TWiV 1348 Clinical Update

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Guest: Daniel Griffin

Aired 14 August 2026

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

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VR: From *MicrobeTV*, this is *TWiV*, *This Week in Virology,* Episode 1,348, recorded on August 13, 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: Red bow tie. I should know this by now, but -

DG: No, this is one I probably don't wear that much because these are inflamed hepatocytes, so it's a generic hepatitis bow tie.

VR: Wow.

DG: Could be toxic metabolic, could be viral.

VR: Like alcoholic hepatitis.

DG: Could be alcoholic hepatitis.

VR: All right. Good equal opportunity bow tie.

DG: Exactly. All right. We're going to jump in. I was just re-watching this movie, introducing it to my son. I don't know if you're familiar with the movie *Cool Hand Luke*, Vincent?

VR: Oh, yes.

DG: There's a couple of famous lines, but perhaps the most famous line is Paul Newman as *Cool Hand Luke*. Actually, his closing line: “What we have here is a failure to communicate.” That’s just -

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VR: That's what we have here in the U.S., right?

DG: Is a failure to communicate. I listened, and I was like, "He's talking about us. He's talking about what's going on."

VR: It's perfect.

DG: Great movie, actually. For some reason, that was super popular among my college friends back in college. I got to reach out to them and find out, "Why do we like that movie so much?" Perhaps we can speculate. Let's jump in on the news. The first thing is, I went ahead, I read this executive order and the delivering gold-standard childhood vaccine recommendations for Americans. This is executive orders. This executive order came out on August 10, 2026. I thought a few excerpts, then you and I can talk a little, and then there's actually some different takes on this. We'll talk a bit.

Actually, I'll leave in a link. People can go. It's not that long. These executive orders, not that long. I should probably go back and see what executive orders over time, whether they're always just these one-pager things. This is like the 14,000-something executive order that's come out in the U.S. These things, there's a lot of these out there. Just reading the executive order, I don't want people to think I'm agreeing with this as I read this. We'll read the excerpts, and then we'll discuss them.

First," the scientific assessment also found that instead of implementing vaccination mandates, most peer nations maintain high childhood vaccination rates through public trust and education. In the United States, by contrast, individual states set mandatory vaccination requirements that children must meet to attend school."

VR: Is that correct, Daniel?

DG: The interesting thing, if this was in a vacuum, I would be like, "Oh my gosh, you're talking about how we need to actually start spending more money on education." I think a perfect example would have been how certain countries approached the COVID vaccine. If anything, it was a privilege. There was a lot of education involved. You reached the same end, but people didn't feel like they were forced because, if you remember the early days, people were fighting to have whatever job they did considered essential so that they could be first in line for the vaccine.

An approach that some countries have definitely used during COVID was basically to spend money on education, spend money building public trust, and then when people are educated, and they actually understand, they're clamoring for the vaccine. I like the idea that - I know that this isn't where this is headed, but I would love if that was really the takeaway, was, hey, we as the U.S. are now going to devote a portion of our public health budget to education about the benefits of vaccination.

VR: I think we have to realize upfront, before we go any further, that everything said in this executive order is a lie. Everything.

DG: Yes. You just start off with the concept that this is a scientific assessment. This is not a scientific assessment, right?

VR: No, it is not. Totally.

DG: There was that great recent interview. What was great about the interview was at one point, one of these folks challenges the person interviewing them and says, "You wouldn't understand this because you're not a scientist." They respond back with, "You're not a scientist either."

VR: That was RFK Jr. on Dana Bash on CNN, right?

DG: Yes. I just thought that was a great response. "Oh, you wouldn't understand because you're not a scientist." It was like, "Neither are you."

VR: To call this gold standard is ridiculous. This is just nonsense because there is no gold standard science here, the current vaccine recommendations is based on gold standard science. We don't call it that because it's obsequious, but this is not gold standard science. It's just a label they give to it so that people who don't know any better can think it's right.

DG: I think that these are catchwords; these are these catch phrases where they're trying to basically challenge and say, this other stuff, it's all the pharmaceutical companies, and everyone's in cahoots trying to make money. Next one. They say based on -

VR: This whole idea of peer nations, nothing is like the U.S. with 50 very different states. You cannot depend on public trust and education. You have to have school vaccination mandates. Otherwise, it doesn't work.

DG: Next, it gets broken down into, “based on consultation with my advisors and review of available scientific evidence.” It's just one of those, and brings me back to the interview. Our president is reviewing the scientific evidence among all the other things that are going on. I can't imagine that that's really happening.

VR: There is no science basis for this executive order. None.

DG: It is not. Then they break things down. Now, this is - I think we'll spend a little time on that. At the very end of this breakdown, where, interesting enough, they actually talk about immunization recommended for all children. It seems to be like, OK, we're just going to-- A bunch of these ones seem to get a pass, it seems. Measles, mumps, rubella, diphtheria, tetanus, pertussis, polio, *Haemophilus influenzae* type B, pneumococcal disease, human papillomavirus, *varicella*. Basically, there actually seems to be like we've identified that these are essential, recommended for all children. Then they're going to mention some others in different contexts.

