TWiV 1262 Clinical Update

Host: Vincent Racaniello

Guest: Daniel Griffin

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Vincent Racaniello: *This Week in Virology,* the podcast about viruses, the kind that make you sick.

[music]

VR: From *MicrobeTV,* this is *TWiV,* this Week in Virology, Episode 1262, recorded on October 15, 2025. I'm Vincent Racaniello, and you're listening to the podcast all about viruses. Joining me today from New York, Daniel Griffin.

Daniel Griffin: Hello, everyone.

VR: Today, you don't have scrubs on. Daniel, the last two episodes where you wore a lab coat and scrubs, they did really well, so you should wear them all the time.

DG: Oh my gosh. That's really interesting.

VR: I think people look and they say, "This is a doctor. I want to hear what he has to say."

DG: I've got scrubs and a white coat. Let's compare. This'll be like, I don't know.

VR: It's a good control. If you wear a scrub, I can't see your bow tie, which you have today. It looks like some kind of a checkerboard, black with white checks on it.

DG: I need to put it in the show notes, like a picture of the bow tie that I'm going to wear, and then you could actually have a better chance.

VR: Oh, that would get them all then. No problem.

DG: You think so? [laughs]

VR: Yes, because the only reason I can't is I can't really see it. Yes, I'm sure. I'm a microbiologist, Daniel.

DG: Yes, this is an ectoparasite that you might find in your bed.

VR: A bed bug.

DG: [laughs] Yes.

VR: Although looking at that, I don't know if I would see it. Why do they have it arrayed in perfect rows? I don't understand that.

DG: Yes, it's true. I just think visually, it's - I don't know, the quality isn't as good, but people

watching on YouTube may use the word visually stunning.

[laughter]

VR: OK, visually stunning. From *MicrobeTV*, visually stunning.

DG: We'll have to see. Yes, I am curious about the whole wearing scrubs and a white jacket. We're going to have to track and see.

VR: No, I'm serious. The last two episodes where you had a white jacket and a stethoscope, maybe it's the scope that does it. They did better.

DG: Hold on, I've got a stethoscope.

VR: OK, now look at the camera and smile so I can use that as the-- Look at the camera, not the screen. OK, that's a good smile. All right.

DG: All right, we'll see. We'll see. I don't know. All right, well, let's jump in with the - we'll start with the quotation: “We are drowning in information while starving for wisdom.”

VR: I don't know, Daniel. I would say it's not even information because most of it's lies.

DG: Yes. We're just drowning in stuff. [laughs] Information, misinformation.

VR: It's all sewage. Refuse.

DG: Yes, I don't know. Yes, what is it at this point? Most of it is not information. It's just stuff out there. We've gotten in that lazy habit, we, where people just read the headlines. I heard this. It's like, "Did you read the article? Did you read the content?" I know you do a few of our shows in a TikTok format to try to take this rich, dense information and then condense it down into like, what is it, the attention span, 22 seconds or something? What is the attention span down to?

VR: Yes, it's just 10, 20 seconds. It's pathetic.

DG: It's amazing. I have to say this first news piece, we read over the last week initially that the Trump administration lays off dozens of CDC officials. First, we hear disease detectives, high-ranking scientists, the entire Washington office, and the staff of a weekly public health journal were among those who learned late Friday that they would lose their jobs. Then a few hours later, we hear that they're walking those back and many notices were sent in error. An HHS official speaking on condition of anonymity said that some people have mistakenly received reduction enforcement notices because of coding errors in their job classifications.

The people who should be brought back, the official said, included those who produced the morbidity and mortality weekly report publication. Initially, we heard they were all fired. People working on the measles outbreak, people working on the Ebola outbreak in the DRC, people in the Global Health and the Epidemic Intelligence Service. I'm just shocked, Vincent. Oh, sorry. I accidentally fired over 1,000 people because of a coding error in -

VR: I don't care what kind of error. Before you fire someone, which is a major life event, it stresses people, you should make sure you have it right. It just shows that these people are

not interested in doing anything right. They don't even pay attention to the details.

