

## **This Week in Virology**

### **TWiV 1234 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. From *MicrobeTV*, this is *TWiV, This Week in Virology*, Episode 1236, recorded on July 18, 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:** Let's see. Today is Friday, so we have an STD bow tie, and I'm guessing it's trichomonas.

**DG:** You got it. You got it. I didn't even have to give you any hints. I had a whole bunch of hints lined up. This one won't be easy. It will be tricky.

**VR:** I see the white background with the purple stain, and I've seen that before, so you're going to have to get more bow ties.

**DG:** I actually have to do that, yes. Maybe these people, well, listeners might know. I have a little bit of an issue with the bow ties in particular, I think, would be the description. I don't like actually pre-made bow ties, so I get the ties, and then I have them custom-made because I like them to be a little bit thicker and the right length and all that.

**VR:** You should have been a pediatrician.

**DG:** I did think about that. All right, let's jump into it. We got a lot to cover. I don't know if people are aware, but we're recording a Friday morning instead of our usual Thursday right before I go sailing. I think it's because, well, Vincent, you were having problems going to and from Canada.

**VR:** Yes, I went to American Society for Virology meeting this week, which is fabulous. Fourteen-hundred virologists. It's just great science. Took me three times earlier in the week to get there, and then last night the flight was delayed. I got home at 11 o'clock, and so I said, "Dan, let's do it in the morning." Here we are, because we don't want you to miss your clinical update.

**DG:** All right, well, let's jump in. Maybe this is appropriate with how difficult it was to get to and from the meeting, but this is a quotation from Napoleon Bonaparte. "The battlefield is a scene of constant chaos. The winner will be the one who controls that chaos, both his own and the enemy's." I just feel like maybe we're in a little bit of a chaotic time as we continue to see a rise in measles cases. A little bit of a change on the cadence here as far as when we get the update.

This page is now updated from the CDC every Wednesday, and that's been the case since the end of June. There's been a few changes there at the CDC, if anyone's paying attention. As I pointed out, I was recently on an NPR, Vincent. I don't know how much longer NPR has. I think there's been some decision to cut. I like the way they refer to state-sponsored media, cuts to state-sponsored media. I think it's really like support for the arts. Anyway, that's -

**VR:** You know what, Daniel? *MicrobeTV* survives without government funding, so they can too.

**DG:** All right. As I pointed out there, here it is, July 2025, already more measles cases so far this year than any other year since the virus was declared eliminated in the United States in 2000. Was the virus declared eliminated? Was the disease declared eliminated?

**VR:** I would say the disease, because you can tell if there's disease, but unless you do extensive surveillance, you don't know if the virus is there or not.

**DG:** I think that's a good point, because that's been the quotation, the virus declared eliminated. It's the disease because there's always people coming back into the country. There's always people coming back into the country who acquired measles somewhere else. Then we've always had this wall of vaccination. I'll talk a little bit about that. One of the things I want to point out as we go through these numbers here in the U.S., CDC is aware of probable measles cases.

However, they're only reporting confirmed. You can actually go to get a test. When we talk about the map here in a moment, you'll see why that seems a little bit suspicious or low, or the fact that we're missing. Maybe there's certain places in our country where people will not go and get that test. As of July 15, that was my birthday, 1,309 confirmed measles cases were reported by 40 jurisdictions. Thank you for wishing me a happy birthday the other day, Vincent.

**VR:** You're welcome. You're only 45, right?

**DG:** No, 48, I think it might be actually. My mother, by the way, still owes me a phone call. My middle daughter was harassing her. "Mom, a text is not adequate on your son's birthday. Just get that out." [laughter] All right. We've got this wonderful map. This is this map of - OK, so I mentioned we've got over 1,300 confirmed cases. They can look at a map and actually see like, where are these cases clustered?

Then you will notice there's a few states where there's zero cases. We've got it in like 40 of the 51 jurisdictions. We've got a lot going on in Texas, a fair amount in New Mexico, Nebraska. Is that Kansas right there, right below Nebraska? That's another hot. You'll notice Idaho, Nevada, Alabama, Mississippi, West Virginia, there's no reported cases, no confirmed cases.

**VR:** There's virus circulating.

**DG:** Well, you see like all around there's reported cases. When you see cases with zero, then it makes you a little suspicious, right?

