TWiV 1294 Clinical Update

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

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Vincent: From *MicrobeTV*, this is *TWiV*. *This Week in Virology*, Episode 1294, recorded on February 5, 2026. 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: What's on the bow tie, Daniel? Give me a clue.

DG: Let's see. One of the nicknames is Red Snappers. It's these little red bacilli.

VR: I've never heard Red Snapper before.

DG: Oh, really? OK. Everything is about - Is that a clue?

VR: No.

DG: [coughs] Good. Sorry, I coughed up a little blood there. Tuberculosis. [chuckles] It was a reference to the Green book, *Everything is Tuberculosis*. I think when I mentioned it, I talked to my wife about when I went through a phase when I was just really obsessed with tuberculosis. She's like, “Yes, that has not ended." [laughs]

VR: You like that book?

DG Actually, it's a good book. He's an engaging writer. I think it's a good book. It's worth it. I would recommend it. It'd be my pick of the day, my pick of the week.

VR: It's nonfiction, right?

DG: It is nonfiction, yes. It really just talks about the scourge, and it really makes it personal, which I think he does a really good job.

VR: What is the name again?

DG: It's one of the Green brothers. It's *Everything is Tuberculosis*. He also wrote *Turtles All the Way Down.*

VR: John Green.

DG John Green.

VR: Oh my gosh. OK. I will read it.

DG It's a quick, but it's really good. Let me do my quote, but then I'm going to talk a little bit about a little aside on tuberculosis and why I was thinking about it apparently when I put on my tie this morning. I'll start off with a quotation from Albert Einstein. I have quoted him before. He said a lot of stuff. This one just came up. I've been studying weather. One of the comments was, "Everything should be made as simple as possible, but not simpler."

VR: That's great. I love it.

DG: [chuckles] I think that's what we aim to do is we want to make things understandable. We want to make it simple as possible, but not too simple. We don't want to lose the subtlety, the nuance. The reason I'm wearing this, I was doing an interview yesterday for *USA Today* about people who maybe have been following what's been going on in the family detention centers across the country. I don't know, Vincent, if you've followed that at all.

VR: Yes.

DG: It's measles, tuberculosis. From an infectious disease standpoint, it's a disaster. Forget about the humanitarian aspect, going to court appearances or going to school drop-offs, grabbing mom and dad, grabbing the kids who are U.S. citizens. Liam, that little kid with the bunny hat being grabbed by the backpack by ICE and put on a bus. These are people that have been in the country for a year or two. A lot of them are trying to go through the legal process, and they take them to these centers. It's winter respiratory season. We now have measles endemic in the U.S. We have problems with tuberculosis.

When you just read about the accounts of what's going on, a lot of these people are sick. They have limited access to medical care. I think it's ibuprofen is the drug of choice or maybe the only drug that - Sometimes when the kids get sick enough and finally do actually get seen, they realize they have measles, for instance. There was a pregnant woman who had latent tuberculosis brought in on one of the buses. It's just really, what a disaster.

VR: They won't let them be inspected. That's the thing. Congress is now trying to push to get these facilities inspected because they're a horror show, and they know it, and they don't want people seeing it.

DG: That's scary, right? The United States of America, we've got armed masked people on the streets, not identifying themselves, dragging people away to these facilities that are run by these private contractors and not being allowed to inspect it. It's like members of Congress, they won't let them see what's going on. I'm like, "What country do we live in?"

VR: No, it's just unbelievable. I don't understand the 30% of people that still support this. What are you thinking, folks?

DG: It's just - well, I'll thank all the thousands of people that tune in each week to us and support us and allow us to continue to basically inform you about what's going on. We'll get back to that in a moment, but as measles becomes an issue in these facilities, as

tuberculosis is an issue, as all the other infectious diseases. You can imagine having norovirus in a facility like this.

VR: The thing is, it's just not the inmates. It's the people who work there, and then they go home, and they bring it back and forth. Now, they're trying to spin this as dirty immigrants bringing measles here and TB. No, they're already here, and it's circulating in the U.S. Another lie that they're promulgating among older lies.

DG: These are at-risk individuals put in situations. All right. You guys on the deep dive *TWiV* always like to talk about the weather.

VR: Yes, we do.

DG: This is the only time of the year that I like to talk. Well, I always watch the weather. People probably know I basically watch the wind. [chuckles] I always tell you what's -

VR: You know why we talk about the weather? Because we're human.

DG: Human beings like talking about the weather.

VR: That's what we do. People complain about it. Tough. We're human beings. That's what makes it an approachable program.

DG: I think that's also, it makes it the realization that scientists are not these evil, I don't know, antisocial individuals in some lab trying to plot the demise of human society. Yes, we're human beings. We walk our dogs, care about when it rains.

VR: They're not evil, but some of them are antisocial. No doubt about it.

DG: Yes, some scientists are antisocial. We were talking about that yesterday, and you weren't mentioned. No, just as an aside. [laughs] Anyway, let's talk about some really exciting. In the United States, we have a history here. Actually, if you trace the roots, this was actually imported from Germany and the whole idea of getting the animals to predict weather for us. It's really interesting. Germans came to Pennsylvania. We're now all down for this. We read Northeast Alabama Sand Mountain Sam predicts an early spring. Now, what's going on here?

Now, on Groundhog Day, my favorite day of the year, the folks in Alabama, do you know which animal they turn to get their weather?