DG: Yes. There's a cruelty going on here, which is just people are being used as pawns in a political game. My heart goes out. All these people who, late Friday night, were told you now do not have a job and then maybe then, the next few days, you get, "Oh, it's OK. Sorry, April fools." That is cruel. You are right. This is your livelihood. This is how you feed your family.

All right. Bird flu. It's that time of year again. I don't think people necessarily know this, but bird flu has a seasonality to it. It makes sense. Part of it has to do with the migration. The wild birds migrate to their seasonal homes. We usually tend to have higher detections in fall and spring. This seems to associate as a causal connection, we think here, to the wild bird spreading viruses that migrate to their seasonal homes. Because this isn't necessarily always in the news, I did want to discuss some good science, Vincent. I feel like Nero playing the violin.

As the world falls down around us, our government is shut down and not functioning, but we still have some good science. Let's go forward. Maybe there's a good analogy right there. Music survived the fall of Rome, right? [laughs] Something will survive our fall. The article, "H5N1 Influenza Virus Stability and Transmission Risk in Raw Milk and Cheese," was published in *Nature Medicine*. Here, they evaluated H5N1 virus persistence in raw milk cheeses made with milk acidified to pH 6.6, 5.8, 5 before cheesemaking and validated their findings in raw milk cheeses inadvertently produced with naturally contaminated raw milk.

I'm going to go through the figures in a moment, but just the high points. The pH values tested, so 6.6, 5.8, and 5, lower the number, more acidic, reflect the pH range encountered in raw milk cheeses at the marketplace. They actually observed pH-dependent virus survival with infectious virus persisting through the cheesemaking process and up to 120 days of aging in cheeses made with raw milk at pH levels of 6.6 and 5.8. Whereas at pH 5, you get more acidified, the virus did not survive the cheesemaking.

I know that, Vincent, you're probably wondering when they say virus survival. They're doing PCR, but they're also doing infectious virus titrations in chick eggs.

VR: Yes, it's still not survival, though.

DG: [laughs] This is what I thought was the cool part. Now it gets cool. We're talking, isn't there something about heating things here? Anyway, this is where it gets cool. They've got these ferrets, and the ferrets, the *Mustela furo,* do I get that right? How do I pronounce that?

VR: *Mustela furo*.

DG: *Mustela furo*, fed H5N1 virus-contaminated raw milk, became infected. Those fed raw milk cheese or cheese suspension did not. They conclude by saying, "these results demonstrate that the H5N1 virus can remain infectious for extended periods in raw milk cheeses under specified conditions, underscoring the potential public health risks associated with consuming raw milk cheese produced from contaminated milk, and highlighting the need for additional mitigation measures in cheese production to prevent human exposure to virus." Let's go through the figures. Vincent, you can tell me your thoughts.

VR: I thought they said that the virus does not remain infectious in the raw milk cheese because the pH is 5, right?

DG: Well, I guess the deal is that if it's a pH of 6.6, 5.8, then you're going to be OK. Well, the virus is going to be okay if you're the virus. If you get it down to a pH of 5, then that's going to actually prevent the virus from surviving.

VR: We need them to put on the cheese label what the pH was.

DG: Well, what's really, I think, important here is that there's been this idea that, okay, you have to worry about it in milk, but the cheese process somehow is supposed to protect us, which we're realizing here, as you point out, maybe that's not true. Maybe you have to actually say, "This may be cheese, but the pH was down to 5.

VR: I'm wondering, so they're talking about raw milk cheeses. Are there cooked milk cheeses?

DG: I think they actually can take the milk, and they heat it first, and then you expose it to the microbes. That would go through this process of it. It comes into the process. Yes, you start off with raw milk, and then you could heat it to a certain temperature for a certain period of time, basically a pasteurization-type process, and then you can actually expose it to the microbes.

VR: Yes, this image is very interesting. They adjust the pH using lactic acid. They can put it down to 5. I guess different kinds of cheeses have different pHs, right?

DG: Yes.

VR: That's why they did that. Interesting.