**VR:** Because viruses don't observe state borders, right?

**DG:** Apparently not. Up there in Canada, where you just got back from, another 120 new

measles cases, just the last week 27, which brings us only up to July 5. That is, what, 3,822 measles cases so quickly approaching 4,000 there. Just keep reminding our clinicians out there, but also our patients as well. Remember how this presents the three C's and the four D's. Those three C's, cough, coryza, conjunctivitis, then four days of fever, then you get the rash. Just keep that in mind. You're coughing, got the really runny, flared up nose and irritated eyes, and then the rash comes. You're contagious before that rash even shows up.

All right, bird flu. That's pretty much gone away. Vincent, they've updated the reporting, they've streamlined the reporting, well, OK. I was spending some time this morning - I remember we used to get these nice, weekly, what was going on? How many herds? How many poultry flocks? Well, at least now we have from the CDC, a little bit of clinical guidance for evaluating patients and treatment and post-exposure prophylaxis of influenza A, H5N1. Here, we had just a couple of key points. I'll leave in a link.

One is basically clinicians should consider the possibility of this as a diagnosis of the H5N1 in patients with signs or symptoms of an acute respiratory illness or conjunctivitis. If they've got that relevant exposure history, so exposure to the dairy or maybe the birds in some cases. Patients with relevant exposure histories who do develop signs and symptoms consistent should be referred for prompt medical evaluation, testing, and go ahead and start that Tamiflu, that oseltamivir while you're waiting for those results.

Then also think about other folks of the household contacts and consider jumping in with post-exposure prophylaxis with Tamiflu for those folks. It's relatively low cost, really minimal side effects. I think some people we refer to as the "tummy-flu" pill because it can throw your tummy off a little bit. Other than that, pretty well tolerated.

**VR:** Tummy flu. I didn't hear that one.

**DG:** You never heard that? "Here's some tummy-flu pills." "Why do you call it that?" "Call me in two days, you'll know why." "My stomach felt a little bit off." It's nice. It doesn't really mess with the microbiome or anything. It just gives you that little bit of stomach thing. All right. Here's a big thing that I didn't actually realize the full extent of this. We've been talking for a while about like, OK, highly pathogenic in avian influenza. Oh, the cows, milk production does a little. It's not like the cows get really sick and die or anything.

Apparently, that's not true. Here we have the article, "The Impact of Highly Pathogenic Avian Influenza H5N1 Virus Infection on Dairy Cows," published in *Nature Communications*. Here, they looked at the impact of the H5N1 virus on an infected herd in Ohio. Let's look at it at this herd in Ohio and then get a sense of what's the deal. Clinical disease, basically cows being sick, lasted for about three weeks, and about 20% of the cows had clinical disease. We're going to see seropositivities a bit higher.

The milk losses were about 900 kilograms liters per cow, recorded infected cows during a 60-day post-outbreak period. I'm converting that 90 kilograms to liters, so it's a little bit off. Seroprevalence was 89.4%, 76.1% were subclinically infected. That's an important distinction here. About 90% of the herd ends up infected, but we're only seeing, as I said, about 1 in 5 showing symptoms in the herd.

**VR** They don't say what the symptoms are other than loss of milk. Is there anything else?

**DG:** Well, as we see, and this is what really threw me, clinically affected cows presented an

increased risk of death, six times. This is interesting, and they say of premature herd removal, 3.6 times when compared to non-clinical cows, and go into what's going on with that. Economic losses, which is really what they're calculating here, due to decreased milk production.

Mortality, it's pointed that - I was not aware of the significant mortality here. Early herd removal were estimated at \$950 per clinically affected cow, so almost \$1,000. This one herd total cost \$737,500 for the herd during just this observation period. They say our results demonstrate a production impact lasting at least 60 days post-clinical diagnosis and major financial consequences of the highly pathogenic avian influenza H5N1 to dairy farms.

**VR:** I misspoke. I said symptoms, but of course, cows can't tell you anything.

**DG:** No, they can't talk. No talking.

**VR:** There's signs of infection. [laughter]

**DG:** Signs. You are right. They'll end up with signs. They appear sick. Then this was really like something I did not really appreciate. Infected cows six times more likely to die. So, 6.8% of the sick cows, so 53 of the 770 sick cows, so about 7% died or were euthanized. They get so sick that they basically put them out of their misery within on average 13.6 days after the diagnosis. They get infected, within two weeks they're gone.

Another 31% were culled within 20.6 days after diagnosis. I think you got to be careful. Don't just look at the first one to two weeks. It looked like some of these cows just were doing so poorly. I think that's a big thing with the cows. They look sick. They can't produce milk. You're losing quite a bit of your herd. This is not, as benign, I think, as we thought about maybe before, oh, 10% milk reduction for a period of time. You're losing cattle, you're losing cows here.

