TWiV 1352 Clinical Update

Host: Vincent Racaniello

Guest: Daniel Griffin

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

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VR: From *MicrobeTV*, this is *TWiV*, *This Week in Virology*, Episode 1352, recorded on August 26, 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: Your tie is like yellow. I can't see it from here. What is it?

DG: This is all the pathogens that you might get from food, all these fecal pathogens. Very appropriate for some of the stuff we'll be talking about.

VR: Right.

DG: All right, let's jump in because we actually have quite a bit to talk about. "Doubt is not a pleasant condition, but certainty is absurd." It's from Voltaire. We've got some pretty absurd characters floating about. It's interesting. I was thinking about this today, Vincent. You and I have some, I think, interesting banter before we start our shows. We probably just start the recording and let the banter go because we were talking about the Moderna mRNA cancer, therapeutic, I guess I would call it. Vaccine therapeutic.

VR: Vaccine. They call it a vaccine because you have to be immunized multiple times to make a T-cell res - it is making a T-cell response against the tumor antigens, yes.

DG: Yes. Over 90% five-year survival in pancreatic cancer, which is just a --

VR: Melanoma.

DG: Melanoma, yes. It's just amazing.

VR: They had a very small number. They had 14 events. The next phase 3 is going to be powered to look at survival, but this suggests that it could be good.

DG: I'm excited. Look at mRNA technology. Originally, a lot of people thought that was where we were going to see the impacts in cancer therapeutics and we're seeing them in.

VR: Yes, but the thing is that it is personalizable. You can rapidly make, at scale, an mRNA

vaccine for a patient. It's not that you have to do other things that would take forever. It is scalable and personalizable. That's the beauty of it.

DG: It's amazing. All right. Starting off in our news section, on August 21, HHS seeks public input on federal vaccine recommendation categories and shared clinical decision-making. The U.S. Department of Health and Human Services announced on August 21 a request for information seeking public input on the categories used in federal vaccine recommendations and the role of shared clinical decision-making. I'm going to leave a link into this. I'm actually hoping some of our listeners can maybe weigh in on how helpful it's going to be if actually the public comments here.

They're asking the public to make comments about several categories, several recommendations, the availability, quality, strength of evidence, the appropriate approach when randomized clinical trial evidence is limited or absent, how to deal with individual autonomy, informed consent, religious freedom, legal and programmatic consequences of recommendation categories, how shared clinical decision-making is understood and applied in practice and how the category could be improved, and communication practices necessary to earn and maintain public trust. I'm going to leave in a link if people want to make comments. Maybe in our show notes, I sent in a comment, Vincent.

VR: Good.

DG: We can leave in the show notes what I had to say. I think it's tough when they get to frame the questions here. I think a couple of things I commented on when I responded, and maybe people will respond, and I'm more curious, is this helpful? The time I spent, the time people might spend. I did talk first about, I think a lot of people are concerned that really there's a prejudice. There's a bias there at the HHS leadership at the moment. That's going to be an issue like when they say, "Oh, we're looking at peer-reviewed literature."

You have cherry-picked literature that serves their end, not actually, as we talk about in science, literature that we look at to try to inform ourselves as opposed to just support our prejudices and our biases. Then talked about what do we do when we don't have RCT evidence. We talk about a lot of studies that are not prospective, randomized, placebo-controlled trials. There's still a lot of value and knowledge in the studies that we talk about.

Then the balance between autonomy, informed consent, religious freedom, and just the freedom to be safe in our society, to not have to worry about sending your child to school where they might die from a contagious disease. We deal with this all the time. We have speed limits. We have restrictions on the use of firearms, illegal drugs, tobacco in neighborhoods and schools. We do have this obligation to provide a safe community and safe schools for our children. Then I go on and talk a little bit more, so I don't know, Vincent.

VR: I find this inappropriate from an administration where we're having that biggest measles outbreak in years, they're talking about task force on safer childhood vaccines? What's wrong with the safety of childhood vaccines? You need to use them. You need to use MMR to stop the measles outbreak. This is just nonsense. I don't understand if they're even going to pay attention to any of the comments that are made. This whole idea, as you said, of making informed choices, no, the committee is supposed to tell you which vaccines you should get because it's based on evidence. It's not what you feel you should get or not. This is ridiculous.