Then they say, and this is, I think, where it gets challenging: “The gold standard childhood vaccine recommendations also recognize that the combined measles, mumps, rubella, MMR vaccine should be administered in three separate single-disease shots once such products are domestically available, and that, to the maximum extent feasible, all childhood immunizations should be administered at separate medical visits.”

VR: This makes no sense. He's trying to cut down the number of shots. He's making more, and there's no scientific reason why you should break it up at all. No manufacturer is going to do this.

DG: I think this is a huge problem. It's really interesting, the timing, too. This has been - I just want to point out: don't feel like you're by yourself. Even though this particular lunatic fringe is very vocal, is most Americans want their children protected. Most Americans do not want to see thousands of cases of measles. Most Americans do not want to see hundreds of children ending up in the hospital with what, up until two years ago, was a vaccine-preventable illness: measles, I'm talking about.

This is the third time in less than a year, and we read about this in *The New York Times*, that President Trump has issued an executive order that basically is targeting vaccines and trying to undermine vaccines in the United States. There's a nice - Actually, I'll leave in a link to that *New York Times* article, but I'm also going to leave in a link to this news explainer article in the journal *Nature*. Trump wants MMR vaccine split up: the science behind why it's a bad idea. Numerous studies have shown that separating childhood jabs will delay protection and increase costs for families.

I wish this wasn't behind a paywall. Some of us subscribe to *Nature* or have the ability to access it, but let's go through. When he signed the executive order, Trump, ready for this, justified the change by stating that combined vaccines contain a dangerous amount of fluid. "A vaccination is the size of a bottle of soda," he said.

VR: This is just so irresponsible, Daniel.

DG: You've gone, right? You've seen vaccines. You've gotten a vaccine. Was there like a bottle of soda injected into you?

VR: No. This is no reality. This guy thinks that he's on a reality show and can lie. This is ridiculous. This is serious business we're talking about. There's no bottle of soda.

DG: I'm just shocked that -

VR: Most vaccines are about a half a mill, right?

DG: It's a tiny amount, yes. That's about it. It's about a half a milliliter. It's a tiny - We've seen these, I think, with our own eyes. We are not injecting children with bottles of soda worth of fluid. The other - and this seems they can't get away from this - is when signing the order, Trump falsely suggested, again, a link between vaccines and autism. We have repeatedly basically pointed out that that's not true. The people that say it's true are in it for the ability to make money. The original claims came out of a guy who was basically committing fraud to try to make himself money off a suit. There's nothing.

Repeatedly, we've even talked about the fact that people say, "Oh, maybe I'll just wait a little until my child's a little older because I just want to be on the safe side." The safe side is not to wait, not to leave children exposed and vulnerable. Not only your children, but we live in a community now where if you're going to have that baby under the age of 1, how safe is it to go out in this world now that we're having these diseases come back? Next.

Are individual jabs available for kids in the United States? The order instructs the country's top health officials to adopt its recommendations, but it does not have any inherent legal power. Putting the recommendations into practice would require vaccine companies to manufacture jabs that target each illness individually, a process that could take years and cost hundreds of millions of dollars. I think you pointed this out, Vincent. Who's going to do this in this anti-vaccine climate? They're saying, "We would like you to invest hundreds of millions of dollars to produce these individual jabs." Then who knows what the environment's going to be like once you've gone through all the approval process.

VR: No, it's not happening. Merck, the manufacturer of MMR, said it would take 10 years and hundreds of millions of dollars, and they're not doing it.

DG: Just poorly spent. Now, the executive order aims to, I like this, “better align the United States with vaccine practices elsewhere.” This is a good one. There's a lot of, we say, the U.S. is not like somewhere else, but maybe they want us to be like Afghanistan. Most well-resourced nations use the MMR jab, but some developing countries where measles is endemic, such as Afghanistan, uses an individual measles vaccine.

Now, they like to bring up Japan, so let's talk about Japan. Now, Japan switched from an MMR vaccine to individual ones in 1993 because of a problem with the specific mumps strain used in the combination jab. I should have left the link into Stanley Plotkin's, got a nice little piece on mumps immunity. Anyway, overall vaccination rates plummeted, in part because of a lack of public trusted immunization. Several outbreaks of the three diseases followed. 2001, for instance, a measles outbreak affected about 265,000 children. The country switched to a measles-rubella vaccine in 2006, and in May approved its first MMR shot since 1993.

VR: This is it for peer nations, right? That's it?

DG: I think maybe there's some sub-Saharan country that might use a single individual, like when there's an outbreak, for instance. Using these individual shots is not something that peer nations are doing. I don't know. Thoughts before we move on?