**VR:** I wonder if these cows who die have some comorbidities that we don't know about.

**DG:** Yes. Most of them are probably chubby, and they don't keep their hair dry. No. I'm glad you bring that up because that seems to be this modern thing. I've been pretty amazed at how, resisted, having a conversation. I don't know if I shared this before. A friend of mine works with some people who are just not willing to believe that disease kills you. There was a discussion about, I think it was like influenza or COVID, and children dying, and they're like, "Well, were any of them overweight?" It was just like this, really, because if you're overweight that kills you. It's just this absurd idea about blaming people for things. All right.

**VR:** They say disease doesn't kill them. What kills them?

**DG:** I don't know. This is like the gun and the bullets, and people don't kill you. It's whatever. I think, as the catch line of this show, a virus is the kind that make you sick. It's not like the show about wet hair. You change the tagline. All right. Talking about flu. The big update I wanted to do here is, as we've talked about before, it takes a little while for all the counts to come in. The big count that I wanted to point out, because there were a lot of discussions early on, and I love that article. COVID is bad. Comparing it to flu is worse. Flu is bad.

A total of 260 influenza-associated pediatric deaths were reported this last season. Two hundred and sixty. That's the highest number of pediatric deaths reported in any non-

pandemic flu season since this became reportable. As we point out repeatedly, half those kids, majority of those kids, completely healthy, not even with obesity or whatever else you want to throw to blame them for dying. Basically, over 90% not vaccinated. That's becoming a bigger problem. People are just not taking this seriously, not providing the kids with those wonderful life-saving protections.

All right, RSV. We have a little bit of an update here. We have this article, "Systematic Review and Expert Consensus on the Use of Long-acting Monoclonal Antibodies for Prevention of Respiratory Syncytial Virus Disease: ARMADA Taskforce," published in *OFID*. ARMADA, what does that stand for? Advancing RSV Management And Disease Awareness. I like that, ARMADA. As we've talked about repeatedly, the introduction of the RSV vaccines and the monoclonals really look like they've been a game changer.

The ARMADA Task Force, an international multidisciplinary expert panel, undertook a systematic review to develop long-acting monoclonal antibody consensus recommendations for RSV disease prevention in children. The task force recommends for all infants aged less than 8 months in the absence of maternal RSV vaccination. We talked about where the moms actually get a vaccination during the beginning of that third trimester. Preterm infants also included less than 37 weeks gestational age less than 12 months, and children less than 24 months with high-risk conditions.

The long-acting monoclonal antibody administration is recommended. They say, although an RSV endemic country's decision should be made locally concerning administration year-round or with peak RSV incidences. What is that last bit about? We're familiar here in the States that really it's about October, we start to see cases down in Florida, they sweep up. In the tropics, subtropical areas, I was reviewing this to just make sure this is what we're seeing. There could be year-round RSV. It becomes a little trickier. They don't really get that seasonal winter peak that we get in some areas of the world.

All right, COVID update. There's a storm on the horizon here, Vincent. If you look at emergency department visits in the United States, still very low, but we're starting to see an increase. I will say that's something we're seeing here locally. I got a few folks in the hospital with COVID, some of them on oxygen, so they're having a bit of a tough time.

If you look at - I put the regional map, and everything's a little delayed. It's a little bit behind the times. As you'll see with this gray in our multicolored later on, some of the data, we're always like two feet into it before we realize. You can see up there in Alaska, down there in Alabama and Florida, really starting to get some pretty high wastewater viral activity levels.

**VR:** Still our curves they're still flat. I'm still holding out for no summer peak.

**DG:** This is going to be interesting because we're going to talk about an article, how to predict the future. I have for -

**VR:** Is it by Yogi Berra?

**DG:** Yes, exactly. The hardest thing to predict is the future. He didn't say half the things he said.

**VR:** Oh, but it's fun to think he did.

**DG:** That's another one of his quotations, which is funny. I didn't say half the things that I said.

**VR:** Ah, that is, it's funny. Yes.

**DG:** Isn't that awesome? [laughter] All right. Following this out, all the way back to 2022. That's when we had our really last super high, very, very high peak. Then we've had this, up and down and up and down, and we had going back to 2023, we had a pretty nice long flat, then it went up. Really didn't rise until end of July into August. Zooming in on what's been going on here the last bit. Maybe some activity, I'm going to give you that. I zoomed all the way in and maybe. Again, you've got this grey period.