DG: Yes, I think that's so critical. The reason we have these advisory groups is we want experts to dig through and then say, "All right, we've looked at all the data, all the information available, and here's what the recommendation is," not "what we have." I've been saying for a while that when you mix politics and medicine, you end up with dead children. We are seeing that. We're going to talk more, a couple more deaths. We've had five deaths from measles since this current health secretary has come into play, come into that role. Hundreds of children have died from flu, more than we had historically.

Vaccinations are dropping. Our children are less safe than they were before. This should have a lot of people really upset. All right, but we're going to keep sharing the science. We have an article on the HPV vaccine. This is the article, "HPV Vaccination and Risk of Head and Neck Cancers: A Large Real-World Cohort Study," accepted for publication in the *International Journal of Infectious Diseases.*

I like this theme of research where we're seeing that these vaccines don't just protect against infection. They protect us against, what, dementia. They protect us against cancer, so the HPV vaccination is really a cancer protection vaccine. They have some highlights. In this study, they analyzed 1.4 million individuals in a U.S. real-world cohort. HPV vaccination was associated with about a 70% reduction in head and neck cancer risk, and oropharyngeal cancer, that was more than a 90% reduction. That's amazing, right?

VR: It's amazing because when these vaccines were made, we didn't even know HPV caused these oral cancers. Now we know. It's great at preventing cervical and anogenital cancers, but now this is amazing.

DG: Yes. This is a pretty robust. Again, this was a retrospective cohort study. It's not a prospective, randomized, placebo, saline-controlled trial, but really robust, compelling data. Retrospective cohort study, 716,630 propensity score matched pairs. Forty head and neck cancers occurred in the HPV vaccinated individuals versus 130 in the unvaccinated controls. They have a really nice figure where you can just see this really continue to separate. Follow this even farther, and you're going to see even more of an impact of this HPV vaccination.

VR: The graph couldn't be clearer, could it?

DG: Yes. No overlap. The P-value, how many zeros there? To put on my glasses. P-value less than 0.0001. This is very clear data. All right. Another, we were talking about now measles is endemic, and we'll talk about measles again. Now, unfortunately, the *MMWR*, "Monkeypox Virus Surveillance, United States, 2024-2025," the number of reported cases of the MPXV, so that's the MPX virus infection, during September through October 2025 was double that during the same period in 2024. Unvaccinated patients accounted for 76.1% of cases and had almost 10 times the odd of hospitalization as those who completed the two-dose Jynneos vaccine.

Unfortunately, as we're seeing here, persistent low-level transmission of the clade IIb MPXV in the United States suggests a likely transition toward endemic circulation. Measles is now endemic. Mpox virus is now endemic in the U.S. You can see, again, really nice figures where you can see this seasonality to it, and you can actually see the areas where we're seeing most of the cases.

All right, now this next one is tough. This is the polio vaccine article. As we've talked about, not only are the rates dropping for measles vaccination, but as we shared last week, the

polio virus vaccinations are dropping at the same level. We still need to understand polio.

Here we have the article "Effect of Inactivated Poliovirus Vaccine on Nasal Mucosal Immunity and Pharyngeal Shedding Following Novel Oral Poliovirus Vaccine Type 2 Challenge: A Randomized, Open-label Trial," published in *JID.* I'm going to ask you to jump in at any point as often as you want, Vincent, because there's a lot in this article which I think a lot of people are going to be confused by.

This is a multicenter, randomized, open-label, parallel-group trial conducted in Bangladesh in 500 polio vaccine-naive infants aged 6 to 8 weeks. We've got two infant cohorts vaccinated with three doses of either IPV or bivalent oral poliovirus vaccine challenged at 18 to 20 weeks with novel OPV type 2. Pharyngeal and fecal viral shedding and nasal, intestinal, and serum immune responses were measured post novel OPV2 challenge. First off, Vincent, why are we doing this? What's going on here?

VR: They're trying to compare shedding in IPV versus OPV vaccinated infants. The problem is that IPV is a trivalent preparation and bivalent OPV is just types 1 and 3, so there's no type 2. Then you're going to challenge with type 2, bivalent OPV, and you're going to look at neutralization titers in the stool and in the serum. The IPV, first of all, the pharyngeal shedding, which we think happens in high-income countries, fewer of the IPV vaccinated shed than the OPV vaccinated infants because, again, there's no type 2 in the bOPV to prevent that.