VR: No.

DG: An opossum. Not Sand Mountain, Sam the opossum. Now, he is Alabama's beloved opossum. He did not see his shadow at a ceremony on Monday, meaning an early spring could be on tap, is how they word it.

VR: What does early mean? Like two days?

DG: It pretty much means, [chuckles] you're going to realize as eight days go by, this might be the year he doesn't do so well. It really means from here on out, it's like we're right into spring. Winter's pretty much over. Punxsutawney Phil, he's the famous guy from the movie, he's the guy out there in Pennsylvania. He did see a shadow and he runs back inside

predicting six more weeks of winter. Now, I have a couple of comments. Now, I picture this, of them coming out of a burrow. It's a sunny day. They see their shadow. It frightens them. They go back in.

Apparently, I realize it's much more complicated. There are actually these animal whisperers. They tell us what Phil is trying to tell us about. It really comes down to maybe Phil always gets it right, but the whisperers get it wrong because he doesn't - actually, they don't let him come out and zip back in. Also, very importantly, as people may notice, Phil is basically immortal. He's had four wives over his immortal career. He never dies. Apparently, there's some special scientific elixir, a secret concoction that he takes. I have to say, Phil is only right about 35% of the time. The reason I watch what Phil has to say is usually he's wrong.

Now, the interesting thing, and this is where government money, well at work, the National Oceanic and Atmospheric Administration page keeps a table with the reliability of the different groundhogs. I'll leave in a link because I know people are going to care about this.

[laughter]

DG: Really, the most accurate groundhog out there is Staten Island Chuck. Now, he's about 85% accurate at predicting. Of course, I went, "Look, Staten Island Chuck says winter's over. It's all going to be great." There's a whole list of other apparently taxidermied groundhogs. [laughs] There's Concord Charlie. Maybe he's a groundhog. Who knows? I'm not really sure how we get his prediction.

VR: How do you tell what they're predicting if you've never seen them?

DG: Apparently, there are whisperers, as I mentioned, and the whisperers tell us what they think.

VR: Now, it's all fake now.

DG: Now, it's all hooey, except, as mentioned, our opossum in Alabama is 97% accurate to date.

VR: Look, the best thing is the *Farmers' Almanac*, right?

DG: [laughs] OK. All right. Moving on to some real science or some human investigative science. I think this is really important because there's been a tremendous amount of misinformation, confusion.

VR: Listen to this. *Farmers' Almanac* predicted for 2026 winter, a wild ride, cold with significant, consistent, and sometimes frigid, snow-filled conditions. That's exactly what we have.

[laughter]

VR: Don't need no stinking animal.

DG: You just need the *Farmers' Almanac*. All right. I want to mention, “Recommended Childhood and Adolescent Immunization Schedule, United States, 2026 Policy Statement,” published in *Pediatrics*. What's going on here? We read that the 2026 Recommended

Childhood and Adolescent Immunization Schedule has been published by the American Academy of Pediatrics. The schedule is revised annually to reflect current recommendations for the use of vaccines licensed by the USFDA.

At this time, the AAP, it's the American Academy of Pediatrics, no longer endorses the Recommended Childhood and Adolescent Immunization Schedule from the CDC. Twelve national organizations representing more than a million clinicians, physicians, pharmacists, other pediatric healthcare professionals agree with the AAP immunization schedule. There's a list, American Academy of Family Physicians, the American College of OBGYNs, the Nurse Midwives, the Pharmacists, the Infectious Disease Society of America, National Association of Pediatric Nurse Practitioners, a number of people really endorse this. This is the science-based, accurate schedule to follow if you really want to protect your children.

VR: Ignore the ACIP, ignore the CDC, forget it. They don't know what they're talking about anymore.

DG: Yes. They're clearly in the pocket of big wellness. They'll say everyone else in the pocket of something. Pediatricians do not make money off vaccines. I was out in Colorado. We tried to - actually successfully, it was John Bender, I think, who did this, one of the family docs, basically got the state involved, and the states were really supplying access to the vaccines. Pediatricians were just helping facilitate that because I was in private practice in rural Colorado for a decade. You're not making money off vaccines. It's a gamble. You got to put the money up ahead of time, try to guess who's coming in. We don't make money off. That's just a lie.

These guys make a ton of money off big wellness, selling these nutraceuticals and fake stuff. The nice thing I like about this is the AAP in this publication has some links to some really nice user-friendly vaccine schedules.

VR: That's great. It's really nice.

DG: Aren't they really easy to look at, easy to interpret, easy to follow, and evidence-based, right? Right at birth, RSV, HepB. One month, you get your next HepB. Two months, you get the next HepB, and you follow it on out. They're still recommending craziness. Polio, imagine that. Unlike the CDC, they actually don't want children dying and getting paralyzed.

VR: Where's polio on here? I don't see it.

DG: IPV

VR: Oh, IPV, OK.

DG: Six down.

VR: Two months, four months, six months, and four to six years. It's actually 6 to 23. You could get it anywhere in that window. That's what the bar means, right?

DG: Yes.

VR: Anywhere in that window. [clears throat] Nice. It's really good. Then they have adolescents 7 through 18 years of age, too. For both, flu. Starting at six months, flu every year for the rest of your life.