DG: Yes, and then once they've exposed it, then they could actually go through the cheese aging process. They've got great photos. You can actually see they've got pictures of the cheese-making process showing all the different stages.

VR: I want to know what mozzarella has. Does it have infectious virus or not?

DG: Yes, because that's not one that's like a hard, long-aged cheese, right?

VR: No, it's very short and soft. It's got a lot of fluid. I just wonder, and I like it too.

DG: I'm a big fan of the - yes.

VR: You like burrata probably, right?

DG: I do. I do. I like cheese.

VR: The soft one that you can spread. I just wonder, because I will only drink pasteurized milk. This is just nonsense.

DG: You're also not a big milk drinker, right?

VR: No, I don't really drink a glass of milk. As I said, I have it in my cereal only because I tried water once in my cereal. It just doesn't cut it.

DG: Yes, not sounding so appetizing. [laughs] Great figures. This is in *Nature*, so not sure everyone will have access to it. I don't know. Is this open access, this *Nature* article? It might be.

VR: Let's see. I will try it right now.

DG: Do you want to check for us?

VR: Yes, download PDF. It's open access.

DG: That's great. Yes, I think the big thing here is we're realizing this whole contaminated H5N1 dairy issue. Not all cheeses are equal as far as the risk.

VR: The interesting thing is that H5N1 in dairy cows is just in the U.S. so far, right?

DG: Yes, so far. It's actually curious to me that it hasn't been reported in Canada or Mexico, at least to my knowledge. It seems like it could move back and forth there. I think the history there, as we've talked about, it started with an introduction into one specific herd. It may have been other introductions.

All right, measles. A little bit tricky here, because the government is shut down. We don't have a functioning government in the moment here in the U.S., but perhaps people are aware that despite that, hundreds of U.S. students quarantine amid measles outbreaks. There's an outbreak in South Carolina where we read that 153 unvaccinated children are now out of the classroom and in quarantine. Minnesota, 118 students are also under quarantine in the Minneapolis-St. Paul area. There's some other ones going on that I just saw earlier today.

Here's the thing I want to point out. We are about to lose our status of measles elimination, and that's going to happen just very soon. It used to be, and I understand there was this argument, I don't know, we're vaccinating, but we don't really have measles anymore. The reason we were vaccinating is so that we could maintain that status. Now we have to worry. We have to worry about children that are too young to be vaccinated. We have to worry about children that get the immune amnesia.

We have to worry about the children that get really sick acutely, maybe don't survive acutely. We have to worry about the two to three years afterwards where child mortality doubles or triples. Then we have to worry, what, six years later when people develop the late-stage encephalitis.

VR: Probably there are more cases than we know of. These are just the confirmed cases, but Paul Offit is always saying there are probably 5,000 cases at least right now.

DG: Yes, he's right because in the U.S., when the government was functioning, we only reported confirmed cases. We didn't do what most people do. Someone comes in and a lot of people have confirmed measles, and then there's a few others that have the rash, the same symptoms, but the parents refuse testing. You don't get to count, but yes, those kids have measles.

Because the government is shut down, I started taking a look at the Johns Hopkins measles tracker, which they updated on the 10th. It's a little bit behind, but again, that number is rising. It's up to 1,569 on the Hopkins measles tracker. U.S. government is not updating. I

think at least for the time being, we'll have to follow the Hopkins tracker. Canada, another 36 new cases. We're up to over 5,000 or 5,060 up there. As we mentioned last time, this is going on in Mexico, really going on throughout the world.

All right, flu, what's going on with the flu? CDC hasn't updated our flu tracker since, well, September. We'll have to see what happens. Are we going to have an early flu season? Well, Vincent, you and I have been talking about this and joking about how here in the U.S., we use the *Farmer's Almanac* and groundhogs to predict the weather and what's going to happen with diseases. As if that were only the most absurd things that was going on in our country. [chuckles] Here we read in CIDRAP that Japan sees early flu activity, already getting school closures.