DG: Those are interesting things off the bat. One is you're really the bivalent OPV. I think the other interesting thing, and this is probably new to a lot of people, the idea of pharyngeal shedding. Right?

VR: Yes. Pharyngeal shedding is thought to happen in high-income countries due to vaccination coverage. Remember, there's no type 2 in bivalent OPV. The nOPV2 challenge is really a prime. It's not a boost. It's not surprising that those in the IPV group have higher serum neutralizing against type 2 because the IPV has type 2 in it. Right?

DG: Yes.

VR: Then this thing about pharyngeal shedding in high-income countries, IPV gives you a strong serum-based immunity. nOPV is more attenuated than Sabin strain, so it's not surprising that a small percentage of vaccinated children post-nOPV challenge shed infectious virus.

DG: Yes. I guess we'll move on. What I thought was really- I'm reading this, and one of the things that I was concerned about was fecal excretion. This falls into the exploratory objectives. Exploratory objectives included assessment of PV2, so poliovirus type 2, fecal excretion at one, two, and four weeks post-challenge, as well as the PV2-specific neutralizing activity and total and PV2-specific IgA responses in stool at day zero, two weeks, and four weeks. Jumping to the chase here. In stool samples, the PV2-specific RNA was detected in 72.2% in the IPV group, 72.5% in the bivalent OPV2 group. At all-time points, stool levels of infectious challenge virus were not different between the groups.

VR: Again, if levels of infectious virus are the same post-nOPV2 challenge, there's no relevance to the marginally higher type 2 IgA found in the stool of children who get bOPV than nOPV2.

DG: What do we do with this? What do we do with this article? What does it tell us? Is it reassuring? Does it tell us that - I'll leave it there. What do we do with this information?

VR: The role of IgAs in preventing shedding has always been questionable. Much of the previous data doesn't support the idea that you need IgA to reduce shedding. It's also known by some studies that multiple doses of IPV can stimulate immunity at mucosal surfaces. Because type 2 polio is absent from bOPV, it's not surprising that IPV-vaccinated children have higher type 2 antibodies following nOPV challenge. The relevance of this study is not clear because they're measuring antibody responses following the administration of a vaccine for something that's not in the vaccine.

It's also known that IPV gives you a high serum neutralizing response, which is all you need to prevent neuroinvasion and paralytic disease, the serum antibody response. This work is to say cessation of bOPV will not cause a catastrophe as the switch in 2016 did. If IPV could not be used for an outbreak response, how does one explain that no paralytic disease has been observed in Europe, which is IPV only, when virus circulation has been detected and intermittently? IPV was used in vaccine clinics in Rockland County in 2022 following the case of paralytic disease, and so IPV can and should be used for outbreak responses, not OPV, not bivalent OPV, because [crosstalk] -

DG: Yes. I feel like we've been saying this for a while.

VR: We have, yes.

DG: Just to be clear, I think, for all our listeners, so the IPV, this is the only vaccine available in the U.S. I'll leave in a link to the IPV. This is the inactivated or injectable. I always forget which the I is for, but it's inactivated.

VR: Inactivated, yes.

DG: I always feel like injectable would work better. It should be the IIPV, the injected inactivated polio vaccine, but it has type 1, type 2, and type 3. It covers them all.

VR: You need that because they're circulating type 2 in the world, and you need to have IPV, which has all three serotypes. You shouldn't be using a bivalent vaccine. The idea would be to switch to IPV everywhere and just use that forever.

DG: That's what we keep suggesting, just for those of you listening out there. While we're talking about more vaccination with IPV, yes, I just was reading this right before we got on, "Florida Prepares to Roll Back School Vaccine Requirements. A Proposed Rule Represents a Step Forward in the State Surgeon General's Plan to Eliminate All Vaccine Mandates and a Step Backward for Mankind." I think that was what they said when they got to the moon. Florida is set to rollback four vaccine requirements for children attending the state's public school. Basically, they're trying to get rid of chickenpox vaccination, hepatitis B vaccination, Haemophilus influenza type b, and pneumococcal vaccination.

VR: This is just so backwards, it's ridiculous. Even the Catholic bishops in Florida are for making kids get vaccinated to go to school. You know the Catholic schools in Florida do not accept religious exemptions for vaccines? How forward is that?