DG Yes. I want to point that out. My daughter's a pediatric ICU nurse. She had this really unfortunate episode recently where it was a family of Irish twins. I don't know if people know what Irish twins are, but it's an 11-month-old and a 1-month-old. When you have two kids within the same year, we call them Irish twins.

[laughter]

DG: The 11-month-old had such severe COVID that they ended up in the hospital on this BiPAP pressure support to basically help the baby breathe because oxygen just wasn't enough. Here's the baby, 11-month-old baby in the ICU. This is all from COVID, struggling to breathe. The parents ask, "Were we supposed to get our baby vaccinated? The pediatrician never mentioned that." It's just disheartening. At least have the conversation. I know the anti-vaxxers have gotten so rabid, a lot of providers are scared to even bring this up.

You certainly don't want to be in that situation like my daughter was, having the conversation already after the first baby's in the ICU. Then they're saying, "Oh my gosh, we have a one-month at home. What's going to happen to that baby?" That baby is below the six months.

VR: The doctor should never be afraid. They're in control of all interactions in society. The doctors are always in control. They have the upper hand and they can say, "Let's talk about this vaccine." There's just no reason for them not to do that.

DG: Here, really nice laid out. Starting at six months, every year you're getting that COVID shot, you're getting that flu shot. As we'll continue to talk about significant reductions, particularly in the kids, this high-risk group of ending up in the hospital struggling to breathe. We should reduce the number of those little kids that end up in the pediatric ICU being taken care of by my daughter.

VR: I noticed they have two HPV doses recommended, three if you give them after age 15. This is interesting, between 9 and 12 years old, two doses. Very interesting. Good. I'm glad to hear that.

DG: We talked about the fact that growing evidence that maybe one is enough, but we'll see how that pans out. All right. There's even a more complicated for clinicians, catch-up vaccination, certain medical indication vaccinations, a lot of detail, but really good evidence-based. I cannot let this go without a mention, “Herpes Zoster Vaccination and Incident Dementia in Canada: An Analysis of Natural Experiments,” published in *The Lancet Neurology*.

Now, this study design should ring some bells for you, Vincent, and our listeners. They included people born in Canada between January 1, 1930, and December 31, 1960, who are registered with one of the 1,434 primary care providers in the Canadian Primary Care Sentinel Surveillance Network. They compared patients born immediately before versus immediately after that magic day, January 1, 1946. This is that same threshold for getting the vaccine. If you're a little too old, sorry, you missed the boat.

I will mention as an aside, in the UK, they've actually started vaccinating older folks based on some of this data. Saying, "OK, maybe we shouldn't just leave you out in the cold." That's a Thinking of Canada thing there. Now, they extracted data on 464,637 patients who were registered with a primary care provider. Ultimately, 232,124 patients born in Ontario

included in the analysis. It's about a 50%/50% split. 54% female, 45.8% male. It's going to matter.

Patients born immediately before versus immediately after the two eligibility thresholds for herpes zoster vaccination didn't differ in their health characteristics. They were pretty much well matched. It was really just the issue is your probability of receiving herpes zoster vaccination because of the eligibility. Now, being born immediately before versus immediately after the eligibility date decreased the probability of receiving a new dementia diagnosis over a 5.5-year follow-up period. I want to talk a little bit about the data. It's really the women again. There's a trend towards a non-statistical trend in the men, but it's really the women that are benefiting from the vaccine.

VR: I guess in women, zoster has more of an impact on inducing dementias, right?

DG: Yes.

VR: That's what it is, essentially.

DG: Yes. This has been pretty consistent from all the studies we've talked about?

VR: All the studies are consistent, yes.

DG: All right. Just a little bit of a worrisome update. Bird flu now in Europe from the European CDC, detection of avian flu antibodies in Dutch dairy cow. H5N1 widely circulating, repeatedly detecting in mammals. The Dutch public health authorities report that antibodies indicating past exposure have been identified in milk from a dairy cow in the Netherlands.

VR: That's interesting. It has not been seen outside of U.S. cows so far, right?

DG: I think this might be one of the first detection in Europe.

VR: It's just antibodies. They don't have virus yet, but we'll see.

DG: Yes. It's a worry that it's in the dairy cow or the dairy cow was exposed. Just serological testing. All right. Measles. I feel like at some point we should do one of those shorts where we talk about how to diagnose measles because I was talking to one of my infectious disease colleagues today about the fact that everyone needs to start getting up to speed on how to recognize measles. We talked a little bit about this, the three Cs. Three days of cough, coryza, conjunctivitis. Cough, we all know what that is. Coryza is just this really inflamed nasal mucosa, and then conjunctivitis.

These are kids who have a non-specific viral illness, except during the first days that the fevers can be really high, 104 degrees, 105 degrees. Really high fevers. They really are a little more miserable than most viral infections. It's during the first three days that if you look in the mouth, do a proper physical exam, you can see these Koplik spots. Doctors lie because they'll always see the measles rash, and then they tell me they see the Koplik spots. The Koplik spots are gone by the time the rash appears. Let's all be honest. We've got to start looking in the mouths of these little kids, looking for those.

Really is you look inside the cheek, and you see basically areas it's red, and you see what looks like little pieces of rice on the sides. Kid's super miserable. Red eyes, red nose, and you

see the Koplik spots. It gives you a little warning because they're already contagious. Then after those three days, that's when you see the fever. That's when you see the rash. Ten to 14 days of a prodrome after exposure so the kids can show up at those internment camps, those family detention centers where there are tens of thousands of people currently locked away.