Japan really usually doesn't start to see flu until end of November. Here we are early, mid-October. They're already shutting schools. This is starting about five weeks early over there. If anything, a reminder for folks that you might want to consider getting that flu vaccination now. Remember the kids, the highest hospitalization rate is children under 5. Children, really a good target group. This rise in Japan, it's actually part of a broader rise in flu activity across Asia, including Singapore, Thailand, India. It does look like the *Farmer's Almanac* and the U.S. rodents are correct.

No update on pediatric deaths, but we do have a nice bit of science here. We have the article, "Effectiveness of Influenza Vaccination to Prevent Severe Disease: A Systematic Review and Meta-analysis of Test-Negative Design Studies," published in *CMI.* I really like this because I think, Vincent, you and I have shared, we're not just that concerned about flu shots preventing you from getting a positive PCR. We're really concerned about disease. We always say, "Oh, Doc, I got the flu shot, but I still got the flu." I always respond with, "But did you - "

VR: Did you die?

DG: Here we're going to ask, does getting that flu shot protect you against death, protect you against getting airspace lung disease, pneumonia, prevent you ending up in the ICU? Does it keep you ending up not on a ventilator? These investigators looked at PubMed, Ovid, Cochrane Central from inception to September 24, 2024, to assess evidence on the real-world effectiveness of influenza vaccination in preventing severe influenza-related outcomes. Overall, they identified 7,727 publications, 461 reviewed, 165 ultimately included.

We get pooled influenza vaccine effectiveness against influenza-associated hospitalization, that's 42%, 36% against death, 51% against pneumonia, 52% against ending up in the ICU, 55% against ventilatory support. A couple of things I want to hone in on - we're going to go through the figures - is this vaccine effectiveness, it varied by age and was actually generally higher, let's say up to two-fold in children compared to adults.

Take all those numbers I just threw at you, 42% up to 55%, and double it, it becomes really quite impressive. Remember, it's the under-5 children that are at the highest risk of getting hospitalized. If you can take that 42% and make it 80%, that's a huge benefit. Also, the vaccine effectiveness was higher for H1N1 compared to H3N2, and also better in seasons where we got a good vaccine matched. There's a couple nice figures.

Figure 2, where you get this pooled estimates of vaccine effectiveness, where you can look

at really similar to the numbers we just talked about, looking at hospitalization, death, pneumonia, ICU admission, requirement for ventilatory support. What I thought was even more impressive was Figure 3, where you actually look at the seasons, because it really matters. Go back 20 years, we were not doing so great. 2004, 2005, all the way up to 2009, not great effectiveness.

Then you really start to see in 2011, we're really starting to get better efficacy. In a sense, our vaccine effectiveness was diluted down from some of those crummy years where we didn't see much of a benefit. So, 2023, we're actually seeing that nice 50% protection, double that for the littlest kids.

VR: I think this is great, except 36% protection against death, well, that's better than nothing, but it's still low, right?

DG: We need a better vaccine, yes. I think pointing out, too, is they would have done better if they said, "Well, let's talk about the modern era. Let's start these numbers in 2010 and get rid of 2004 to 2009." We really just were not seeing much benefit.

VR: Now, these were in people of all ages?

DG: They're looking at all ages here. Remember, a lot of this goes back before we had these updated recommendations for the senior flu vaccine recommendations, the high dose and some of the other things.

VR: We've talked about high dose being better, actually, right?

DG: Yes, we actually shared a study. CDC, imagine those guys, they actually recommended for adults age 65 and older, they're preferential vaccines. You've got a high dose inactivated, the flu zone high dose, the HD-IIV3, or maybe the recombinant, which is the Flublok or the RIV3, or the adjuvanted. That's the Fluad or the AIIV3. You got one of the high doses, right, this year, Vincent?

VR: I did. First time, I think, in a long time, I got it, yes.