VR: This is his third executive order on vaccine schedules. The last one was blocked by a judge because it's not legal. This is going to probably suffer the same fate. Multiple entities will sue, and a judge will block it because this is all nonsense based on nothing in reality.

DG: I think you got to ask yourself, and maybe our listeners and people they talk to can ask this question. This is this idea that this one man, that this federal government can have this incredible power to basically take away access to lifesaving preventive medication. The whole idea of this balance between states' rights and the federal government, the way it's set up is, the federal government gives us advice, it gives us guidance, it gives us expert opinion. Maybe some of those things might affect access to vaccines, as far as getting insurance companies and the rest to pay for them. Ultimately, the vaccination decisions are at the state level.

This is really quite an overreach for the executive branch of our government trying to take away these choices from us at the state level.

VR: Normally, what would happen is the ACIP of CDC would make vaccine recommendations, and then the states would decide whether to adopt them. Most of the time they did in the old days when the ACIP was respectable. Then the CDC director has to sign off on the ACIP recommendations. Now it will be very interesting to see if the new CDC director supports this or says, "This is wrong," and gets fired.

DG: That's a challenge. That's going to be the first test of the new CDC director, and there's a nice article.

VR: She was asked about this, and she said, "Oh, they would never ask to put our children at risk." They just have. Now what are you going to do about it?

DG: She said, "Oh, this would never happen. They would never ask me to do something that would undermine the health of people here in the U.S." Here it is. We'll see what happens,

because this may not even make it to that point. There's the whole idea that National Vaccine Advisory Committee is going to make some recommendations, but the question, will that even come to fruition? Will those recommendations be made? Will the new director be in this position? We'll leave in a link, actually, because there is this Department of Health and Human Services solicitation of nominations for membership on the National Vaccine Advisory Committee.

VR: Oh, are you going to apply, Daniel?

DG: I was thinking about it. [laughs] No, thank you.

VR: I'll nominate you if you'd like.

DG: Feel free to nominate me. I would definitely think about it. It seems like this might not be the most pleasant experience just with what's been going on in the last -

VR: I think if you got on that committee, you wouldn't be able to do *TWIV* clinical update anymore.

DG: I'd probably have to stop, yes. Maybe *TWIV* clinical update is a better way to spend my days.

VR: I think so.

DG: We've got some other stuff going on. I do want to point out, there's a lot of stuff going on. We can't cover it all, but a couple of things that I will mention is the West Nile virus outbreak in Pee Dee. The South Carolina Department of Public Health has confirmed an outbreak of West Nile virus in the Pee Dee. What is the Pee Dee? Do you know what this is?

VR: I don't know.

DG: You'll have to Google that for me.

VR: It's a geographic region in northeastern South Carolina named after the historic Pee Dee indigenous tribe. Ten to 12 counties centered on the Great Pee Dee River watershed.

DG: Also, this is an interesting mystery, but mystery being solved. Newly discovered virus is sickening cattle in Western Europe. When farmers in Switzerland and southern Germany in June noticed that their cows were getting sluggish, suffering from diarrhea, and producing less milk than normal, many at first assumed it might be an effect of the scorching heat wave holding Europe in its grip. As more and more farms were affected, including some in eastern France, researchers started to look for another cause.

After standard tests ruled out some likely suspect, teams from the Friedrich-Loeffler-Institut in Germany and France's National Research Institute for Agriculture, Food, and Environment independently found the real culprit: a virus never seen in Europe before and likely transmitted by midges. The latest of several such viruses to arrive in Europe in the past five years. The virus belongs to a large group called orthobunyavirus, which cause many livestock diseases and a few human ones, including Oropouche fever.

It's most closely related to and shares more than 90% of its genome with the Shamonda virus, a pathogen spread by midges that was first isolated from cattle in Nigeria in 1965 and

has since been found across Africa as well as Japan.

VR: You remember Schmallenberg virus? It first arrived in Europe. It was spread by midges a number of years ago.

DG: Yes.

VR: Same thing, same idea.

DG: Those midges. Also, it's interesting how things get to Japan. There's a lot of - I won't call it trafficking, but it's trafficking. Cattle's being transported to different parts of the world. This is encouraging. This is an article in *The Lancet*. We have, "Safety, Tolerability, and Immunogenicity of SPVX02, a Room-temperature-stabilized Tetanus-Diphtheria Vaccine, Compared to Two Established Tetanus-Diphtheria Booster Vaccines: A Multicenter, Single-blind, Randomized, First-in-Human Phase 1 Trial in the UK."

Here's why do we care. Because the cold chain requirement has always been an issue with a lot of vaccines. It limits vaccine accessibility. It limits our ability to deploy the vaccines. This is a lyophilized. It's basically dry, desiccated. It's a powder. It's a fridge-free version of this tetanus-diphtheria vaccine, stable for up to two years, up to temperatures of 30C. It can get pretty darn hot. This is a multicenter First-in-Human Phase 1, single-blind, randomized clinical trial conducted at three sites in the UK. Really encouraging here. Their findings suggest that this is safe, well-tolerated, similar immunogenicity to the approved vaccines. Exciting that we might have these room-temperature vaccines.