They're miserable. They're sick. They've got a virus. They don't have a rash yet. You really got to look in the mouth so you can pick this up early before they get that rash and have already spread it to others. Then they get the rash that goes on for maybe four days. Then, unfortunately, about 20% of these kids get so sick, particularly struggling to breathe that they end up in the hospital. Then some of them, it's about one in a 1,000, will actually have the virus go into the brain. You'll get encephalitis. There's even a late stage. Six to eight years later, everything seemed fine, but now about the same rate actually in this age group. They get that subacute sclerosing panencephalitis, SSPE.

I was surprised by this. I think a lot of docs, just because this was a historical thing - the immune amnesia. A lot of docs had not heard about the immune amnesia and that really horrific. Here's these kids. Most of the kids, as we're going to see, we're going to talk about the South Carolina measles outbreak, are in this 5 to 11 years of age. They're already earned their immunity by seeing a bunch of things. They end up with this immune amnesia where you get this 80% reduction in your B-cell repertoire. Really, now you've got to try to build up all that immunity again.

All right. What is going on? South Carolina, we are in the midst of a major measles outbreak. This is really blown by the numbers we saw in Texas. Total cases, 876. It's really just rising exponentially. These are confirmed cases. There's even more.

VR: What's really good is that 800 of those are in unvaccinated individuals. That's it. This could be stopped. No question.

DG: Yes. This is a result of not vaccinating the kids.

VR: RFK Jr. is directly responsible for this because he's not having vaccination go forward. Somehow, he should be liable for this because it's the right thing to do. Someone told me last night on the livestream that if a physician doesn't immunize someone and they die of an infectious disease, as a consequence, they are liable.

DG: I think if you don't have the conversation, it's very difficult. He doesn't have a medical license, so he can't be held liable. It's really odd. Here you have this guy giving basically medical advice. He's using this platform to give medical. Practicing medicine without a license is ultimately what he's doing on a grand scale. All right. Approaching 1,000 there. You can see there's - if you go to the Johns Hopkins tracker, you can see - They're always a little bit behind, but you can see they've really got this big thing going on there in South Carolina. We've also got cases in a number of other areas. Got some stuff going on in New Mexico, in Utah, Idaho, various spots throughout the country.

Now, the CDC is a little bit out of sync. I think, like everyone else, I'm losing trust in them at a rapid speed. Here we see 876 cases confirmed by South Carolina. CDC says only 588 in the entire country. That doesn't really quite -

VR: Look at this map. The vast majority are locally acquired. That means the virus is

circulating in the U.S. There's just one here imported. If you're going to say all the immigrants are bringing it in, no, you're wrong. They're not. It's circulating in the U.S. because people are not getting vaccinated.

DG: Yes. That was what the guy at the CDC, he's like, "Oh, yes, this is just the cost of doing business. You've got people coming in from other -" No, no. Elimination status is about this. It's about local spread of measles. Measles is spreading in the U.S. It's spreading in Mexico. It's spreading in Canada. Basically, the Americas are no longer measles-free. We have measles here. All right. Flu, maybe things are getting a little bit better here. We're still at high levels. Look at that map. It's still bright red, dark red in a lot of areas, but a few places are moving down into just moderate to low-high.

If you look at the epidemic trend, it's likely declining in the Northeast, but it's still growing down in Florida, down in the South, up in the West. What I worry about is we often see this second peak. What happens is it starts to go down, and if it does not get below a certain threshold, it can rebound back up. About 50% of the time, we talked about this last time, we're already starting to see a little bit of a rebound. We got that big holiday. I'm sure during halftime, instead of watching Bad Bunny, people are going to be listening to our clinical update as they breathe in this air full of flu virus. It's the one the analytic -

VR: Is it really worth a football game to get sick?

DG: I don't know. You could watch it. Or like me, you could somehow sign up for the shift to work that day. [laughs] We'll see what happens, but I'm a little worried. We're still a little too high. It looks like we're starting to see a little bit of an uptick. We'll know in the next little bit. Unfortunately, as I point out, the data is always a little bit behind. It always takes a little bit of time for us to get the data from the CDC. Yes, over 50 children have already died this season from the flu, so not good.

Remember, you can treat this even in kids. I think it's an under-recognition. You use Tamiflu all the way down to six months of age. We've definitely talked about the Xofluza, which is the xofluza.com. You can get your $50 pill from that site. All right, RSV, still pretty high and actually growing in a lot of the country. This is throwing me. We're supposed to be on the way out of this.

VR: Now New York State is not reporting.

DG: I was a little surprised by that. We don't get any data from -

VR: That's not good. We have a good Department of Health in this state. What's happening?

DG: I don't know why. Apparently, the data did not end up there at the CDC. We're like Wyoming.

VR: Yes, another one, which is, I don't know anything about their health department.

DG: Most of the country, it's actually growing.

VR: Yes, or not changing, which means it's high. There are just a few states where it's declining.

DG: All right. COVID.

VR: Look what we have here. At least in the Midwest, it's going up again. A little uptick.

DG: Yes, the Midwest has a little bit of an uptick. The South has a little bit of an uptick.

VR: Oh, but also the South, yes. What's that other one? Northeast is the dark blue now.