DG: All right. I'm under the 65, so I got Flucelvax, which, all right, one day. One day, I'll be grown up and I can get the high dose. All right, RSV. Just reminding folks if you haven't gotten your RSV vaccine. Actually, there's a little bit of a thing I'll throw in there. Not only can we protect our kids, and we can protect the newborns, either mom gets vaccinated, and that's week 32 through 36, or the little kids can get the monoclonals, that's the nirsevimab or the clesrovimab, but the adults, 65 and older, can all get RSV vaccine, and adults 50 to 74 who are increased risk can also get an RSV vaccine.

All right. COVID. Let's take a look at our multicolor trend line. Oh, no, the government is closed. No information for you. Now, it still seems like we're at the lower area. We're in a little bit of a gap before we see our winter peak, so we'll see what happens there. We have some great science in this section. This is a fun one. The article, "Effectiveness of NVX COV2373," basically Novavax, "Compared to BNT162B2," so Pfizer-BioNTech, COVID-19 vaccines "Vaccination in South Korean Adults," published in the *Pediatric Infectious Disease Journal*. We're going to get some head-to-head, Novavax compared to the mRNA vaccine by Pfizer-BioNTech.

They start off with the reminder. I think people need this reminder over and over again. Adolescents can have severe chronic outcomes from COVID-19. Real-world data on relative vaccine effectiveness between mRNA and protein-based vaccines are limited. They point out that more data are needed. Particularly, we're looking at adolescents here. Here, we've got the K-COV-N database, a wonderful thing that the South Koreans have. We've got this COVID-19 vaccine registry. We've got health insurance claims. They're able to retrospectively review, identify the adolescents 12 to 18 in Southern Korea.

They're going to look at folks that got a homologous primary series of Novavax or the BioNTech and a heterologous or homologous third vaccine dose. All the same or all the same plus a different third vaccine dose. Then they're going to go ahead. They're going to propensity score match to reduce confounding. They're going to get adjusted hazard ratios. Here, they go ahead, and they're going to look at vaccine effectiveness every 30 days through a 180-day risk window from February to December 2022.

We've got 3,174 and 6,253 doses of the Novavax and the BioNTech, respectively, administered to South Korean adolescents. Now, a little bit of difference in populations. The individuals who received the Novavax tended to be older, have a disability, or have a prior SARS-CoV-2 infections. We've got to keep those in mind. Then they do the propensity score matching where they end up with 107 individuals in each primary group and 701 and 1,417 groups in the Novavax and the BioNTech third dose groups, respectively. The results come in. The adjusted hazard ratio for Novavax compared with BioNTech for medically attended COVID-19 in the 100-day risk window was 0.57 for primary series, 0.68 for the third dose.

VR: Just a slight advantage, right?

DG: What's that?

VR: Slight advantage.

DG: Yes, it's a slight advantage. Actually, I have to say for the 180-day risk window, you're actually a little bit over the confidence interval of 1 there. Yes, a little bit of a favoring. It is interesting because we've talked about antibody titers, but here's an effectiveness. We'll talk primary series. You start with the primary series, a little bit of advantage, 30 days, 60 days, 90 days, but then you start to lose that advantage over time. Yes, the third dose went the other way. It was actually almost the durability of getting a third Novavax added on.

VR: Really, minor differences.

DG: It is minor. It is minor.

VR: It's consistent throughout the time, yes.

DG: It's interesting.

VR: You should get the vaccine that you can get.

DG: It is interesting. The authors say Novavax may provide more robust protection. That's not really fair to put may and then use the word robust, right? How about it might be a little bit better, maybe. No, I agree with you. Get the vaccine. A lot of times when I talk to people about getting the vaccine, I ask them. One was asking me today about there's two Modernas now, and so I went through a little bit. Then I asked, I said, "Do you tolerate

Moderna? You've been getting that shot all -" She says, "Oh, get it. I feel just fine."

I was like, "That's great." For other folks, they say, "Oh my gosh, every time I get a Moderna or a Pfizer BioNTech, I'm down for the count." I'm like, "Hey, have you thought about trying the Novavax? It might be less reactogenicity." This was shocking. Are you ready for this, Vincent?

VR: Yes.

DG: Guess who got a COVID and flu shot?

VR: RFK Jr.?