From 6/21 to 7/5. We're here past the middle, getting into the end of July. We're already like ahead of this. Maybe a suggestion that things are starting to go up. Here comes this article – can we predict the future – the article, "Estimated COVID-19 Periodicity and Correlation with SARS-CoV-2 Spike Protein S1 Antigenic Diversity, United States," published in *Emerging Infectious Diseases*. A couple of comments here, and I enjoyed this article. It's a good article. It's got some nice, fancy, multicolored figures.

It starts off by pointing out, as we've talked, a single winter peak annually is characteristic of several respiratory viruses, including seasonal flu, RSV, seasonal human coronaviruses. However, conversely, other respiratory viruses, including parainfluenza, rhinoviruses/enteroviruses, typically peak twice a year. This is not unheard of, the idea of having the double peaks. I will say, as I mentioned, it's coronaviruses that fall in like flu and RSV, so we have this expectation that eventually that might happen.

Here, these authors report that their analysis revealed biannual COVID-19 peaks in late summer and winter. They say a pattern that is expected to persist as long as the rapid evolution of SARS-CoV-2 and cyclical S1 diversity continues. Then they note that a single dominant S1 sequence genotype was associated with both winter and late summer surges until November 2022. Since winter 2022-2023, a dominant genotype was also associated with a surge in virus activity during the winter season, but co-circulating variants with similar spike substitutions have been associated with late summer surges.

They've got this nice pattern you can see, and the overlay really looks pretty similar to what we discuss each week. I don't know, did you have any thoughts here? It's going to be interesting. They're predicting the future, and here we are, entering the future.

**VR:** Well, I think they're trying to associate genotypes with these peaks. What the peaks are, are human activity, in my opinion, that correlate with what people do at different times of the year. I heard at ASV a very cool talk by a guy in Pasteur in Cambodia. He says the peaks of avian influenza correspond with the activities that people do at different times of the year. When you stop those activities, the disease peaks go away. The idea that you're going to find a magic mutation in the genome, I don't think so.

**DG:** I think that's been the idea. Oh, it's doing this because it's still so rapidly evolving. I don't know if it's still so rapidly evolving, actually.

**VR:** Well, it may be, but it's too easy to blame disease patterns on a genotype. It's more likely the behavior of the host.

**DG:** Yes. They put it in there. They're like, "By the way, this isn't exactly true." They're already saying this dominant genotype, it works this way, but it doesn't work here.

**VR:** We may see a little peak here because I think July 4th, there's a lot of activity. We're lagging behind there. I just do not think we're going to have the extensive peak that we saw last time, but we'll see.

**DG:** No, it is interesting. We always talk about, it's like sometimes I watch the weather and then, July 4th, it's like rainy and everyone's indoors. I'm like, "Oh my gosh." Yes, it seems to be affected a lot by behavior. We'll follow that. We'll see. We're going to know in a couple of weeks here. The bets are still in. Vincent thinks we're good until, what, November? Is that what you're giving us, a flat till November?

**VR:** Yes.

**DG:** I think by the time we get to the end of August, it will be clear that we're back up again. All right, COVID early viral phase. We have the article, "Drug Treatments for Mild or Moderate COVID-19: Systematic Review and Network Meta-analysis," published in the *BMJ*, all little letters, *British Medical Journal*. Really interesting, interactive, graphical, abstract that it must recommend. I don't know, Vincent, maybe you should, everyone should go check this out. It's really cool. You move your mouse around and like different things highlight. You move it to the - there's a circle, and they've got all the different potential therapeutics.

Then you click on it, and you just hover over it. I guess it's the best graphical abstract ever. Even if you don't care about the content, people, this is like just cool way of sharing and communicating. They start by stating that the current evidence supports two stages of COVID-19 disease. Oh my gosh, I feel like someone's been talking about that. An early phase marked by viral replication, that's when we get the non-severe disease and a later inflammatory phase when we get severe disease. Have you heard of that model before?

**VR:** There's this guy, Daniel Griffin, who said that way at the beginning of the pandemic.

**DG:** I think a bunch of us like published like in the spring, we're like, "Hey, this is what's going on. You should study treatments based on this paradigm." All right, who knows? Maybe I just got lucky. The different pathogenesis and resulting severity of symptoms of each of these stages suggests different interventions are most effective at certain stages of disease. Oh man, brilliance here. Consequently, our systematic review and network meta-analysis now addresses patients with mild or moderate COVID-19, also known as non-severe COVID-19, separate from those with severe COVID-19. This is that first week, viral replication.

In this publication, they're going to compare the effects of drug treatments for the first phase. Separate publication, looking at treatments for severe, critical COVID-19. This is going to be part of this series. Ultimately, in this, they looked at 259 trials, evaluating 166,230 patients. They compared standard drug and they basically found two drugs probably reduced hospital admission. Nirmatrelvir-ritonavir. That's Paxlovid, 25 fewer per thousand. Remdesivir, 21 fewer per thousand.