VR: That'd be great.

DG: Fantastic. *Cyclospora cayetanensis*. There's a lot going on. Apparently, there's a lot of political intrigue going on about food safety and who may or may not be getting favors in exchange for contributions, but we won't talk about that. We'll talk about the disease and the current numbers as per the CDC. You'll see that these are lower than when we start adding the states, but the CDC has received reports of 13,895 lab-confirmed cases, at least 10,455 additional cases that they report require further investigation and analysis.

Michigan alone: total cases 12,485; 279 have ended up in the hospital. There've been a couple of deaths. Missouri, 1,577. New York City, 594. I like the New York City because you can see that we seem to be - It's August now, we should be getting to the end of the *Cyclospora* importation season, I guess. Also, some of the sources have been identified, and some of that stuff's been pulled off the shelves. Do you know 40% of all the lettuce consumed in the U.S. comes from Taylor Farms?

VR: No, I didn't know that.

DG: Apparently.

VR: Is it all made and grown in Mexico?

DG: That's really what you worry about: is the Taylor Farms de Mexico, where basically it gets contaminated and then it gets brought in. Speaking of stuff that we're importing from Mexico, I thought we were supposed to be importing less. Don't we have all these tariffs. Can't we tariff the parasites? This is a screwworm. We're up to a total of 45 cases. Really, it's down in that New Mexico, Southwest Texas area. There's a nice article published in *EIS,*

“Human Myiasis Resulting from Re-emergence of *Cochliomyia hominivorax* screwworm Mexico 2025-2026.”

We read: After its elimination from Mexico in 2003, 20 years ago, myiasis caused by New World screwworm has recently re-emerged as a public and animal health concern. So, these individuals conduct a retrospective study of human New World screwworm myiasis cases reported through Mexico's national surveillance system April 13, 2022, to March 14, 2026. Of 204 cases in official surveillance summaries, 202 had sufficient information for case-level clinical and epidemiological analysis.

Remember, this is humans. We're looking at humans. Human cases were concentrated in southern Mexico. Most, 72%, occurred in men. Mean patient age was 61. Lower limbs, 55%, were in the lower limbs. Now, 77%, about three-quarters of these folks had at least one concurrent medical condition, so comorbidity. Six deaths were reported among these folks, but only one death was directly attributed to myiasis. Just the horror of basically being eaten alive by these maggots.

VR: How would this cause death, Daniel?

DG: What ends up happening, let's say this person has diabetes or they have a neuropathy or something. Neuropathy is the classic. You've got a cut or scrape or an infection, and then the maggots get in there, and then they start eating the flesh. Basically, you've got this open flesh that then bacteria get into. You end up with sepsis. Some interesting details, we'll go into this. The New World screwworm is an obligate parasite during its larval stage. Adult female flies are attracted to blood, wounds, inflamed tissue, mucous membranes, natural body orifices, where they deposit the eggs, and these eggs are going to hatch within 12 to 24 hours.

Then the larvae are going to invade and immediately start feeding on living tissue for five to seven days before they drop to the soil to continue development. Now, because the New World screwworm flies usually mate only once, we can do this mass release of irradiated sterile flies to interrupt the reproduction. This sterile insect technique, combined with quarantine and treatment of infested animals, actually supported eradication of New World screwworm from North America southward all the way to the Darién Gap. After eradication, north of the Darién Gap, continued release was used to maintain this barrier.

Environmental conditions, including moderate to heavy rainfall, these pretty high temperatures, 35 C and above, could really favor the New World screwworm's development. You actually see this graph where the number of cases down there in Mexico is actually rising. Maybe if you're watching on YouTube, you'll actually see that it starts off with a trickle and then we're seeing really the number of cases rise.

VR: This is the same parasite that causes the cattle screwworm disease?

DG: Yes. The crazy thing here is over 200 human beings. It doesn't take much. You don't notice because you might not feel or - You can see it's all - It started in southern Mexico, but it's starting to move. As we're seeing, it has crossed the border.

VR: In the U.S., have we seen human cases [crosstalk]?

DG: So far, I don't think we've actually seen someone in the U.S. get it in the U.S. It's mostly

domestic or domesticated. Most of this is in dogs and goats and sheep and cattle. Ebola: 4,449 confirmed cases, over 2,000 confirmed deaths in the DRC. As we -

VR: That's a lot. 50%. Wow.

DG: It's a high mortality, right?

VR: Yes.

DG: We even talked about. Even if you survive, this is something where there's a post-Ebola sequela. A lot of these folks are not okay even if they survive. What are we doing? A couple of things. We read in *Science*, mismatched vaccine being rolled out against Ebola outbreak. Three separate studies have found that blood from people who received the vaccine contained antibodies that bind to the Bundibugyo virus. This is Ervebo. The Ervebo-vaccinated ferret survived infection with Bundibugyo, whereas control animals died within 10 days. Three out of four vaccinated monkeys also survived the Bundibugyo challenge versus only one of four control animals.