DG: Yes. We'll leave a link. It's really interesting, right? I don't know. The Catholics versus

the Protestants, the interesting thing here. The Catholic system is kind of hierarchical. The book was originally written in Aramaic and other languages that most of us don't speak, and so I don't know. Growing up Catholic and being married to a Protestant, we sometimes discuss about, really? Can really a person read that book translated by someone else without all the nuances of the original language? Yes, in Catholicism, the bishops, the priests, the cardinals, all the high - they basically say, "Yes, I'm looking at this book and I'm not seeing any right to refuse vaccines here." All right, [crosstalk].

VR: He wanted to originally roll back all vaccines, so now he's going for four.

DG: Yes. No, that's their goal. Big quotes around they. Yes, to get rid of the protection and make our schools unsafe for the children.

VR: I just don't understand. This guy's an MD. I don't know what he's thinking.

DG: Yes. What do they ca - you know what the name is? I don't know. If you go to medical school, Vincent, we have a name for the person who graduates at the bottom of their class and barely graduates from medical school, what we call them?

VR: A doctor. He's doctor.

DG: Doctor.

VR: That's right.

DG: All right. We were talking about my tie. Apparently, we're not doing such a good job in the U.S. of making sure that our food is safe. That's another thing. We have measles back. We have five people now dead. We have children dying of flu. We'll talk about how many, now that we have the total for this last season, but just compare. In the past, we would see about 1,000 cases of *cyclospora* each year. That was kind of our tolerance. Now, since May 2026, this is the explosion of the explosive diarrhea. This is the parasitic *cyclospora* diarrhea. So far, the CDC has 17,180 lab-confirmed cases, an additional 11,844. We're looking at close to 30,000 cases of *cyclospora*, usually about 1,000, so a 30-fold increase.

VR: Why is that, Daniel?

DG: We're not even going to talk about importing like bad beef from Argentina and putting all our good ranchers in poverty.

VR: Why is this happening, Daniel?

DG: Unfortunately, what we're hearing about is there really seems to be a reduction in basically the staffing, the focus, the funding of imported food safety. You don't necessarily get the lettuce and some of the other things inspected. It comes in this country, and then after people get super, super sick and thousands of people get sick, then you say, "Oh, I think we have a problem here," and you stop doing that. No, but we're having a problem. Going into this administration, I think it was only about 50% of food coming in the U.S. would get inspected. Now it seems like that's really diminished further.

All right, Ebola. This is a disaster. Ebola, is so much going on, I think you can drown, but this is an area that I think a lot of people need to appreciate. In the AP, we have the article "Here's Data Showing Congo's Ebola Outbreak is On Track to Surpass History's Largest." The

Ebola outbreak that's spreading is spreading at unprecedented speed in Congo, has not peaked yet, and could be three times the current known size according to data from the authorities and Africa's top public health agency.

It's history's fastest Ebola outbreak, and the WHO says it's on track to surpass the deadliest on record. That was the one with over 11,000 deaths across West Africa. The current outbreak has already recorded 2,516 deaths. This is an area with an intensely mobile population. A lot of folks are displaced by armed conflicts. There's a lot of distrust of medical authorities. This is really critical, less than 10% of cases are currently coming from known contacts.

VR: They're having trouble contact tracing, basically.

DG: Yes, because only 10% are actually from their contact tracing. Then this is, you just take our number and multiply it by three. The current estimates that we've only detected about 30% of the cases, so if you take that 5,000, you say 50% mortality, 15,000, we're already probably 7,000 deaths are just waiting for the numbers to roll in. There's a couple graphs that I put in. A number of Ebola cases and deaths rising faster than the previous outbreaks. Even if you say, "Oh, it took a while," the slope is already worse than it was in the West African.

I also put in some pictures, and hopefully this will be up for the YouTube people to watch. Now, this first photo, and this stuff is all coming from the AP News article, you've got these two, I guess, healthcare professionals, but basically, there's two individuals that are in these plastic blue gowns. They've got masks. One has a headnet on. There's another gentleman behind them in these tall rubber boots. Two of them are holding the casket, another standing behind them, but then you've got all these just other people just right there.

VR: Yes, with nothing.

DG: Nothing.

VR: This is very sad. It's a 3-year-old. It's a tiny coffin they're putting in the ground.

DG: Yes, tiny coffin, and all these unprotected people right there.

VR: They feel bad enough that this child died, but then they may get sick themselves. Right?

DG: Yes. Then you have this cascade effect. Then there's a map where you can see it's multiple areas. It's not just one concentrated area. You think about these ring vaccinations and other strategies, which we'll talk about in a moment, but you've got multiple districts here where we're seeing cases.