DG: Trump. Well, we know RFK Jr. got a COVID shot. I remember that. He's like, "Well, I didn't really want to get it, but my wife said I had to because we were having a party." Really? Apparently, you're telling us that the COVID shot is poisoning and killing millions of people, but all it took was your wife saying, "We're having a party, go get a shot?" Yes, Trump, again, got another COVID shot. I think people who follow what Trump does, I think there's a hat. “Everything Trump Said Was Correct.” Well, he got a COVID vaccine. If you want to follow in his footsteps, you could get a COVID shot too, and a flu shot.

VR: Look, obviously, his doctors feel that it's important to protect his health that he get the shot, and they're right because he's 79 years old. He's in direct conflict with RFK Jr., who says they're no good. I don't get this at all.

DG: He's got the heart of a 65-year-old, Vincent.

VR: I don't believe any of that either. I think they're all lying, frankly.

DG: [laughs] OK. Yes, let's not talk about the heart. All right, so COVID. This was another fun one. This is like the head-to-head week where they're like one vaccine against the other, one antiviral against another. There's going to be a funny twist at the very end of this one. I don't know if you got a chance to read ahead, Vincent. The article, “Antiviral Efficacy of Oral Ensitrelvir versus Oral Ritonavir-boosted Nirmatrelvir in COVID-19 (PLATCOV): An Open-label, Phase 2, Randomised, Controlled, Adaptive Trial.”

This was published in *The Lancet Infectious Diseases*, open-label, phase 2, randomized, controlled, adaptive pharmacometric platform trial. Low-risk adult outpatients aged 18 to 60. Early symptomatic COVID, so less than four days of symptoms. Recruited from hospital acute respiratory infection clinics in Thailand and Laos. Patients are randomly assigned in blocks. OK, this group, you get this. This group, you get the other, and the block sizes depend on it a little bit.

They end up in one of eight treatment groups. One of the treatment groups was oral ensitrelvir. Another was ritonavir at standard doses. They're both given for five days and no study drug. We'll mention a little bit. What about those other treatment groups? Here, they're comparing specifically the ensitrelvir to the nirmatrelvir boosted, so the different antivirals. Six hundred four of 903 patients enrolled were concurrently assigned to the three treatment groups that we just went through. 202, 207, and then 195, no drug.

The SARS-CoV-2 clearance half-lives, this is PCR half-lives, by the way, 5.9 hours for ensitrelvir, 5.2 with nirmatrelvir, 11.6 with no study drugs. Viral clearance following

ensitrelvir was 82% faster than no study drug, but 16% slower than the ritonavir-boosted nirmatrelvir. Then, of course, because they've just got to poke the bear, viral rebound occurred in 7% of 207 patients in the nirmatrelvir, 5% in the ensitrelvir group. They don't give us a background.

You know why they don't give us a background? You've got to look at the figure because the people that got no study drug, the virus is still, the PCR and everything is still up there. See, you can't rebound if it's still up there. It's just still up there. Anyway, we've got some nice figures. I think this is open access. I'm not sure. There's some nice figures. We can actually see time since randomization. Remember, it has to be within four days. You look at the nirmatrelvir group and you can see quickly the genomes per milliliter. We're doing PCR here. They go down probably the fastest. Then you see ensitrelvir come down. You see no study drug really takes a long time to come down.

They also give us symptoms so you can follow over time. How quick does the fever go away? The fever's gone, in general, about a day earlier. Most people are fever-free within 24 hours starting on the antivirals where it's going to take another day longer for the folks not getting. Then you can actually follow a proportion of patients with symptoms. Again, you're seeing with medication folks are getting better quicker.

This is the fun part, Vincent. What about the other groups? I was looking through the other group and one of my favorite drugs was in the other group. This was the high-dose ivermectin group. They actually did worse than no drug. Isn't that weird? They actually had slower viral clearance, PCR again, than folks that you just left them alone. Kind of wild. All right. You guys can email us about this.

VR: Very good.