DG: We're like the only ones. The Northeast is really-

VR: Going down.

DG: And the national, we're pulling. Other than the Northeast, every other regional is starting to see that little second uptick. We'll see where things - Then if you follow the epidemic trend, you can see California likely growing all through the South. Most of the country, it's just holding at where it is, but we'll see over the next bit. What can you do about this? This circles us right back to vaccinations. I think a lot of people - I had a conversation with a gentleman in the hospital. He's in the hospital because he got COVID. Apparently, he's sick enough that he's in the hospital.

I'm asking him - I bring up vaccines, and I say, "So flu shots, COVID shots, you tend to get those?" He's like, "Oh, no, I don't." I said, "Well, what happened?" He goes, "Well, I got the flu shot this morning. I had a bad reaction." I'm like, "Well, what happened?" He goes, "I didn't feel good the next day." "You do realize you're in the hospital [chuckles] with COVID. Just weigh those two." [laughs]

VR: He didn't feel good. What an idiot.

DG: Do these flu shots work? Do these COVID shots work? Do these vaccinations work? We continue to encourage people to get yearly flu and yearly COVID shots. Why? Because data like this, "Estimated Effectiveness of 2024/2025 COVID-19 Vaccination against Severe COVID-19," published in *JAMA Network Open.* Results of a multicenter, test negative, case control study conducted by the Investigating Respiratory Viruses in the Acutely Ill Network. They included adult patients 18 years and older hospitalized between September 1, 2024 to April 30t 2025 at 26 hospitals in 20 U.S. states. Pretty robust here. Case patients presented with COVID-19-like illness.

Remember we used to say influenza-like illness? Now we say COVID-like illness and a positive SARS-CoV-2 nucleic acid or antigen test result. Controlled patients had the negative test, but similar presentations like other things going on. What were the outcomes we're going to look at? They've got a total of 8,493 patients, and about half of them are female. They're going to actually do whole-genome sequencing. We're going to see that the KP.3.1.1, we've got - let's see, 36.7% with the KP.3, 23% with the XEC, 14% with the LP.8.1. Vaccine effectiveness against COVID-19-associated hospitalization, 40%. Forty percent reduction in ending up in the hospital.

Protection was sustained through 90 to 179 days after vaccination. We talked about the fact that it really is a yearly thing. It does wear off. Now, vaccination effectiveness was higher against the most severe outcomes. Ending up on a ventilator or dying, 79% effective. It was about 49% effective for the KP.3, 34% for XEC, and 24% for LP.8.1. I think that was interesting, breaking it down by the different variants.

VR: This is good. I always want to see this. You can see the effect of the variant on

protection. It's good.

DG: It's actually interesting. I think that that's helpful as we're trying to understand the chasing the variant game that we've got ourselves into.

VR: Daniel, if you see a patient with respiratory symptoms without testing, can you tell if it's flu or COVID?

DG: You can't. You really can't. That's the take-home message. The only way you know is by doing a test. I think people say, "I knew it wasn't." I'm like, "How did you know it wasn't COVID?" "Well, all I had was this," or, "All I had was that." Scratchy throat could be COVID. All right. I want to wrap us off with late phase Long COVID. We've got a few things here to talk about. Let's start off with the first one. "Long COVID Associated with SARS-CoV-2 Reinfection among Children and Adolescents in the Omicron Era (RECOVER-EHR): A Retrospective Cohort Study" published in *The Lancet Infectious Diseases.*

Retrospective cohort study used data from 40 children's hospitals and health institutions in the USA participating in the Researching COVID to Enhance Recovery, the RECOVER Initiative. They included patients younger than 21 years at the time of cohort entry with documented SARS-CoV-2 infection after January 1st, 2022, who had at least one healthcare visit within 24 months to seven days before the first infection. The second SARS-CoV-2 infection was confirmed by positive PCR, antigen tests, or a diagnosis of COVID-19 that occurred at least 60 days after the first infection. The primary endpoint was clinician-documented diagnosis of PASC.

Basically, to wrap this up, I'm going to go through the numbers here, but I'm going to say we're seeing post-acute sequelae with the first infection, and we're seeing basically double the risk if you get two infections. Basically, each time you get it, it's the same roll of the dice. 407,300 eligible children and adolescents with a first infection episode, and then you have 58,417 with a second infection. In this database, the incident rate of PASC per million people per six months was 903. It's actually pretty high.

VR: Why aren't kids eligible for COVID vaccines? Why does RFK think they don't need it? Clearly, they do.

DG: I think the challenge is disconnecting. You go up to our recommendation. If you look at the AAP recommendation as opposed to who knows what's going on in the CDC, we do know what's going on, the recommendation based on the science is that you start vaccinating the kids at 6 months and you do it every year. For the youngest kids, there still is the FDA-approved Moderna vaccine, and that starts at 6months. The Pfizer's vaccine, that's approved for ages 5 through 64. Novavax, 12 years and older. If you've got an adolescent, you're just worried about the mRNA technology for whatever misinformation they've sold you, you could do that. It's a protein-based vaccine. It's traditional. It's just fine.

Here we're seeing, and then they get the second episode, you end up with another crop of kids. A nice comment article, "Long COVID is Here to Stay, Even in Children," where it reviews this above study. We read, "These findings reinforce an urgent message that children and adolescents can develop long COVID not only after an initial infection, but also after reinfection."