VR: It's really unfortunate that we didn't have a vaccine because this Bundibugyo virus was just under the radar.

DG: Yes, and we're going to find out here in a moment. CDC, 5,584 cases, 2,680 confirmed deaths. We've got that really high increase going on. I'm going to talk about a couple articles. These are actually about the monoclonal antibody. The first, it's really a case study. The first is this article "A Case of Bundibugyo Virus Disease Treated with Monoclonal Antibodies and Remdesivir." It's published in *Nature Medicine.* Both of these are *Nature Medicine*. Here they describe the case of a previously healthy 39-year-old healthcare worker

who gets the infection while working in the DRC. They get medivacced to Germany. They receive this MBP134, an investigational combination of two monoclonal antibodies. This is under an FDA IND.

They get remdesivir. They get supportive care. Basically, they go on and they follow oropharyngeal swabs, plasma, show that the virus becomes undetectable as time goes on. They're able to monitor the induced antibody responses. A patient actually recovers. We've got this nice case description of the clinical course, virological dynamics, and the immune responses. Doesn't necessarily tell us, we don't know what would have happened without the antibodies.

Then we have this article "Post-Exposure Prophylaxis with a Monoclonal antibody Cocktail Following Bundibugyo Ebolavirus Exposure in Adults and Children," published in *Nature Medicine*. Here we've got five individuals from a single family cluster. One, this was the ZEBOV vaccinated adult, four unvaccinated children aged 1 to 7. They end up getting this investigational MBP134. We're now familiar, that's that cocktail.

This is a broadly neutralizing monoclonal antibody cocktail, and given the absence of approved preventive interventions against this particular virus, it's administered as individual treatment. Administration, well-tolerated. No treatment adverse events. Throughout the 21-day monitoring period, all family members remain free of clinical or laboratory evidence of BVD as assessed by daily medical examination. This is basically a post-exposure monoclonal antibody treatment.

VR: I wonder if this one person who was vaccinated against ZEBOV, he got the monoclonal, so we can't tell what would have happened.

DG: Yes, you don't really have a - because everyone does well.

VR: The thing that gets me is these two papers, incredibly intensive treatment, really, especially in the first one, and you have to hospitalize these patients. There are thousands of patients in DRC. How can you possibly treat everyone like this?

DG: Yes, the amount of - yes.

VR: You don't have hospital space for this.

DG: Yes. That was an interesting thing in the last Ebola outbreak in Uganda when I was there, and I was trying to avoid it. I did not end up in the middle of that on purpose. I was talking to some of the Doctors Without Borders who were there. If you have proper critical care, supportive care, the outcomes are much better. The mortality really goes down. Early on, we don't know what's going on. You're not sure what to do. Mortality's super high, but do you have access to this level of care in these parts of the DRC? The answer is no, you don't.

VR: In West Africa in the 2015 outbreak, someone built Ebola treatment centers outdoors. Could have just tents, and that was good enough.

DG: Some of those centers were quite good, yes.

VR: You could implement that in DRC and just treat everybody. I've heard you can give them an antibody and give them remdesivir. To impact all these deaths, it's crazy.

DG: Yes. All right, measles. We basically added another 200 cases this last week. We're now up to 2,813 measles cases, adding 200 in a week, and I should point out that we're concerned because when historically do measles cases go up, it's when you send the kids back to those crowded classrooms. We're very concerned in the next couple of months what is going to happen here.

We did have a couple more deaths. We're up to five measles deaths during this administration under this HHS secretary. We did not have deaths from measles in the U.S. Pennsylvania Department of Health confirms two measles-associated deaths. The deaths mark the first related to the highly contagious virus in Pennsylvania in 35 years. DOH confirmed both individuals were unvaccinated residents of Lancaster County. They're not going to tell us much about them to protect their privacy.

VR: We don't know if the children are adults?

DG: True. Yes. All right. "Quantifying the Cost of Measles Outbreak in the U.S. and How Costs Scale with Outbreak Size." This is an article published in *Vaccine*, and it really is looking at the cost. Is this a wise economic decision to basically allow vaccination rates to drop? How many hundreds of millions of dollars is this going to cost us? The investigators conduct a literature review. They look at PubMed. They look at official CDC and state health department data. They examine how costs scale with outbreak size. 120 articles screened, 33 underwent full text review.