DG: Or leave rude comments in our YouTube. Going to the last section of the article, "Longitudinal Patient-reported Outcome Trajectories in Long COVID: Findings from the STOP-PASC Clinical Trial," published in *Open Forum Infectious Diseases*. A reminder that the STOP-PASC trial was the Stanford-based study that looked at giving people with Long COVID 15 days a Paxlovid or not, and didn't show any benefit. We discussed that result when it was published in *JAMA Network Open*. Here's an exploratory analysis of those patients. I want to start with the methods. It's kind of a mouthful.

Here they performed latent class trajectory modeling, LCTM, on PRO measures, including the Patient Global Impression of Severity, PGIS, Patient Global Impression of hange, PCGIC, PRO-MIS domains, and core symptoms among 155 randomized participants. Let me translate that into something more understandable. First, latent class trajectory modeling. It's a way of analyzing data that looks at a mixed group and tries to detect distinct subgroups. Is there a group of folks and maybe they're tracking in a certain way, or they refer to as latent classes.

Latent classes, think of those as the subgroups that we're going to pull out. Now, the PRO measures are patient-reported outcomes. Too many three-letter acronyms. Participants were followed for 15 weeks with serial symptom assessments. Trajectory groups were identified and characterized using descriptive statistics. They're looking at certain subjects or certain groups of people with Long COVID that have had certain trajectory or change over time. They do report some success as we read that two groups emerged for the Patient Global Impression of Severity.

These folks were a group that looked like they were improving, say at N17, and a persistent severity that was N136. Using the PGIS, and you're finding the two groups. They also did the PGIC, another assessment, and they found these two groups, an N of 130 that were improving and an N of 22 that were worsening. They also looked at the PROMIS, another physical function score, and there they identified four groups, so an improving group, a normal, mild, a moderate, and a severe.

Basically, they were able to find these groups and then find some correlations here. Now, worsening groups had higher proportions of nirmitrelivir, so Paxlovid treated participants, greater prevalence of cardiovascular symptoms, and low-dose naltrexone use. Improving groups had shorter time since infection, higher baseline physical function. As we talked about before, no subgroup showed any benefit to the Paxlovid.

Searching, maybe there was a subgroup of patient that would benefit Paxlovid, and unfortunately, we didn't find that here.

All right, no one is safe until everyone is safe. I'm going to ask people to pause the recording right here. Go to parasiteswithoutborders.com and click on the Donate button. Every little bit helps for August, September, and October, right? We've only got a couple weeks left here in our ASTMNH fundraiser. Hoping to double your donations, get up to that maximum donation of $20,000.

VR: It's time for your questions for Daniel. You can send yours to daniel@microbe.tv. Lisa writes, "Listening to this morning's episode in which you mentioned Trump saying his recommendation is for parents to split up the MMR vaccine for their kids. I'm a pediatric nurse practitioner in Florida, which as you know, has its own special brand of crazy surrounding vaccines right now. It made me smack my head when I saw he'd said this recently because separate vaccines are no longer available, at least in the U.S.

He's the dang president of our country. I don't expect him to be an expert on the childhood vaccine schedule, but I do expect him not to shoot off random tweets without knowing if what he's recommended is even an option. It's so frustrating. I left a lot of words rhyming with the word duck out of this. Ha."

DG: Yes, Lisa. This is difficult because it really builds on this anti-science conspiracy idea that came out of the UK, that publication in *The Lancet* and this whole idea that, "Oh, you see, the reason there's a correlation with MMR and autism is because," which we now know and we knew even then, there is no correlation, so there is no problem to start with. Then they're asking the pharmaceutical companies, hey, would you spend a few hundred million dollars to create something that doesn't exist to solve a problem that doesn't exist? It's very frustrating. It makes no sense. Yes, maybe duck is what we need to do, keep our heads down and somehow survive this craziness.

VR: Jeff writes, "I've been listening to your updates religiously since COVID. Your updates made this old cardiologist a somewhat local expert at our facility. People ask me daily about when to take vaccines and what the latest wastewater samples show. I recommend they listen to you. When I listened today, you discussed asymptomatic people post-COVID who have objective loss of smell. There's no doubt in my mind that there are many unfortunate people who have long-term loss and are very symptomatic. I know some, and they were fine prior to contracting COVID.

