're most successful with the conjunctival samples. They typically have higher viral load in those samples, as indicated by lower CT values compared to the respiratory samples that are tested. So that has been the most successful sample type for virus isolation to date.

Sean Courtney: Good to know. Thank you. Our next question was, are beef cattle also being affected, or is this just really restricted to dairy cattle?

Todd Davis: Yeah, so far just restricted to dairy cattle. So there have been quite a lot of investigations conducted by USDA to show that this is unique to dairy cattle.

Sean Courtney: Excellent. The next question was-- sorry, there's a few. It was a great-- glad you're on today, actually. Were any mammalian adaptation markers detected in other gene segments? For example, E762K in PB2 in human H5N1 cases where more complete whole genome sequencing data is available.

Todd Davis: Yeah, the good news is no. So the very first case we saw in Texas back in April did have a molecular change at 627K. We were concerned because we did see that change in the very first case. But subsequent to that very first case, we have not seen any indication of mammalian adaptations in genes in these viruses.

Sean Courtney: That's great news. Yep. All right. I've got two more questions we'll go through. And then if you're able to stay on, I'll ask you to answer some questions in the Q&A box. But this next one is knowing the difference in case fatality between the current virus and the H5N1 virus reported in 1997 in Asia, what are the virological and genetic differences that might be responsible for this difference?

Todd Davis: Yeah. Yeah, it's a really good question, and one that I don't think we have all the answers to. But I think what we're seeing in the United States is, again, primarily individuals that have extremely close contact with dairy cows or poultry, in the case of Colorado, where they have been exposed to secretions or environmental contaminants but using PPE.

So it might not be the perfect PPE use, but there is PPE that's being used among these agricultural workers. That's very different from the exposures that have been reported in Asia where there typically is not PPE that's being used.

And I also think that contact with, for example, milk or splashes to the face with milk tends to infect mucosal membranes around the eyes. Individuals are not inhaling a lot of virus. And subsequent to that, not getting a lower respiratory tract infection, which is more common in other countries where people are not using PPE, and it's a different animal that they're typically infected with. So I think this tends to be more of an exposure route that leads to the mild illness and not a virologic or genetic difference in the viruses.

Sean Courtney: Yeah. Great. Thank you. All right. Next question was, any risk for clinical respiratory viral culture in clinical labs?

Todd Davis: Yeah. So you know, H5, despite being now exempt from the select agent regulations, it's still a controlled, dangerous pathogen. And so any work that CDC does with H5 is done in high-containment BSL-3 facilities.

And so it's still considered a pathogen that requires BSL-3 containment when virus isolation occurs. And so I would highly stress that, that just because it's not a select agent, that doesn't mean that it can be handled in BSL-2 laboratories after a positive clinical specimen has been confirmed and then subsequently tested using virus isolation.

Sean Courtney: Right, right, right. Thank you. All right. Well, I did lie to you earlier. There's one last question. So while I have you. It's, if you know, does the process of cow milking increase the transmission of the H5 virus?

Todd Davis: Yeah, I think it's safe to say that milking-infected cows will increase risk. CDC still considers the risk to the general population to be low. All of these people, with the exception of the one case from Missouri, have reported exposure to infected or presumably infected animals, so we do think that milking is a high-risk activity.

Sean Courtney: Right. Right. All right, Todd. Well, thank you for that. Thank you for answering all the questions and for joining the call today. We appreciate it as always, and really giving us an update on what's going on with H5 around the country. So thank you for joining.

Todd Davis: Thank you, Sean.

Sean Courtney: Thanks. Have a good one. All right. And so as I share the slides again-- there we are-- want to introduce our next speaker. Here we are. So we have Rory Welsh from CDC's Division of Infectious Disease Readiness and Innovation, and he's going to be discussing wastewater testing for H5. So Rory, I will hand it over to you. And you can just let me know when to advance slides, and I can take care of that for you.

Rory Welsh: Yeah. You can go ahead and advance the slide. Thank you for this opportunity to present on behalf of our National Wastewater Surveillance System. So next slide.

All right. So I'll first provide a little bit about, what is wastewater surveillance, and why is it important for infectious disease? So here, we think this is a good representation of exactly why it's so important for infectious disease.

Wastewater surveillance helps provide data on the true total burden of circulating infections in a community. So we might all be familiar with the iceberg metaphor for infectious disease in that really, whatever you see at the surface of an iceberg is really an incomplete picture, and a majority is really hiding kind of beneath the surface.