Now this one, I was a little disappointed. This was the article, "Early Administration of

Neutralizing Monoclonal Antibodies and Post-acute Sequelae of COVID-19," published in the *International Journal of Infectious Diseases.*

Using national COVID-19 registries and healthcare claims data, this group conducted a retrospective cohort study, including all Singaporeans who were unvaccinated, partially vaccinated, or immunocompromised at the time of SARS-CoV-2 infection between July 2021 and December 2022. Individuals were stratified by receipt of monoclonal antibodies of 19,689 eligible hospitalized patients, 6.9% received early monoclonal antibody therapy. Think about those numbers there, about 20,000. We're dealing with about 1,400 of those folks getting monoclonals.

They say, "Monoclonal antibody had no statistically significant impact on overall post-acute sequelae. The adjusted hazard ratio was trending in the wrong direction, 1.26, but a confidence interval of 0.98 to 1.63. "They saw an increased risk of autoimmune disease, adjusted hazard ratio of 2.2. It was particularly lupus and rheumatoid arthritis, and also an elevated risk of DVT. They speculate what's going on.

We published a study on this as well, which they do reference, so I appreciate that, where we were hoping monoclonal antibodies not only keeping people out of the hospital, not only saving an incredible number of lives by reducing the risk of death by over 80%, but these people lived and what happened down the road? We did not see in our study that there was a reduction in PASC, post-acute sequelae of COVID, consistent with this, but what's going on with these other things? Now, we didn't look specifically at these, but when they did and they saw these things, they said, "Causal inferences cannot be drawn from this observational study." I feel like they listened to *TWiV*, right?

VR: Yes.

DG: "Several biologically plausible mechanisms may explain the observed association. Neutralizing monoclonal antibodies, persist in circulation for weeks to months, prolonged antibody exposure may facilitate immune complex formation, FC receptor-mediated immune activation, complement activation." Now, one of the things, and they go on and talk a bit about this, one of the things they talk about is maybe it has something to do with these extended half-lives of the monoclonals.

If you look closely at the data, I spent a lot of time digging through this article, this is not necessarily a class effect. The elevated risk was observed in the sotrovimab subgroup, which has a really long half-life. They didn't see it in the casirivimab/imdevimab or tixagevimab/cilgavimab.

VR: That's interesting. That's very interesting.

DG: It may have to do with this really long period of time of having these monoclonal antibodies in the system.

VR: Are we now going to back off these long-lasting monoclonals as a consequence of this, you think?

DG: Well, it's interesting because there are these camps where people are like, "I don't want a vaccine," and then if I get sick, "I don't want Paxlovid, I don't want that drug, I want the monoclonals," because somebody got the monoclonals and championed them. It's

interesting because you would look at this data and say, "Get the Paxlovid. Get the vaccine, get the antivirals." Monoclonals are not really - because they may keep you alive, but then you may end up with lupus or rheumatoid arthritis or a clot or something.

VR: Even an immunocompromised person, they're not going to be able to get vaccinated, right? They should take Paxlovid.

DG: They can get vaccinated. They may not have as robust a response, but we still recommend. You do have to juggle some of the drug-drug interactions, but you can do remdesivir, you can do Paxlovid, you can do antivirals. This does, as we're seeing, presents a downside to the idea that we'll just use monoclonals.

VR: I remember studies in solid organ transplant recipients. They give three doses of vaccine, then they finally got some kind of an immune response, so maybe they need more.

DG: Yes, so they may require more doses. All right. I'm going to wrap us up with metformin. Interesting. Interesting, we'll spend a little time on this to make sure we clarify it. “New Review Highlights Growing Evidence that Diabetes Drug Metformin Can Prevent Long COVID.” Seems interesting, so I read, "Multiple randomized clinical trials and analysis of electronic health records suggest that metformin, a widely available diabetes drug, may reduce the risk of developing Long COVID when taken during or shortly after acute COVID-19, according to a literature review published in *CID*."

This review is written by Carolyn Bramante and David Boulware out at University of Minnesota. They were commissioned to comment on a recent population-based cohort study. I'm going to talk about that study first, then pull it all together. The article they're asked to comment on, is this article, "Effect of Metformin on the Risk of Post-coronavirus Disease 2019 Condition Among Individuals With Overweight or Obese: A Population-based Retrospective Cohort Study." This was published in *CID* in September. We did discuss this. It's a retrospective cohort study. They used this sequential target trial emulation framework. Adults had to be overweight or have obesity.

Basically, what they did, I think this is really important, you're going to end up getting metformin. The dosing is a little bit tricky. The reason it's tricky is that when we initially were trying to do the COVID-OUT trial, that was UnitedHealth Group-supported study, you couldn't just put them on metformin. They're sick. They've got COVID. They don't feel well. They're nauseated. You have to do a really slow introduction. You start off on day one.

I think if people are going to consider this, keep in mind what the doses are. 500 milligrams of the immediate release on day one, 500 milligrams twice a day for four days, starting on the second day. Then you go to 500 milligrams in the morning, 1,000 milligrams in the evening. You do that for nine days. You dispense 36 tablets. It's pretty complex. You could build this into your EHR if you want to. [clears throat] When they did this in this trial looking at overweight and obese individuals, there was a reduction in the one-year risk for post-COVID conditions and the intention to treat analysis.