Now, the average outbreak cost per case was estimated at $43,203, while the average cost per contact was $443, and there was a variation. The average cost per case varied from about $33,000 up to about $60,000, and this included public health response costs. Basically when they run all the numbers, measles outbreaks in the U.S. continue to re-emerge and impose significant financial and public health burden. There's a really nice *CIDRAP* article, I'll leave a link into that, basically each measles case in the U.S., when you add it all together, costing about $60,000, study estimates, were $134 million. This is amazing.

They're supposedly cutting all this funding and you're costing us over $100 million a year. Then forget about the fact that we have five dead individuals. We know at least some of them were children. My wife and I were talking about that *Brady Bunch* episode, because apparently that's part of the handbook of the anti-vax, "Go look at the *Brady Bunch*. Measles was never a thing."

My wife was commenting. There were six kids. We're seeing for every five kids, one ends up in the hospital basically desperate to get enough oxygen, struggling to breathe. If that was not a kid-friendly show, but actually a realistic depiction of measles, one of the *Brady Bunch* kids would have been in the hospital struggling to breathe, requiring supplemental oxygen, maybe even ending up in the ICU. Then if you follow them out, how do they do over time?

VR: I think it's a lot cheaper to get vaccinated, don't you think?

DG: It's cheaper, and it sure is a kindler and the safer choice for our children. All right. We've got a total for pediatric flu deaths 2025-2026, the, oh, it's just the flu? Pediatric deaths, a total of 191 deaths for last year. These are little kids, and half those kids, as we pointed out, were completely healthy before within 48 hours they got sick and died of the flu. The majority, as we pointed out too, were not vaccinated. We'll be encouraging everyone to get their vaccine starting next month. All right. COVID, it is on the way up. I'm going to talk a

little bit about blue washing, Vincent. I don't know if you're familiar with blue washing?

VR: I'm not. What's that?

DG: There's a couple of things out there. Do you know sports washing? This is when you do really bad things to people, but then you pay for really nice sports events. It's called sports washing.

[laughter]

DG: This is about as horrible as that. What you do, we talked about before, they have these categories. Very low, low, moderate, and high. You have certain numbers put you in each category. What you just do is you just say, "Let's just change those categories. Let's take what was moderate and we'll make that low, and what was low, we'll make that very low." That's apparently what has gone on is the CDC has changed its threshold for the different categories. Right now, you can see this is mid-August, number 8/15, and you can see it's starting to enter the low. Historically, that would have already been up in the moderate.

VR: I see.

DG: They're blue washing, which is basically instead of things being red and scary, they're basically blue washed down to like, "Don't you worry so much." When you look at the map of the country, you can see that, yes, Texas, Mississippi, they're already high. California's already moderate. The numbers, it's really coming up, and it's coming up fast.

VR: We're having a late summer outbreak.

DG: Yes. I don't know how this works because we're already late. We're in August now. It's going to be right into the fall. It'll be interesting to see how the dynamic works here.

VR: Yes. Maybe it'll just go till next year.

DG: Just keep going.

VR: It's very strange.

DG: Here's the one thing I want to talk about. This is really, I think, an important one. The next article that we're going to talk about, there's a nice little piece in *CIDRAP*, but it was this question that came up. I remember having this conversation with the mother of a young child. Young child, trying to go back in time here. We're talking about teenager, 15-year-old boy. The mother was concerned, family history of some heart issues. She's like, "I don't know if I want to vaccinate them because there's this choice. If I vaccinate them, there's a certain risk of heart issues, the myocarditis, pericarditis.

There's also the issue that if you don't vaccinate them and let them get the COVID without being protected for the vaccine. The question is, what is the safer choice? Here's a study that we're going to talk about. It was published last week in *Vaccine* that looked at more than four million children. We're going to see that basically getting the vaccine was associated with a significantly lower risk of your heart ending up developing issues. Here we are, pandemic, the safer choice. Here we have the article. "Cardiac Outcomes Following SARS-CoV-2 Infection versus BNT162b2 Vaccination in Adolescents and Young Adults: A Cohort Study of 4 Million Individuals."