And that kind of goes true for a lot of our clinical surveillance systems. So we have hospitalizations, deaths. We have clinical test results that are all part of that visible above the water level picture of total disease in a community.

And a lot of these traditional surveillance systems have really honed in through monitoring and evaluation to have a pretty good understanding of what that true, complete picture is beneath the water. But that's all of the asymptomatic infections, pre-symptomatic infections, latent infections, healthcare-seeking behavior that might lead individuals to not get tested.

Wastewater surveillance, as long as you are connected to a sewer system-- everybody poops, so we should all be able to get tracking of the viral concentrations in a community through wastewater surveillance. And I would argue that it also helps kind of lower that water level, because if your health department has data on viral concentrations through wastewater surveillance, you can better target communications, testing resources to help uncover a little bit more of that complete picture of all the infected individuals in a community. Next slide.

So our National Wastewater Surveillance System, or NWSS, as we refer to it, was first started for SARS-CoV-2 in September of 2020. It has since grown to the state of where it is today. This is a current metric

for SARS-CoV-2 data. Every dot is a sampling site. They're color-coded by the percentile metric, which is just the concentration of SARS-CoV-2 in a wastewater sample.

We have over 1,500 sampling sites in all 50 states, seven territories, and even some tribal communities nationwide. That population of over 150 million individuals are about 45% of the total U.S. population. And we've grown to now have six Centers of Excellence. That's California, Colorado, Houston, Wisconsin, New York, and North Carolina. Now, these are both the leaders in the field, as well as the technical first-stop resource for the jurisdictions in their region. Next slide.

So the Wastewater Surveillance System requires partnership. It's a little unique in that-- I believe this slide has some animations you might want to click through until those all appear.

At the top is the utilities. So nothing happens without the utilities. That's where the subject matter expertise for the sewer system, sewershed boundaries are, the geographic coverage. They are the ones that are collecting the samples and sending them to the public health laboratories.

Well, a majority of our laboratories are public health laboratories. We do have a subset that are also environmental health laboratories that are doing the testing for Wastewater Surveillance System, as well as some commercial partners.

And the successful implementation of this has usually one point of contact at the lab that is interfacing with the utilities. And that's important because no one wants to be surprised when samples arrive on a day that you weren't expecting.

But also, if there's something that was changed in the utility, they're able to communicate that to the lab to better interpret it and have contextualization of the test results. Those results are then fed into the health department, who then communicate it back to both the utilities, the labs, and the public. Our CDC program, as you'll see in a bit, also has a cloud-based platform for that data submission and real-time reporting. We work closely with our health departments and centers of excellence. And this is really important for fostering innovation, advancing our workforce development, improving our data sharing, and really just advancing the science of wastewater surveillance for public health action in general. So next slide.

Right. Now we're going to pivot to the topic of today's call, which is wastewater surveillance for H5 and influenza. I have a little bit of information on assays and data flow. So next slide.

So CDC recently validated influenza A as well as subtyping assays for wastewater. This was pan flu A, the H1 pdm09 assay, H3, H5. These were all validated in singleplex. We have detailed information about the assays and instructions for use that are available that we disseminated through our APHL ColLABorate community of practice for any of our jurisdictions that are doing wastewater testing, that are interested in onboarding H5 testing or influenza A, or any of the subtyping assays for their jurisdictions.

They can get access to these materials. And we also have some considerations for when you would do subtyping for health departments, as well as laboratories. Now, these assays were developed by CDC and are not intended for commercial development or for process-- or for-profit testing, but they are available for public health use. So next slide.

So here's a little bit of information about one of the real underappreciated barriers to expanding our nation's testing capacity. That's the select agent implications for H5 as well as biosafety.

So as Todd alluded to earlier, there was an exemption for H5 avian influenza under the select agents. This is a temporary exemption. We're consistently communicating to all of our testing labs that may not be familiar with operating within the select agent regulations that there's a strong importance on documentation, chain of custody for these samples, destruction of the samples, and documenting all of that for if and when this temporary exemption is finally lifted.

For biosafety, ultimately, it's up to the site's own biosafety committee for site-specific risk assessments. But CDC does have general guidelines for laboratory biosafety handling. There's the BMBL that's also available. We have these resources that we can drop in the chat. And I see that's already occurring as we speak.

There's also some considerations, standard precautions for all of our wastewater testing labs. There are some aerosol-generating procedures. And in general, we try to advocate for heat treating wastewater samples. This is a quick 60-degree Celsius, 30-minute heat treatment step that just reduces the risk of exposure for wastewater processing. Next slide.