Basically, this group has decided to support a phase 3 trial of this Ervebo in the DRC. We're going to be seeing multiple vaccine trials. Emergence of Bundibugyo virus variant in 2026 outbreak in the Democratic Republic of the Congo and Uganda. They've done phylogenetic analysis, confirms cross-border transmission between the DRC and Uganda. I will point out Uganda, at this point, has done a really good job. Currently, Ebola-free and really doing a good job of protecting that border.

VR: I hope this vaccine works well because if it doesn't, then people are going to be reluctant to get any other vaccine in the future there, any other Ebola or Bundibugyo-specific vaccine.

DG: Fingers crossed. I do hope it helps.

VR: Ferrets are not humans, did you know?

DG: It's true. Now, pretty upset when I saw how much this number had risen. The number of measles cases. Over 100 measles cases were added to the count just in this last block, if we look at the Johns Hopkins measles tracker. 2,484 cases so far this year. I want to point out that's a number. What is that they say? Big numbers are statistics, but one person is a tragedy. I just want to give that number some context. 2,484 cases of measles. Now, 10% to 20% of those folks end up in the hospital, not for quarantine, but because they're so sick.

We've already had deaths from measles, which should not be happening in the United States. Think of this: hundreds of little kids ending up in the hospital struggling to breathe because of this undermining of confidence in vaccines. When you think about that, just try to think about this medical freedom that everyone is talking about. Think about the medical freedom that you're taking away from that little baby who's now in the hospital, and the medical freedom impact on the parents who now have a child in the hospital. Then even if the child survives and makes it out of the hospital, the risk of them dying is increased for the next several years. There's even the issue about problems down the road.

VR: This is astounding because at one point, not too long ago, there was no measles in the U.S. Now this is all because of failure to vaccinate and because people are not listening,

because the public health authorities are not telling them what to do.

DG: It's the opposite of not telling them what to do. One is they're misinforming them, like, "Oh, this is all coming in from other - This is a worldwide problem." That's not true. This is measles spreading here in the United States. Basically, if you say otherwise, you're lying. Apparently, there's a few folks who are happy to lie.

VR: I cannot believe that politicians are OK with this happening under RFK Jr. These are kids that are getting sick. I don't understand what they are thinking.

DG: When someone brings this up, "This is not OK, let's have a fun discussion," hundreds of little kids are ending up in the hospital struggling to breathe. We've had deaths. This is not OK. As I point out, there's a *New York Times* article: “Kennedy Stirred Vaccine Fears in Pennsylvania Years Before Measles Outbreak.” At a speech in Lancaster County, RFK mocked the threat of measles. Now local officials are racing to contain one of the largest outbreaks in the country. "The groups facing these outbreaks were almost all religious communities that just don't vaccinate," he told CNN's Dana Bash.

"It's hard to blame that on me," he added. What Mr. Kennedy failed to acknowledge is his own role and the role of Children's Health Defense, the anti-vaccine group he once led, in stirring distrust in these very communities. That includes Lancaster, which is now at the center of one of the largest measles outbreaks in the country. The state has reported dozens of hospitalizations, more than 230 cases. A number that some local doctors consider to be a vast underestimate, given that these communities often avoid traditional healthcare.

Five years ago, Mr. Kennedy stood behind a wooden lectern on a farm in the county and delivered a warning to the local Amish community about the nation's public health agencies. "Those agencies are going to do everything in their power to make the Amish vaccinated," he said, "because they cannot stand the fact that you are healthy." A large crowd, 1,500 people, according to a local paper's account, spilled out from under a white tent at the annual farming fair to hear from Mr. Kennedy, then the leader of Children's Health Defense. He turned to measles, a disease that was so horrible, he joked, that when he fell ill with it as a child, he had to stay home and watch TV the whole week.

The audience erupted with applause and laughter. "The cure for measles is chicken soup and vitamin A," he added. Every now and then, Kennedy would be dragged in front of the camera and begrudgingly make some offhand positive comment about the MMR vaccine. That's about the best you're going to get out of him.

VR: This one individual with no scientific background should not be leading this country's vaccine policy. Folks, use your vote.

DG: Yes, we really have to do something. This is a call to arms. We have children suffering. You know that when you mix politics and medicine, you end up with hospitalized and dead children. There are things that we can do. Science has made this a better world for many of us to take advantage of this, and for our children. We have a nice article, “Effectiveness of Oseltamivir in Hospitalized Children with Laboratory-Confirmed Influenza 2014 to 2023,” published in *JAMA Pediatric*s. I think sometimes Tamiflu, oseltamivir, gets a bad rap, like, oh, we wish we had something that was more effective, but this is pretty impressive, actually, when you look at the data here.