Molnupiravir, systemic corticosteroids, may reduce hospital admission, but low certainty. Drugs for prophylaxis and antibody-based treatments, they're going to address separately. I

want to point that out because I was like, "Oh, where's the data on the monoclonal antibodies," which were pretty impressive back when we were using them, but not seeing that covered here. Remember, one of the first things we recommend and reinforced here, number one, Paxlovid, oral, way too expensive, by the way.

We have the article, "Extended nirmatrelvir-ritonavir Treatment Durations for Immunocompromised Patients with COVID-19 (EPIC-IC): A Placebo-controlled, Randomized, Double-blind, Phase 2 Trial," published in *The Lancet Infectious Diseases*. This is this thing that doesn't go away. People keep talking about like, "well, maybe we're not giving it long enough. Maybe instead of five days, we should do 10 days or 15 days. Well, they studied this. This is a placebo-controlled, randomized, double-blind, phase 2 trial that enrolled non-hospitalized, immunocompromised individuals aged 12 years or older with symptomatic COVID-19 from 73 sites across nine countries.

These are immunocompromised. If someone needs longer than five days, this seems like it would be the right group to look at. Participants were randomly assigned. It's a one-to-one-to-one to get either five days, 10 days, or 15 days, Paxlovid. Primary endpoint was proportion of randomly assigned and dose participants with sustained SARS-CoV-2 RNA concentrations below the lower limit of quantification from, this was interesting, from days 15 to 44. Curious why they start at day 15. We'll look at the actual data.

Secondary endpoints include the incidence of viral rebound after the end of treatment up to day 44. Safety, a secondary endpoint, was assessed in all randomly assigned participants who received at least one dose of the nirmatrelvir-ritonavir. Put in the bets. Everyone's ready. Is it five? Is it 10? Is it 15? They tell us no difference was observed between the three treatment durations in the primary endpoint. Extended nirmatrelvir-ritonavir treatment beyond five days resulted in a nominal improvement in the frequency of the viral rebound, generally well tolerated. Let us take a little closer look here.

We've got this figure. The primary endpoint was reached in 61.5% of the folks in the five days, 70.8% in the people who got 10 days, 66% in the people that got 15 days. Then they've got these graphs. We can actually look at this viral rebound. They're basically going to give us different numbers here. The big thing here is going to be wide confidence intervals. They're going to say viral rebound occurred in 17% with the five days, 2% in the 10 days, 2% in the 15 days. From gross numbers you look at that, you say, "Well, it seems a little bit different." There were two COVID-19-related hospitalizations reported, both in the five-day treatment group.

**VR:** It's probably not significant, though.

**DG:** I think that was the problem. These were not significant differences.

**VR:** It's very interesting.

**DG:** Yes, it is pretty interesting. I can give everyone the punchline, but also let people look a little closer at the data here. You look at the five-day group and the severely immunocompromised. Those are really the only ones that we're seeing, maybe a little bit of higher nasopharyngeal viral RNA going out farther. You get to this 10-day, this 15-day group. They're really indistinguishable from the non-severely immunocompromised. I think we're still left with the five days, but it does raise some situations where, maybe severely immunocompromised, you might consider this.

Again, it becomes this issue about what is your endgame. Are you trying to keep people out of the hospital? Are you trying to keep people from not or getting through this? All right, number two, remdesivir. That was another one of the drugs that stood out in this meta-analysis. We still in the list in some parts of the world, we've got molnupiravir, we've got convalescent plasma. Not a lot of big changes during that second early inflammatory phase. We'll look forward to the big analysis of that, but still steroids, right time, right patient, right dose, anticoagulation, pulmonary support, remdesivir, if we're still within the first 10 days, immune modulation.

That's going to bring us into the Long COVID, late phase, PASC. It's interesting, I was on NPR this week, and I was supposed to talk about Long COVID and measles. Basically, I talked about Long COVID and then just a little bit at the end about measles. There was a nice special on NPR this last week, and you can go and listen to it as well. Just people sharing stories, people pointing out the fact that, the current administration does not want to talk about Long COVID. It's only about infection fatality rate.

It is not about people that got sick and developed diabetes, had heart attacks, had strokes, have this debilitating ME-CFS type presentation. There are folks out there, we're still seeing them, unfortunately. Vaccination, tremendous way to reduce your risk of that. What about therapy? We hear from Invivyd, that, "Invivyd and leading researchers form SPEAR (Spike Protein Elimination and Recovery) Study Group, I like that, SPEAR, to assess the effects of monoclonal antibody therapy for Long COVID and COVID-19 post-vaccination syndrome."