OK. So that was a little bit about the assays and performing the testing. Now we're going to switch gears to what happens to those test results. So our CDC cloud-based platform is DCIPHER.

This is a flexible, scalable, cloud-based platform that allows for flexible data submissions, whether that's manual uploads or we can establish APIs for pushing and pulling that data to CDC, as well as also includes these automated QC checks. So if there's missing controls or key fields, we get flags and we can help kind of seamlessly control those data flows, and ultimately help with the more timely data for public health action.

So this platform ingests data in real time. It runs multiple times a day so that we're doing updates in real time daily for health departments. After they've submitted their data, they can see that new data as well as neighboring jurisdictions' data, all in this one kind of central resource.

It's also where we're kind of piloting new visualizations for additional targets. It's often where we do those initial piloting phases. Our health departments are really good at providing critical feedback that then we implement before we push this data to the public. And it's the DCIPHER platform that is actually pushing the data out to our public-facing dashboard. So next slide.

Here, we can see CDC's public-facing dashboard for H5. So any of the individuals on this call that have wastewater surveillance data in their community can go to the CDC web page and see what the results are for any recent testing. If you click on any of these dots on the map, it'll pull up this table to the right here where you have detailed information about the sewershed ID, the counties where we have wastewater testing, and what were the recent detection results, either positive or negative, in that table. So if we go to the next slide.

I believe that dashboard is outdated right now. We actually had an increased, I think, 312 sites that are doing H5 testing. And there's only one recent detection, I believe, on today's dashboard. But I'll find that link and drop it in the chat after the presentation.

So that was the public-facing dashboard. There are some suppressions to the public-facing dashboard like a sewershed or a wastewater treatment plant that serves under 3,000 individuals. We won't present it on the public-facing dashboard, but it is available to the health department on the health department DCIPHER-based platform.

So here, you're seeing that health department view. There's also richer metadata about exactly where the sampling was occurring, who was doing the testing, just additional metadata for health departments and for public health action.

If there's any positives, there's alerts that go out to the health department also to inform them, whether that's tests that were done through the health department or through the CDC national contract. So next slide.

If you select any of those sampling locations, you get this kind of breakout of whether or not you had a detection. You can filter by detections. And then you can see the kind of historical weekly detection category for that particular site, not just the most recent sample that's projected there on the map. Next slide.

So here, we're now going into the data dissemination and access. So as we just walked through, we have-- all the health departments have data available in real time via DCIPHER. This updates multiple times a day. It's automated outreach to jurisdictions that have detections. Then the public has updated weekly dashboards that are available where they can see data on detections of H5 in their communities. These data are available through multiple public dashboards, and they're also downloadable through data.cdc.gov.

So it's one of the kind of hallmarks of this new national surveillance program. Really, any new surveillance program that you're building, you want to have timely data, you want it to be accessible for the public, and want it to be used for public health action. So with that, I'll leave my presentation and open it up for any questions.

Sean Courtney: Sorry, it took me a second to find the button. Thank you for that update today, Rory. There are a few questions that came in while you were presenting. I'll start with some of the first ones, which I actually think you covered during your presentation, but I'll allow you to cover it again now, which was whether CDC has published any of these technical SOPs for testing wastewater specimens or if they will be available.

Rory Welsh: So we have them available now for any jurisdiction that's looking to onboard wastewater testing. If you're not already part of our wastewater APHL community of practice, I'll drop the contact information to join that, and then you'll have access to the talking points as well as the instructions for use for the assays. We have not published the assays in a peer-reviewed journal at this point, but it is our intention to get this information out to the broader general public beyond just our National Wastewater Surveillance Health Department community.

Sean Courtney: OK. OK, great. Thank you. Next question was, what regulatory agency or agencies are these laboratories that provide wastewater testing subject to?

Rory Welsh: So the H5 regulatory agency for select agents is USDA. They oversee the H5 select agents and that select agent exemption. Many of these testing labs are located within the health departments

and are subject to all the health department regulations. There's also a small subset of our testing labs that are in the Environmental Health Department that do the wastewater testing. And so hopefully, that's the landscape that they were looking for.

Sean Courtney: Great. Thank you. Next question was, there's been a conversation that some academic partners do not share testing data with CDC through DCIPHER. And do you know if there are any plans to bring them on board to share information and better coverage for public health action?

Rory Welsh: Oh, sure. So our National Wastewater Surveillance System is accepting data from other groups, such as WastewaterSCAN, that are doing testing at sites nationwide. They're able to submit that data through DCIPHER, and then we also include that in our public-facing dashboard. So that's one example.