This cohort study used data that was obtained from the Influenza Hospitalization Surveillance Network, FluSurv-NET. It looks at influenza hospitalizations across all ages, 13 states. The primary outcome was time from symptom onset to ICU admission, and they also looked at length of stay. You've got 6,044 cases in the ICU analysis, 70% get Tamiflu or oseltamivir; 7,103 in the length-of-stay secondary analysis, 80.9% got oseltamivir. Now, in the ICU analysis, remember, these are little kids, the median age was 3, about half of them were male. 49% had one or more medical comorbidity, 51% did not, and if they did have a comorbidity, the most common one was asthma. It's about a quarter of the kids.

Half the kids with comorbidities, half without. Compared with untreated children, the folks that got the Tamiflu, the oseltamivir, 31% reduced risk of ending up in the ICU, and there was also a shortened length of stay for the folks that got the Tamiflu. They did a nice job. You can go through - They've got these nice forest plots where they look at different variables. They even analyzed getting it right away, what if you wait a little and still get it. It really looked like just getting it earlier, of course, is better. We've seen that many times. Really, a call to arms to make sure that these children don't miss the potential benefit of getting an antiviral.

VR: The protection of the hazard of ICU admission, was that across the children with and without comorbidities?

DG: Yes.

VR: That's good.

DG: Excellent. Keep getting more and more good data on the RSV vaccine and the monoclonals. The nice thing, too - I thought this was nice, and I haven't included a link to the article - but I just think it's pretty straightforward. If your kid doesn't get RSV, if they don't end up with this particular respiratory infection, there's such a tendency when you take them to a provider for them to get antibiotics, that we're starting to also see that we're reducing the exposure of these kids to all these antibiotics, which is just great in and of itself.

OK, COVID, Vincent.

VR: It's going up, Daniel.

DG: I'm starting to see things go up.

VR: Yes, that's it, we lost. Too bad.

DG: Starting to rise here at the beginning, and really - California is already up to moderate, Kentucky is already up to moderate. I don't know what's going on there in Alaska and the Virgin Islands, but it's at high already. We'll keep an eye on that. I'm a little concerned that this is the beginning.

VR: If this goes anything like last year, this will continue until the end of October.

DG: Yes, it's interesting. That was the pattern. It was late, right around beginning of August, end of July, you started to see it, and it really shot up. September, you had -

VR: Then right away in mid-November, it starts to go back up again, so you really don't get

much of a break.

DR: No.

VR: We've had a good break since April, really.

DG: It might be - Get that vaccine early when they come out here, because it looks like we're going to be right into it. This is interesting because I think that this article I'm going to talk about here in the COVID section is more broadly relevant than just COVID. This is an article that was published in the *Journal of Infectious Disease*, the article, "Impact of COVID-19 Monoclonal Antibody Therapy on Subsequent Vaccine-Elicited SARS-CoV-2 Immune Responses."

I'm going to have some questions, criticisms, and comments, but basically these researchers are asking this question: you go ahead and you get the monoclonal antibodies, and then later you get a vaccine. Is this going to impact the monoclonal antibodies? Will that impact your subsequent vaccine responses? They conduct this prospective phase 4 open-label study of adults who got either the Moderna or the Pfizer-BioNTech vaccine, and you've got this first cohort, which is folks who have acute COVID, and they either get the monoclonal antibodies. They're previously randomized to monoclonal antibodies, camostat, or placebo, this part of ACTIV-2. Then you have a second cohort, COHORT-2, and these are unvaccinated adults without reported prior COVID-19. They're analyzed, and they're going to measure the binding of the IgG, the neutralizing antibodies, spike-specific memory B cells, CD4-positive, CA-positive T cells, and they get a baseline and a few different time points. Forty-three participants were analyzed.

At day 140, the neutralizing antibody titers were lower among prior monoclonal antibody recipients and COVID-19-naive participants than among placebo, camostat recipients, and those with evidence of prior infection. The receptor-binding domain-specific, those RBD-specific but not spike-specific memory B cells, were reduced after prior monoclonal antibody therapy at days 56 and 140. Frequency of spike-specific CD4-positive and CD8-positive T-cells did not differ by prior monoclonal antibody exposure.

Interesting. It does look like prior anti-SARS-CoV-2 monoclonal antibody treatment limits the endogenous RBD-focused B-cell response to later mRNA vaccination, but doesn't really affect T-cell immunity. What I thought was interesting, what I wanted to know, is about timing, because we talk about, this is going to get you through that. This was, back as we saw in the early days, 80% reduction in ending up in the hospital or dying, but then later on, you're going to get vaccinated. If we wait three months, if we wait six months, I'd love to see if there was a timing of vaccination that might somehow give you the protection we're hoping to get. Leave that as an open.