Without testing the asymptomatic people prior to their COVID, you can't know if their significant loss of smell was their baseline prior to infection. I would love to get CME for your podcast. They are more informative than most of the CME I experience."

[laughter]

DG: Thank you, Jeff. Yes, maybe we'll have to look into that. Is there a way that folks can get CME? No, this is interesting. I capitalized on this. I don't know if you know, Vincent, but I bought several bottles of Sriracha, because I realized that now no one can smell or taste. Everyone's using Sriracha, and they blame, they have all ideas on why there was a shortage, but I'm going to blame it on the COVID impact.

VR: Marie writes, "I saw my gynecologist this week and she reported that her 17-year-old son has type 1 diabetes post-flu this year. It was the first time he didn't get a flu vaccine. She remarked there's a huge increase in type 1 diabetes in teens post-flu infection without having received flu vaccine. Have you heard anything about this? Thank you for being a source of sanity and science in this crazy world."

DG: If you do a literature search and start looking at this, there is an increase in type 1 diabetes. There are some studies out of Japan looking at this. Certainly, we did our studies looking at COVID and this during the last few years. Yes, there actually is with viral illnesses, there can be an increase in type 1 diabetes post-infectious.

VR: Connie writes, "Thank you so much for your steady and reliable presence giving us solid information every week. I'm wondering what does it mean when COVID wastewater levels are low? Can you give us a sense of the prevalence of infected people with that level? For example, if you are in a room with 100 people, is it likely one has COVID or is it more like 1 in 50 or 1 in 100? Thank you for any light you can shed."

I looked at the New York State page because it's very reliable and they have a beautiful table, Daniel, which says if you don't detect it in wastewater, they're less than 10 cases per 100,000. If it's moderate, it's 10 to 49 per 100,000. If it's high, it's over 50 cases per 100,000.

DG: I like that. [chuckles]

VR: It's very nice. Carol writes, "My daughter-in-law received her RSV vaccine in September 2025, third trimester. She is due any day now. Should the baby still receive nirsevimab?"

DG: Yes, Carol, this is interesting because it's gone back and forth. I'm going to talk more about the science and the actual recommendation. An individual, so the mom gets the RSV vaccine, and the idea is then there's going to be a protection for the newborn. The timing is great here with the season, September, and usually we start seeing cases in September about this time. I don't know what's going on because we don't have any monitoring at the moment, but usually it's about early October, we start seeing cases, it moves up into our region here in New York.

We've said 50%, 60% protection for RSV-attended lower respiratory tract infection, RSV hospitalization. Then maybe we're seeing a little bit better with the nirsevimab. Does it make sense to do both scientifically? It'd be great to do those trials of just one versus the other, versus both. It does make sense scientifically to do both.

VR: Anonymous writes, "I think perhaps Mary was referring to a child who developed measles after getting the measles vaccine." This was a question last week from someone who said, what's that? "Child had a genetic disorder of immunity, homozygous mutation in the IFNAR2 gene. I believe you talked about this a few months ago. See the article below. It's from *JCI,* September 24. This is a paper, Severe Adverse Reaction to Measles Vaccine Due to Homozygous Mutation in IFNAR2." It's a case report.

DG: Yes. Actually, this is a good reminder because I think you guys did a deep dive on this paper on Twitter.

VR: Yes, we did.

DG: People have been saying because there's the misinformation out there, millions of children are being killed by the measles vaccine. It's not true. Then the other side was nobody's ever been killed. I think it was this one person once with this genetic mutation, this homozygous mutation.

VR: This child survived, actually.

DG: Oh, they did actually survive.

VR: There was another case of a child who didn't, yes. That's the only one I know of. That's *TWiV* weekly clinical update with Dr. Daniel Griffin. Thank you, Daniel.

DG: Oh, thank you. Everyone, be safe.

[music]

[00:44:34] [END OF AUDIO]