VR: Yes, it's not huge, but it's there.

DG: Yes, it's minus 12.58%.

VR: Were these people getting metformin for diabetes or obesity, or they were just given as

part of this trial?

DG: That's always been an exclusion. These people have to not be getting metformin. They have to not have gotten metformin in the prior year. That was one of the exclusions. This builds on it. I think it's probably worth looking at the article, "Preventing Long COVID with Metformin," that this was published in *CID.* They have a really nice chart where they break down what are the different trials.

The COVID-OUT randomized control trial did not have low-risk adults. You had to have either standard or high-risk adults. There was this EHR analysis. Actually, I will also point out there was ACTIV-6 RCT. The ACTIV-6 RCT is when they said, "Let's also include the lower-risk, non-obese individuals." That was the one where it really didn't quite reach statistical significance at huge confidence intervals. Maybe there was a reduction. The COVID-OUT RCT, you did see a statistically significant reduction. Basically, putting all this together, the metformin may have a reduction, may be associated with a reduction in progressing on to Long COVID.

The data is more compelling in people who are overweight, higher risk. You do have to follow this dosing, because otherwise people are vomiting it up, people are not doing well. The other, which the authors really, I think, make an honest point about, is none of the trials have looked at treating Long COVID with metformin. We really haven't seen much success. This is really a particular way of trying to prevent Long COVID by treating acutely.

VR: Isn't metformin used to treat obese people for diabetes?

DG: It is. It is.

VR: Maybe that's the effect we're seeing, because diabetes and obesity are complications for COVID, right? Long COVID even as well.

DG: Yes. They do reference a study where there was a 93% reduction in - they say viral load, but what we really mean is the RNA copy numbers with this acute treatment. They're suggesting that maybe there's an anti-viral and anti-inflammatory. We don't know. We don't really know.

VR: Well, because obesity is an inflammatory disease. On top of COVID, maybe that's why you get Long COVID, and this is somehow dampening that. I don't know what the mechanism is. Do you?

DG: No, it's a good, yes. I just want to share that. All right. No one is safe until everyone is safe. Vincent, we finished the *MicrobeTV* fundraiser, and it was successful.

VR: Very good. Glad to hear it. Thanks, everyone, for your support.

DG: Thank you, everyone.

VR It's wonderful. Look forward to making more science for you.

DG: All right. What are we moving on to? Floating Doctors, February through April. Now, February through April, we're going to be doing Floating Doctors. Go to parasiteswithoutborders.com. We will match your donations. If you're as generous as folks were, we'll get up to that maximum donation of $20,000 for Floating Doctors.

VR: It's time for your questions for Daniel. You can send yours to daniel@microbe.tv. Mary writes, "I am writing to request a science-based approach to measles exposure in a clinic. I am a pediatrician working in a busy multidisciplinary neighborhood health center. We had a patient in clinic later diagnosed with measles. About one week later, a staff member vaccinated developed a mild case confirmed by the health department. Our administration is requesting all staff have an IgG titer drawn. Anyone with a low titer is sent home for three weeks.

Is titer indicative of actual immunity? People sent home are not quarantined. What is the science-based approach to dealing with an outbreak? What would you at your clinic?"

DG: That's clever, curious, the idea of doing titers on people and then trying to use that to separate. What's the science? What do we know? If an individual gets their vaccines, they still could get, as you saw, measles, but one is they're very unlikely to spread it onward. You've reduced that by 400-fold by getting vaccinated. We introduced that second dose to reduce the risk even more. Really, it's the getting one or two doses of vaccine. One thing is, working in a pediatrician's office, probably want to make sure everyone's had their two doses.

Now, it is interesting, in healthcare, particularly when you go to certain hospitals, they will draw your titers. If it's below a certain threshold, you will be revaccinated. I don't know how solid the science is, the correlation between whatever that titer threshold is and whatever outcome they're really looking at. Because we're talking about the fact that if you're vaccinated, you're not likely to get a severe case. You're not going to get that immune amnesia. You're not going to end up in the hospital. Really, the reason we added that second dose is to just reduce the onward transmission more. It wasn't that people were getting sick with just one shot of the MMR.

Unfortunately, the science-based approach to dealing with these outbreaks, one of the things I talked about, we're going to be seeing more and more measles. Kids are going to be coming into these clinics. You got to start doing that oral exam because you want to pick it up before they have that rash. It is tough, busy, multidisciplinary health clinic. It's tough because you got so many different things pulling for your time. Then when there's a situation like this, the big thing is just to make sure people are vaccinated. There is that. We talked about 10-to-14-day incubation period.

If you've got an unvaccinated staff member who's been exposed, one bad idea to be in such an environment without the protection of vaccine. I'm not sure I would really divide things out based upon serum levels.

VR: I would vaccinate them. Why not?

DG: Everyone needs to be vaccinated. If you're going to work, two doses would make a lot of sense.

VR: If there's a case, just vaccinate everybody. With COVID, some people quit. OK, if they're going to quit, let them quit. This is a healthcare situation. You can't be fooling around.

DG: I think that's the challenge here because if you decide, "Oh, my freedom, I want to be unvaccinated," that's not fair to the little kids.

VR: No. No, there's no freedom with this. You've got to be vaccinated. It's all baloney, this medical freedom crap. You stop at a red light, do you go through a stop sign? Do you not buckle your seatbelt? Do you not smoke inside? Give me a break.