These are the results of a retrospective cohort study. They use this database for over four million individuals aged 16 to 25. They put them into the different groups. What we're significantly interested in, let's look at the folks that get SARS-CoV-2 infection. SARS-CoV-2 infection was associated with significantly higher risk of myocarditis. That's a relative risk of 5; pericarditis, about 2; mortality, 1.3, versus no infection. Now, in direct comparison, vaccination was associated with an 85% lower myocarditis risk, a 79% lower pericarditis risk, and 72% lower mortality versus infection.

VR: That's even with the vaccine causing some -

DG: Some, yes.

VR: - low rate of myocarditis, right?

DG: Yes, so much safer. The safer choice if you're trying to protect your young lad, because this was more of an issue on the boys. All right. I'm going to wrap us up there before we get to our emails. No one is safe until everyone is safe. We're in our American Society of Tropical Medicine and Hygiene fundraiser. Vincent, I just booked my hotel and my travel down to Washington for the conference. It'll be November. Our fundraiser runs August through October. What we're trying to do, we're trying to raise $100,000 because we're trying to create this ongoing five-year Dickson Despommier memorial lecture series. We're going to support the president's reception where we're going to announce that. Go to parasiteswithoutborders.com. Click on that donate button. Thank you so much.

VR: It's time for your questions for Daniel. You can send yours to daniel@microbe.tv. Bob writes, "A friend mentioned that he had heard that Long COVID is associated with small blood clots that could be associated with the symptoms of Long COVID. He heard that treatment with anti-clotting medication is prescribed, and he sends an article and wants your opinion. 'Circulating Microclots are Structurally Associated with Neutrophil Extracellular Traps and Their Amounts are Elevated in Long COVID Patients.'"

DG: Bob, this is definitely something that's been described. The big challenge now is, so what do you do about this? There are these ongoing trials. People are jumping in, and maybe this is, I'm going to say, a lesson in humility. The oath's take is "do no harm." What happened a lot during the early days of COVID, a lot of people just couldn't keep their hands in their pockets, and the whole idea is, "I should do something." We had a couple disasters, hydroxychloroquine, increased mortality by 20%, and there've been a lot of other things that happened where actually if you have a good idea and you have a good theory, unfortunately, what we've learned over decades and decades is most good ideas are not helpful.

We are not as smart as Mother Nature. We're not as smart as what evolution has crafted. A lot of people are already jumping. They're using these blood thinners, these direct oral anticoagulant therapies. We don't know. We don't know if they help. We don't know if the benefit outweighs the risk, the harm. Some people will have strokes. Some people will bleed out and die. At this point, this is interesting. It's important. We need funding to do those studies so that we actually know what is the safe thing to do with these potential problems.

VR: Marc writes, "Check out this dashboard that a collaborator at Tulane University in Louisiana put together some time ago." This is a very nice pandemic mitigation collaborative dashboard where you can see the map of the U.S. and the heat map of you're very low, low,

moderate, high, and very high wastewater. Then, prevalence estimates. It is a very interesting table. Chances anyone is infectious in a room of 10 to 100 people based on [crosstalk].

DG: I think that's helpful. Give people some kind of a context. Every so often, I see this like, "Oh, at this level, that means one in every 20. At this level, it means one in every 50." I think that helps people when they're thinking about, "Oh, I'm going to a party. There's going to be 50 people there, but one in 20 people have COVID at this level." You're like, "Someone at the party is going to have COVID, and I'm going to get it. Then I'll have a heart attack or a stroke or something."

VR: "It's put together by Michael Hoerger at Tulane. I've been following Mike on social media for a year, and now the project has really improved, better than the CDC's infographic, in my humble opinion. Also, I thought a great topic for a *TWiV* clinical update would be information on nasal vaccines, including any interesting studies or preprint info or emerging studies or project funding you might be aware of. Appreciate you guys. Best wishes from the front lines of the ineptocracy here in Florida." Oh, my gosh.

DG: Yes, good luck in the race to the bottom down there. Yes, definitely, if we see some interesting nasal vaccine studies, this would be a great place to share them.

VR: Marc, just send me your address, vincent@microbe.tv. You want some stickers, I'll send them out to you. Charmaine writes, "Daniel, here's an article about the Trump administration letting cattle in from Mexico. How do you feel about this? I'm a bit worried. I'm not sure if I really trust these people to inspect every animal adequately.