Now, last article we're going to talk about before we get to emails. This is the article, "Clinical Practice Guideline for Long COVID Prevention and Treatment," published in the *European Respiratory Journal*. I have to say, this is more than just a practice guideline. It's an open-access article that reviews the different approaches to prevention and treatment of Long COVID, and it's what I love, the evidence for and against each potential intervention. You go through these tables, and you see what is the potential intervention, what's the data. You can go through the links and look at the individual articles.

Here, a multidisciplinary working group was established and comprised 60 members from

10 countries, 10 areas of expertise, with a strong background in Long COVID research, clinical practice, and methodology of guideline development. Through a two-step process, they determined eight PICO - Population, Intervention, Comparison, Outcome - questions. This is a way you go through and do these. After they search the literature, they end up with three rounds of the Delphi survey. I joke about the Delphi survey as we get a bunch of experts in the room and they breathe in the vapors, and they reach a consensus.

The guideline presented 10 specific recommendations, each supported by existing, updated, or newly conducted systematic reviews, some of the ones I think our listeners will not be surprised by. You want to prevent it: suggestions of getting vaccinated or the use of antiviral agents during the acute phase of COVID-19. Then they talk about things that do and don't work. I'm going to leave in a link. It's open access. Not a bad resource.

VR: Vaccination and antivirals are up there.

DG: Yes. That's number one right up there. Get vaccinated. Try not to get COVID. Get early treatment. As we've been saying for quite a while, no one is safe until everyone is safe. We have moved into, I think, our most exciting of the year fundraiser. You may think it's the *MicrobeTV,* one that comes in November-January. But this year, we're doing our fundraiser for ASTM&H because we're actually doing a big tribute to Dickson Despommier. We're going to do a five-year lecture series. We're going to announce this at the annual ASTM&H meeting.

We're going to support the president's meeting that's going to be announcing this. We're hoping to get up to a maximum donation of $100,000. Go to parasiteswithoutborders.com, click on the Donate button, and help us reach our goal.

VR: It's time for your questions for Daniel. You can send yours to daniel@microbe.tv. John writes, "I wonder if oil and vinegar neutralizes *Cyclospora*. We hear about cases that seem to stem from places like Taco Bell that aren't exactly serving up tossed salads. Of course, there are a lot of other consideration, like uniformly tossing the dressing. If it does, it might be a way of being able to enjoy a salad with some level of comfort."

DG: What about ranch dressing? Wasn't that a big hit? Everyone who came to watch the football, they went home with travel-size ranch. Maybe the ranch will get it off. No. It would be great if the vinegar and oil would neutralize the *Cyclospora*. Unfortunately, it doesn't. As we've talked about, really hard to get it off.

VR: Robin writes, "I'm a long-term *TWiV* listener. Wanted to pass along something I thought might be of interest, particularly given your comments about the need for more testing for mpox a while back. Seegene USA recently received FDA emergency use authorization for the AllPlex HSV-1 and -2/VZV/MPXV assay. It's a multiplex real-time PCR assay authorized for the simultaneous qualitative detection and differentiation of MPXV, HSV-1, -2, and VZV from lesion swab specimens in individuals suspected of viral infection consistent with mpox.

"I work for Seegene, so a full disclosure here, but I'm not reaching out to pitch anything. I simply thought this was a relevant development given the conversations you've had around mpox testing and diagnosis."

DG: I think this is great. I always say physicians are limited by the tests they have access to because we're not always right. Our clinical ideas need to have that redirection of a lab to

tell us, is this? As we've seen from a number of these studies, even physicians that feel like they're experienced and think they know what the diagnosis is are often surprised when a result comes back.

VR: Daniel writes, "It's been almost a week since my wife and I woke to a bat in our bedroom. We heard some ticking, turned on the light, and there was a bat flying around. We got our door closed and called animal control. They came. They couldn't find the bat. Then we called a private company. They came and couldn't find the bat. We proceeded to our local ER for PEP. We completed our two shots, second shot yesterday. I was in no mood to hear all about the parasites of food handlers in New York City. We visit my son in Brooklyn next week, and he says he has some great international restaurants he wants to take us to.

"To make matters worse, I learned from you that my taking the polio sugar cube prior to contracting measles in 1963 could be a problem. Thanks a lot for spooking me, Dr. Griffin. Should I look to score some ivermectin? I'm going to wait to see if we start getting some polio in North Carolina before I get another shot. My main reason for writing is to let you know the CDC COVID score for wastewater is defined as a categorical score. I think the data analytics folks somehow came up with this number. There are no units attached to it.

"North Carolina has a very good respiratory viruses website which tracks flu, RSV, COVID, and a category of just respiratory illness. Hospitalizations and ER visits are tracked, and they correlate quite well with the wastewater data from previous weeks. The wastewater testing is fairly extensive but does miss some areas, mainly in the southern rural areas. I believe that all hospitals are required to track respiratory admissions and ER visits. I appreciate your show, watch it regularly, and thus am typically the smartest guy in the room."