Just before I go into like what they're going to say, just what's the concept here? The concept here is the idea that there might be persistent antigenic stimulation of the immune system. The whole idea that there's still spike protein, maybe a monoclonal antibody combined to that spike protein, clear that out, and you're going to reduce the ongoing immune activation. That's the idea. There's people, as we've talked about, who have this idea that, oh, there's ongoing viral replication, where he did a multiple-day, multiple-length, multiple studies looking at highly effective antivirals.

Thinking about my HIV days there, but can we just give them lots of Paxlovid, and they're going to get better? That doesn't seem to work. Maybe there's some way to mop up antigen with monoclonals. The SPEAR study group was initiated in response to a growing number of case reports and reported case series from across the U.S. suggesting actually folks getting Pempgarda, pemivibart, that monoclonal that you get every three months, actually reporting that they're doing better. They seem to be doing better.

People with Long COVID are getting this for protection, pre-exposure prophylaxis, and a lot of them are saying, "Once I started this, I started to feel better." Pempgarda is not authorized for treatment of Long COVID. These emerging reports are, as they point out, anecdotal, uncontrolled. Collectively, they support this plausible hypothesis that prolonged exposure to the "pathogenic SARS-CoV-2 spike protein" or other forms of persistent viral material may drive disease in some patients. They're actually going to go ahead, enroll folks, give them the monoclonals, and see if it makes a difference.

**VR:** I think that's a good study. Just remember that just because there's persisting antigen in Long COVID doesn't mean it's causative. It could be a consequence or just an association. Unless we have animal models where we can determine what's going on, we just don't know. It's an observation that may not mean anything.

**DG:** Yes, I agree. This will be exciting, and that's what we've got to do. We've got to keep looking because we've got people out there, millions of people out there suffering. Great that we still have ongoing trials, and it's great that, even if the federal government is shutting stuff down, that we've got companies, we've got private individuals supporting ongoing research. I think I mentioned last week that the first grant that was cut was the Long COVID study at Columbia, my colleague Lawrence Purpura.

We've had private people step in. We had the Cohen family step in with several million dollars of support to keep our clinic open, keep things going forward. Thanks to all the people that are stepping in there. Here, as we've been saying for, well, five plus years, no one is safe until everyone is safe. I just thank everyone for all the contributions. That's what drives us forward. I want everyone to pause the recording right here, go to [parasiteswithoutborders.com](https://parasiteswithoutborders.com), and click that Donate button.

The small amounts help, the big amounts help. We're getting to the end of our Foundation International Medical Relief of Children fundraiser, May, June, and July. Not quite there yet. We've got to get up to a \$10,000 to double that for that maximum donation of \$20,000. Thank you for your support.

**VR:** It's time for your questions for Daniel. You can send yours to [daniel@microbe.tv](mailto:daniel@microbe.tv). Janet writes, sends a link to an article in CIDRAP saying, "Adults don't need tetanus, diphtheria vaccine boosters," according to a study. The question from Janet is, "What about the pertussis vaccine, which was included in the DPT booster? I think you said it actually wanes before the 10 years is up."

**DG:** This is great, Janet. Actually, I'm glad you leave this link in because I see this and I'm like, "Oh, I wish I had that. Oh, there's the link right there." Thank you. This is an interesting study. What basically we have this shot, so the diphtheria, tetanus, acellular pertussis in there now. It wasn't that many years ago. I still remember when we actually went from just the diphtheria, tetanus every 10 year to the diphtheria, tetanus, acellular pertussis, three-shot.

Now, the interesting thing in this study, and I think we've been observing this for a while, is even though we say, "Oh my gosh, it's been 10 years, you need that next tetanus booster." I don't know how true that is. I think the tetanus protection lasts well past those 10 years. There's plenty of adults out there not getting their tetanus shot every 10 years and people are not dying left and right of tetanus. We do see tetanus in the United States, by the way, and we see it particularly in senior individuals.

We might see it in nursing homes. We might see what's been way past those 10 years. Ten years is probably more than we need for the tetanus. Probably also, as we're seeing from the study, the diphtheria protection you get lasts more than 10 years. What about the acellular pertussis? As we've mentioned before, the recommendations are driven by this diphtheria, tetanus every 10 year. The pertussis does not last 10 years.