DG: Do you come to work drunk? [laughs]

VR: Margaret writes, "Thank you for all you do and for keeping the light on in the darkening night. What organization has the best chance of providing medical care for Liam Conejo Ramos and other children in detention? Who should I call and email besides my elected officials?"

DG: This is tough. Liam's that little kid with the cool hat who we talked about a little bit earlier. I think everyone - I'll leave in our notes, I think, a link up above to how to reach out to your local representatives. This is a disaster, what's going on. I think we really need to stop doing this. We can't be having these little kids – U.S. citizens being taken to these basically internment camps. The last time we interned this number of people was the Japanese internment camps. This is really horrible. In our show notes, we'll leave a link and reach out to your local representatives. Let them know this is unacceptable before more -

VR: Is there anybody else that they could reach out to? You're not allowed in these facilities. That's the problem, right?

DG: Yes. If there's anyone you can really reach out to, because these places are basically, they're dark. Even members of Congress can't even see what's going on. Really limited access to medical care. We really need to change. I have this www.house.gov/representatives/find-your-representative. Go there, reach out. This is the United States of America. This is not what should be going on. This is horrible. It would be great. Oh, reach out to this organization, the providers. No, they're not even letting the healthcare people into these places.

VR: The disdain of this administration for public health is showing now, and it's causing problems. This is not acceptable.

DG: It's just the beginning of the tip of this iceberg.

VR Judith writes, "I recently traveled abroad and having learned from your podcast that Xofluza could be taken to prevent flu exposure, I asked my doctor for a prescription, which he readily provided. I'm vaccinated, but I also was last year when I contracted flu in London. I was very worried about it happening again. The good news is that using my Medicare drug insurance, I only paid $25 for it at my neighborhood, Upper West Side, New York City pharmacy. Also good news, I took the single pill dose two days after traveling and didn't get sick. I wore a quality mask in the airport, on the plane, and around people. Thank you for the important service you provide with your podcast."

DG: My pleasure.

VR: L writes, "A few years ago when I was in my 40s, I acquired HPV for the first time and was having trouble clearing it. After more than 18 months of monitoring, including a colposcopy, my immune system still wasn't clearing it. My GYN couldn't prescribe Gardasil because I was too old, only approved up to age 25 back then. Having prescribing privileges, I prescribed the vaccine series for myself, paid out of pocket, and gave it to myself according

to the schedule. I got rid of HPV right away, and I've never had it again. Yes, in my case, it was curative. Thank you for all your work for medical science."

DG: Yes. There was a deep dive on *TWiV* discussing this, the fact that getting HPV vaccine after infection can still be curative. Amazing.

VR: We need to get this approved for all ages, but then they won't be -

DG: Or just start using it off-label like this, which is fine.

VR: Laura writes, "We hope 2026 is off to a good start for you. I continue to benefit greatly from your clinical updates and appreciate every week's information. Thought you might be interested to know that San Francisco currently has an outbreak of tuberculosis associated with a private high school in the city. This high school has a boarding school component for international students. The school has three active cases of TB identified since November 2025 and 50 cases of latent TB. The entire school is under remote learning this week. Beginning on February 9, hybrid learning will commence and all students must complete TB testing to be allowed back on campus later the month.

At our hospital, we admitted one of the students who is immunocompromised and has active TB with liver involvement. This is not the index patient. My question is, once a patient with active TB undergoes treatment, when is it safe for them to leave isolation? Thanks again for your valuable updates. All the best from Laura and Kip, two PharmDs from San Francisco."

DG: All right. This is an interesting issue. Tuberculosis, how do you get tuberculosis? It's by breathing in. Someone has tuberculosis, they're coughing, singing, doing whatever they're doing. They're creating these droplet nuclei which are then in the air and we can breathe them in. Measles and tuberculosis suffered from this issue is when we moved away from the bad air, miasma to germ theory, it was nothing can spread through the air. There's no such thing as bad air. Well, if you walk into a room where someone's been coughing up a lung and it's full of TB, that is bad air, but it's not miasma bad air. It's bad air full of pathogens.

Now, the interesting thing is children under the age of 12 seem unable to produce those droplet nuclei and spread it to others. The contagion is occurring from adults. That's one issue. Age is an issue. A lot of times when we want to diagnose it in kids, you really can't get it from a sputum. We'll actually put a tube down and we'll do a first AM gastric lavage to do it. Now, the general rule, someone's been diagnosed with tuberculosis, we want them on treatment for a minimum of two weeks and then we want them to be smear negative. You cough up and you don't see any tuberculosis, any red snappers under the microscope.

VR: Red snappers on your tie. There you go. Once a kid is treated, they're not going to transmit, right?

DG: Usually, they're not transmitting anyway. It's usually from an adult. It's usually some adult. The adults - each county has their own rules. Let's say I'm taking care of a patient. It doesn't matter where the hospital is. It matters where the patient will return to. If it's Nassau or Suffolk or New York City, we'll reach out to Department of Health. They have specific rules. That's basically the sciences. Two weeks of being on effective therapy and then smear negative.

VR: Got it. That's *TWiV* weekly clinical update with Dr. Daniel Griffin. Thank you, Daniel.

DG: Thank you, and everyone be safe.

[music]

[00:57:21] [END OF AUDIO]