DG: This is awesome. There's so much in your email here. We could have an hour discussion of each. The first is the bat. The tough thing about bats is that bats have these tiny, razor-sharp teeth. A lot of times, you don't even know if you've been bitten or not. This whole idea of you wake up in a bedroom, and there's a bat, that bat may have bit you in your sleep. Unfortunately, there was a case about a young boy who died up in Canada recently. It was, I think, sleeping in a barn or something. There was a bat. They thought there was no issue, and then later, the boy ends up dying of rabies.

Some people do these cost analyses about what should you do. I think that if that's you did the right thing. You go to your local ER. You get your post-exposure prophylaxis. There is a bit of a discussion about, do you get the RIG, the Rabies Immune Globulin. That vaccine is going to take a while to start working. If it's within the first week of getting the vaccine, once you get the vaccine, seven days later, you're good to go. That first seven days, you're unprotected. We often give RIG as well.

I recently had an episode where I got involved recently, as in this week. It was mom, it was dad, it was a 2-year-old. They wake up, and there's a bat. Then the bat's gone. "Oh, where did the bat go?" The bat went out the same way it came in. Usually, they have a way of access through an attic or something. You want to get animal control. You want to have them figure out what potential access points to keep that from happening. Next, measles, 1963. You got it after your sugar cube.

VR: Sugar cube was 1962, so I guess it's possible.

DG: You got it. I guess he gets sugar cube in '62, and then he gets these measles in '63, right?

VR: Yes.

DG: It's interesting. We've talked about the concern there. Now, the WHO has not made a recommendation. Just think about people in this scenario: should they all be getting -- We've definitely talked about the concerns, so leave that out there. It's good to just let people know that people are starting to talk about this, people are starting to think about this. There is this concern that if you get measles after your vaccine-preventable illnesses, do you have the protection you think you had? I think you're joking about the ivermectin. Go enjoy those international eating opportunities when you come to visit New York.

VR: Charles writes, "Now that it looks like we will be able to get an mRNA flu vaccine, what would you recommend for Dr. Racaniello? I am almost as old as Dr. Racaniello and am leaning towards the high-dose flu vaccines."

DG: Charles, right now, it's going to be 50 to 64. Some of us, like myself, are in that zone. I'll probably pick the mRNA flu vaccine. We're basically waiting to see about the 65 and over because that's going to be a different comparator. This is better than the standard-dose flu. How does it compare to the high-dose or the different flu vaccinations recommended for the 65 and over? At least at this point, until we find out the answer to that, plan early because we've talked about, a lot of times you might have issues accessing the senior flu shots. Plan early, call around. Clearly, it's better than the standard when you look head-to-head. We'll have to find out how the mRNA stands up to the high-dose.

VR: It says it has accelerated approval with ongoing post-marketing studies. What does that mean, Daniel? What is accelerated? Can I get it or not?

DG: I think so. The way we'll know - and we'll keep track of this, you'll keep track of this-- you go on your CVS, your Rite Aid, or whatever, and then see if it allows you to click the box.

VR: I want the mRNA vaccine because I think it's better than the old one. I never was able to get the high-dose because it's always out by the time I go. I'll just try the mRNA vaccine, right?

DG: Sounds good, yes.

VR: Peter writes, "Looking at the wastewater graph, someone asks, what does the ‘2’ mean? Good question. I asked the same question to Gemini AI. The answer is attached. It's quite complicated." I'll briefly tell you the answer from AI. Transforming a raw sewage sample into a smooth trendline on a public health dashboard involves a multi-step pipeline. The process converts raw molecular signals like genetic material into standard per capita metrics normalized for rain dilution and population shifts.

First, you get a sample, you concentrate it. You extract the nucleic acid. Then you do either quantitative PCR, and you get a cycle threshold, or you do digital PCR, where you get an absolute count of viral gene targets. Then they convert the droplet or cycle count into a physical volume concentration by accounting for dilutions and so forth. This produces a number in units like gene copies per liter or gene copies per gram. Then they normalize for rain and sewage composition. I didn't actually know this, but raw concentrations fluctuate

widely due to non-biological factors like rainfall, industrial discharge, groundwater infiltration. They have ways of normalizing for that.

Then they scale to the population to compare different sewer sheds or cities. Total daily viral loads are divided by the estimated population served by the plant. That gives you a standardized unit such as gene copies per person per day. Then the single-day wastewater points are noisy due to sample variance. They have to calculate seven- or 15-day rolling averages, apply linear regressions to fit a smooth trend line, and then they plot it on the graph. That's how you get the graph.

DG: It's a lot involved there.

VR: A lot involved there. As you heard from Daniel - not Daniel Griffin, but Daniel above - the units don't mean anything. They're a categorical score. If you're looking at just the numbers, it's one thing. In this case, what Peter has done is to explain the graphs, and that's something different.

DG: Very cool. Thank you.

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

DG: Thank you, and everyone, be safe.

[music]

[00:54:53] [END OF AUDIO]