What we've tried to do is a few things. Try to target high-risk populations. Mom, during the first week or so of that third trimester, to protect the kids. All the adults that are going to be around the newborn, get them to get updated. We don't wait 10 years. Try to sort of modify this. This is an interesting challenge like how often should people get a pertussis update as we're starting to see more pertussis cases and pertussis deaths.

**VR:** Jessica writes, "What's the ideal timing of vaccines in the third trimester of pregnancy? I'm currently pregnant with my first child due late October." Jessica lists four different vaccines. Let's take them one at a time, all right? First, "Tdap: My OB typically gives Tdap at 28 weeks, which would be early August. They also recommend that all caretakers receive a Tdap booster. Does it matter when they get it as long as it's two weeks before interacting with the baby?"

**DG:** This is great. Let's go through this one at a time, and this perfectly dovetails onto the last one. The Tdap, yes, 28 weeks is great. In general, what we're thinking about with the vaccines, and we'll have maybe more data as we get into the other vaccines is ideal is the beginning of that third trimester or thereabouts. You want to give mom, yourself - congratulations, by the way, enough time to really develop a good immune response. As we've learned, it's not just antibodies.

There actually is a transfer of a cellular immunity through breastfeeding as well. I like the Tdap being - here it looks like we're end of second trimester right before the beginning of the third trimester. Those are the thoughts. Now, as far as the ring immunity that we try to produce for all the caretakers, yes, again, two to three weeks before they interact with the baby, enough time to get that immune protection.

**DG:** OK. "RSV: My OB says the RSV vaccine can only be given between 32 and 36 weeks from October through February. At the beginning of October, I will just be beyond 36 weeks, so maybe barely not eligible. However, if I have the choice, am I better off getting RSV vaccine or waiting until the baby is born and giving them nirsevimab?"

**VR:** This is a good one. A couple of things here is head-to-head. What's better? Mom getting the RSV vaccine, the baby getting nirsevimab, everything. In most places, I think it's a financial issue. They say, "Hey, you got to choose." If you're going to choose the RSV vaccine, ideal is right at that 32 weeks. If you're just beyond 36 weeks, again, there's going to potentially be a lack of time. We're worried that it's not going to give you enough time.

The nirsevimab, the monoclonal antibodies, which we just talked about a review, really are pretty tremendous. That's a fine option in a situation like this where you might say, "You know what, it looks like the timing is not going to work here. Baby's born, gets nirsevimab."

**VR:** "COVID: I'd like to get Novavax in the fall, but I'm not sure I'll be allowed to under the new rules, since I have no underlying conditions other than pregnancy. I got Novavax last year, much better than the week-long reaction I got from Pfizer or Moderna. If I'm allowed to get Novavax, what would be the timing? Should I wait until a new booster comes out?"

**DG:** Yes. I'm glad you bring this up. It's just not fair. There are a number of individuals who say, "I'd rather get the Novavax because I don't want to be down and out for one, two days, seven days," in your case. You've got enough going on. It's really tough that some individuals are taking away our access to vaccines. Even after they said under oath, they would do no such thing.

The timing would be ideally, as I mentioned, the beginning of that third trimester, it's going to give you protection, going to give the baby protection. There'll be a new formulation this fall. I think that makes sense. Yes, let's see what happens with this court case, and are people going to have access to the vaccines.

**VR:** "Flu: Should I wait to get the flu shot until October, or should I get it earlier in case the baby is born earlier?"

**DG:** Yes, so that's always a challenge. We've got this timing issue because, you get the vaccine, you get it during that third trimester. Not only is it going to protect you, but it's also going to protect the baby. There is a period of time from the time you get that shot till the baby is born as you're developing that robust immune response that you'll share with the baby. There's a challenge here, too. If you protect yourself, you end up not getting the flu, then less likely the baby.

If you end up getting it too soon, and then you end up with the flu, you're going to have a certain protection for the baby, but now you're going to have the flu. We've talked about that 15% reduction in protection as time goes by. I think it makes sense for you to get that flu shot, probably October. It's probably a good timing for protecting everyone in scenarios like this.

**VR:** "If I'm eligible for all four vaccines, do any of them need to be spaced out for effectiveness?"

**DG:** No, no, I think this would be fine. Go ahead and get them all. Never miss an opportunity to vaccinate or get vaccinated.

**VR:** Got to catch them all. I don't know if you get that reference, Daniel. It's like a Pokémon.

**DG:** Pokémon.

**VR:** Very good.

**DG:** Pokémon, is that what you're doing?

**VR:** Yes. I love this email because Jessica recognizes the value of immunization. She's not asking us, do I need to get this or is it going to harm me? When should I get it? I love it.