Any of the academics that are doing testing for jurisdiction can reach out to their local health department and submit their data to the health department. And then the health department is the one that's primarily submitting the data to CDC for all of our public-facing dashboards.

Now, I will say, a lot of the academics that are doing wastewater testing are doing it for a university campus level, and a lot of those sampling sites at dorms are sub-sewershed-level, are going to be below that 3,000 suppression population cut-off, and so they might not make it to the public dashboard. But we do have multiple routes where we can get that information. We just don't want to go at CDC at the federal level around the state health department and accept data from an academic without the academic going to their jurisdiction's health department first and then submitting to CDC.

Sean Courtney: That makes sense. Thank you. All right. Next question was, since this is an H5 test, what is the value in an H5 detection if it is unclear if it is low or high path being detected?

Rory Welsh: So there's certainly some important limitations and caveats to wastewater surveillance. There's always going to be some possibility of intrusion from environmental sources into the wastewater stream. So these aren't-- any detection isn't necessarily from a human source. This could be from agricultural systems. There's even the dairy transport vehicles that get subject to essentially the large-scale car washes, and then that's another input into the system.

The testing that we're doing is also just for the subtypes-- H5, H3, H1, and the like-- and not necessarily doing the downstream sequencing or additional typing to say that even though we've detected H1, we don't have the N gene, we can't say it's H1N1, and the like. So there are some important limitations for wastewater testing.

Sean Courtney: Excellent. Thank you. And actually, to add on to that, a question just came in. Was around whether positive samples are sequenced.

Rory Welsh: So we are oftentimes bouncing right around the lower limit of detection for our influenza wastewater testing. There are multiple groups that are trying to advance the field here, including some of our COEs, to get usable sequencing data. But this is not a pathogen that's similar to SARS-CoV-2. We could almost rinse and repeat the clinical workflows to get really good whole-genome sequencing at high depth of coverage, breadth of coverage.

But for influenza, we're really struggling to even get some of the targeted approaches where we're just trying to get informative region of the genome sequence so that we can get some information about subtyping. And so there are some efforts underway, but at the current-- where we're allocating resources is for quantitative detection, and we don't have a pipeline to ingest, analyze, and report back out that sequencing data at this time.

Sean Courtney: Excellent. Excellent. Thank you. All right, Rory. I have one more question that we'll go through, and it is, have you compared data from wastewater with the results of clinical samples? And do you isolate-- have you isolated any of the virus from the wastewater?

Rory Welsh: Yeah, so that's a really good question. A lot of our jurisdictions have published some of these detailed comparisons. At the jurisdiction level, they often have the really high-resolution geographic information about the clinical cases, and they also have the sewershed boundaries to know whether or not they fall within those sewersheds. And a summary of these publications is that the wastewater concentrations in the clinical cases track really well.

Then the second part of the question was isolating viable virus. This has been something that many of the experts and leaders in wastewater surveillance have attempted at some point or another for SARS-CoV-2 and influenza. And we've not been able to successfully isolate out viable SARS-CoV-2 or influenza. We're still treating it as a potentially infectious sample.

But I think going back to those biosafety considerations, this is something that we really need to devote a little bit more resources to, and a distinction that the viral concentrations that you see in a clinical specimen or in some of these agriculture, dairy specimens are just so many orders of magnitude higher than any of the concentrations that we're likely to see in wastewater. And so there is some distinction that needs to be made for the risk to the laboratorians that are doing this testing in wastewater.

Sean Courtney: Excellent. Thank you. Thanks for that, Rory. And thank you for joining our call today. Really appreciate this update on wastewater testing for H5. Really enjoyed having you on today.

Rory Welsh: My pleasure. Thank you.

Sean Courtney: Thank you. And thanks to both you and Todd for joining our call. That's it for our presentations today. So I just want to thank both of you. Going to try to advance these slides here.

All right. And as a reminder, our next call is currently scheduled for Monday, November 18th, from 3:00 to 4:00 PM Eastern. We typically hold these calls on the third Monday of each month, and they take place for an hour. Let us know if you have any suggestions for topics for future calls as we look forward to continuing to discuss hot topics and answering your laboratory and testing community's needs.

As I mentioned at the beginning of this call, we'll be posting the audio, transcript, and slides from the call on our LOCs web page within the next week or two. You can find CDC on various social media platforms, as shown here, so please follow any of them to stay up to date with the latest news and recommendations.

And again, I just want to thank our speakers and thank all of you for joining today's call. We continue to be grateful for your work, and we'll talk to you again on Monday, November 18th. So thanks, everybody. Have a good one, bye.