DG: It's a challenge right now. Historically, we've always prided ourselves, Texas and all the beef production. Now we've got a number of things going on. We've been talking about the New World screwworm and concerns about cattle coming in, potentially bringing that in. We just heard about, what was it, 30,000-something pounds or tons or just some huge amount of beef coming into Texas and Florida. Then it finds out after the fact that it's contaminated. Really, there's a little bit concerned about cattle and other things coming in if we don't put the effort and the right people there to basically protect our food and our animals from all these problems.

VR: You think it's OK to let these cattle in, Daniel?

DG: Should we let the cattle in? I think if we're not going to inspect them, we're just letting them in, that's not great. I would be a little worried.

VR: Bruce writes, "In *TWiV* 1350, Daniel recited the first four couplets of the poem *Worth While* written by Ella Wheeler Wilcox and first published in her 1892 collection *An Erring Woman's Love*," and Bruce sends a link to her bio in Wikipedia. "I have watched your *TWiV* podcast every week since 2020. They have been tremendously helpful, even life-saving for family and friends. In the spring of 2020, I started publishing a weekly email newsletter, “COVID Updates,” to track the emerging SARS-2 epidemiology, immunology, public health best practices, and treatments.

"My aim was to summarize, in simple lay terms, many reputable technical preprints and journal articles as well as commentary by experts to make their science useful for grandmas with iPads. These newsletters were sent to 1,000-plus regular readers and forwarded to

many more. Aside from my own diligence reading preprints and refereed journals, I relied on and cited your commentary and analysis as well as that from *CIDRAP*, Trevor Bedford, Shane Crotty, Kristian Andersen, Katelyn Jetelina, and Akiko Iwasaki, to name a few sources. My readers and I owe you and all the other experts a large debt of gratitude."

DG: That's really kind, Bruce. It's nice to be included in that list.

VR: Sheila writes, "I am currently watching clinical update 1350 and saw the graphs on the increase in kindergarten students with non-medical vaccine exemptions. While I have no doubt that there are a lot fewer kids getting vaccinated, there is something strange related to exemptions that I have seen in my area. I have seen multiple Facebook posts in recent years from people that have recently moved to Alabama, and they all have their kids' vaccine records, but the schools here require the vaccine records on a specific card. Parents are posting because they haven't found local doctors yet and are having trouble getting a doctor's appointment to get the records transferred onto the correct card and signed by the doctor and are looking for doctors that might be able to help.

"Each of the last few years, I see multiple people recommending that they just fill out the exemption form because it's easier to get an exemption than to provide the correct paperwork to show your kids are vaccinated. Last year, someone even said someone at the school had recommended this. It probably isn't a large number, but it would be interesting to know how many kids with exemptions are really actually vaccinated but just don't have the records on the right form."

DG: Wow. That's interesting. I appreciate you saying that. I'm hoping this isn't a significant issue, but that's a problem actually to create so much bureaucracy that people are filling out an exemption form.

VR: Yes. Ann writes, "You're probably sick of questions about timing vaccinations by now, but here's mine. I'm 67, no additional risk factors. I was hoping to get my COVID booster before going on vacation September 10. I spent the afternoon trying to find out when and where this year's updated vaccines would be available, and I couldn't find anyone to even give me a date.

"I got estimates of the beginning of September, end of September, and before the end of the year. I'm really eager to get vaccinated before a vacation because twice I caught COVID on vacation, fortunately not feeling sick until the day after I got home. The last time I was vaccinated was about a year ago. Given the timing, should I just give up on the new one and take the old one 14 days before I leave, or should I gamble that it'll come at the very beginning of September and wait until then? Thanks for being a voice of informed sanity."

DG: This is a tough one, and no, I don't grow tired of giving people advice about their timing of their vaccines. We are hoping, here we are, by the time this drops, like August is almost over, and we're hoping the new updated vaccine is going to be there. It is interesting, how much does it matter? How much is the new one going to be better than the old one? We never know until like a year from now when finally the data rolls in. We never really do those prospect where we say, "OK, let's say 1,000 people get the old one, 1,000 people get the new one, and let's follow them over time." I would love that. That would be amazing. Wait, and if basically the clock runs out, then get whatever you can get.

VR: Last week, I asked you about the mRNA flu vaccine, and you said, "Just wait because I'm

going away on the 15th to Europe." You said, "Just wait until the last possible minute, which would be September 1," which is just next week.

DG: It's going to be there before you know it.

VR: Right. It's *TWiV w*eekly clinical update with Dr. Daniel Griffin. Thank you, Daniel.

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

[music]

[00:49:09] [END OF AUDIO]