**DG:** It's a great email. Thanks, because it allows us to walk through all these decisions.

**VR:** Eric writes, "During last week's episode, you discussed a lawsuit against RFK Jr. filed by six organizations based on new vaccine recommendations. As a longtime listener who had his professional and personal queries about infectious diseases answered on air by Dr. Griffin on three separate occasions, I was delighted for the opportunity to return the favor in some small way when he sought advice from any listeners who are attorneys like myself to explain the potential outcomes.

The lawsuit filed in the Federal District Court for Massachusetts is civil in nature and seeks to vacate, i.e., overrule, the actions by the Secretary and several other senior health officials that removed the COVID-19 vaccine from the CDC immunization schedule for healthy children and pregnant women. If the plaintiffs prevail, the court would find that the actions by the named officials were arbitrary and capricious and therefore unlawful, thereby leaving the previous CDC vaccine schedule in place, which recommends boosters for healthy children and pregnant women."

There's the answer. Eric gives some notes that we'll put in the show notes for your reading. That's yes, if they win the case, then we have to go back to the old schedule.

**DG:** Yes, then children and pregnant women will have access to vaccines, which we really should not be taking away that choice.

**VR:** Although I can imagine appeals, and appeals, and appeals, and its dragging out, right?

**DG:** Yes.

**VR:** Well, people are in danger of becoming ill and perhaps dying. The courts will take their time. Tony writes, "I feel the need to provide a correction to the recent discussion of the possibility that the adjuvant used for Shingrix and the Arexvy vaccines -" well, that's the end of the sentence.

"Both use the AS01 adjuvant, which does not contain alum/aluminum. In fact, AS01 is a lipid mixture forming micelles/ lipid nanoparticles that have intrinsic innate immunity, stimulating properties that enhance the effectiveness of the protein antigens in these vaccines.

I appreciate that RFK Jr. made a big stink about aluminum in vaccines being a great hazard, despite the decades of evidence to the contrary. Although he should not be able to use that track, I have no doubt that he could up with another crackpot hypothesis that would similarly attack such lipid adjuvants using his Dunning-Krueger genius. In addition, there are two more of the many single antigen vaccines that have proven to be effective despite this other trope of his. I might also add there's an adjuvant that flu vaccine used in the U.S., at least for geezers like me, 77 years old. This has been the vaccine I've gotten the last three years. Tony."

**DG:** Yes, yes.

**VR:** Finally, David, "In the Attack on Science section of *TWiV* 1230, you mentioned a citation by a dubious June 24-25 ACIP presenter, Lyn Redwood, who referenced a thimerosal study by Dr. Berman. She implied Berman's study found "long-term consequences in the brain" from thimerosal. A simple online search reveals what a gross misinterpretation, as you pointed out, this was. Dr. Berman in *Toxicological Sciences*, Volume 101, Issue 2, February 2008, is co-author of, Low-Level Neonatal Thimerosal Exposure: Further Evaluation of Altered Neurotoxic Potential in SJL Mice.

The last sentence of the abstract says it all, "The present results do not indicate pervasive developmental neurotoxicity following vaccine-level thimerosal injections in SJL mice and provide little, if any, support for the hypothesis that thimerosal exposure contributes to the etiology of neurodevelopmental disorders." Provides a link to that article.

"I'm deeply disturbed by the cruel arrogance and ignorance that has hijacked our government, institutions, and media. I'm grateful that you and Dr. R. are doing what you can to fend off the attacks on medical science. I hope I live long enough to see truth regain its predominance in our national conscience." Here's a quote from Tad Williams. "Every time we tell a lie, the thing we fear grows stronger." "Let us be the ones growing stronger."

**DG:** Thank you, David. That's a great quotation. Great email. Thank you to all the folks writing in.

**VR:** Daniel, they took this article, which the title is noncommittal. It's just long-term

consequences. They twist around the conclusion, assuming no one's ever going to look at the article.

**DG:** I think that's the way it works for them. They're like, "They'll look at this article," and they put it up there. Then, "Oh, the authors say that." When I looked at the articles, I guess, yes. They make stuff up, and they use this like veil, this illusion that they're actually reading the literature. No, but they start off with their conclusion. Even before AI, it was just like simple Google searches. Oh, there's a title that makes sense. Just throw that in. I'm not going to actually read that.

**VR:** I like this. Cruel arrogance and ignorance. That's *TWiV* weekly clinical update with Dr. Daniel Griffin. Thank you, Daniel.

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

**[00:49:11] [END OF AUDIO]**