This Week in Virology

TWiV 1240 Clinical Update

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Guest: Daniel Griffin

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

[music]

VR: From *MicrobeTV*, this is *TWiV*, *This Week in Virology*, Episode 1240, recorded on July 31, 2025. I'm Vincent Racaniello, and you're listening to the podcast, *All About Viruses*. Joining me today from New York, Daniel Griffin.

Daniel Griffin: Hello, everyone.

VR: I should know that bow tie by now, black and white. It's Friday. No, it's not Friday. Ok.

DG: It's Thursday, and I will say you should get this one right.

VR: Yes, I can't see it, though. It's too small. Can you zoom in?

DG: Everyone in the Rotary Club would get it right. How about that?

VR: Poliovirus.

DG: [chuckles] You got it.

VR: Most people wouldn't get that clue, right?

DG: That's actually probably true. They might not be aware of the Rotary Club's involvement in trying to move things forward with polio.

VR: Ok.

DG: You asked right before we started how my race was, and maybe some of the listeners remember that we record a little early last week because last Thursday morning, we did our Around Long Island Regatta, where we start off sailing under the shadow of the Statue of Liberty, sail out into the Atlantic, 100 miles east, round Montauk, and sail back. It was a great trip. My boat's damaged, so I was able to convince, I think that's the right verb, to convince the mom of one of the kids that I've taught to sail over the years to do the race on her boat, and I think she loved it. This was her first time as a captain in this race, and she got the first-place finish for a new-time captain, so she was delighted. We got second in our division, and some interesting weather out there, Vincent. You guys like to start with the

weather, right, on *TWiV*?

VR: Yes.

DG: The weather we had at one point, we had something called a microburst, which it's kind of like a tornado. Maybe some of our listeners will write in little details, but we're about 35 miles from the finish. We're talking about like, "Oh, maybe we'll get home for an early dinner, right?" It's Friday afternoon. We've been sailing since Thursday morning nonstop. Beautiful sunny day. Maybe it looks like some weather might be developing north of us.

All of a sudden, within seconds, the world changes. It's blowing 60 miles an hour. It's freezing rain and hail. This wind comes from a completely different direction, takes this 37-foot sailboat and just knocks it completely over. Keel is out of the water, mast is down. Yes, one of the guys on deck, he's on deck, but he's like up to his waist in water because the boat's that far over. He's standing on the rails on the side. It was a little exciting.

VR: This is your Danish sailboat. Is that right?

DG: My Danish sailboat is the one that's broken at the moment. This is a, it's called a Dehler 37 Varianta. It's a different boat, but it "weathered" this quite well.

VR: I've been on sailboats when they go over. I've been on them when the mast goes all the way down into the mud. That's hard to right.

DG: Yes. Fortunately, in a big boat like this, once you spin it up into the wind and free the sheets, it comes right back up.

VR: Really? You don't have to hang on the sides and pull it up?

DG: No, no. Fortunately not.

VR: Well, that's good. Yesterday I had an exciting trip. I went to the Gowanus Canal, Daniel.

DG: Oh my gosh. What were you doing at the Gowanus Canal?

VR: We had done a paper on *TWiM* a couple of months ago about a microbiological and biochemical analysis of the sludge at the bottom of the canal, which is there because of many, many years of industrial and environmental runoff and pollution. It's full of all kinds of bacteria. It has every antibiotic resistance gene known to humans, has all kinds of chemicals. I just wanted to show people where it was, so I took a walk along it, and- [chuckles]

DG: Oh, my. It's got a name, like black something, right?

VR: Black mayonnaise.

DG: Black mayonnaise. Yes. Oh my gosh.

VR: Wouldn't you like that on your sandwich?

DG: No, thank you. [laughs]

VR: Some of these bacteria are actually remediating the sludge. It's very interesting. They

put bulkheads all along the sides, metal bulkheads. They're pile driving them in. They're going to take out as much of the sludge as they can, and then they're going to cover the bottom because they can't get it all out. It's just many years of sludge. They're going to put some kind of cover. I don't know what kind of cover they - I guess some non-corrosive metal or plastic. I don't know, but it's a Superfund site.

It's funded by the EPA, and it's only about one-third done so far, so it's still quite polluted. It's green with algae bloom, but there is a Gowanus Conservancy that is trying to promote healing it. They have a little nursery there. They have a walk along it, and they're trying to make it - It's an interesting body of water. It goes about 1.8 kilometers from the South Bay all the way into Brooklyn with a couple of branches. Unfortunately, a lot of it is still industrialized. There's heavy industry on either side, and it's very unpleasant, but as you get further into Brooklyn, it's a little better.

DG: OK. I've got to go for a visit. I was actually in Brooklyn yesterday. If I had known, I would have made a - [crosstalk]

VR: It was too hot. I wanted to walk the whole thing, but it was too hot yesterday.

DG: Oh, it was 102 degrees here. Yes, it was -

VR: It was just too much. On the stream last night, I said, "I'm going to walk in the fall." Then, like 10 people wanted to go on a walk, a Gowanus walk. [laughter] You can come too. They would love for you to come.

DG: We'll reschedule when it gets cooler. Just let me know. All right, let's jump into it. People may know that my wife and I foster service dogs, and right now, we're fostering a hearing dog. This is a dog for someone who is unable to hear. We've got the dog during this gap. The dog has finished its 18 months of puppy raising. It finished its six months of university and did so well that Charlene is now going to go on to get her master's in helping someone who's deaf. I am quoting from Helen Keller here. "The world is moving along, not only by the mighty shoves of its heroes, but also by the aggregate of tiny pushes of each honest worker."

VR: You know, Daniel, honest workers, little honest workers, is what made this country great, and the current administration doesn't respect them at all. It's really too bad.

DG: All right.

VR: You don't have to say anything. I'm just making the point that that's how it senses to me. I mean, taking away Medicaid, right?

DG: I think we talked last week about what it is to be American, what are we proud of. I think one of the things we've historically been proud of is the "hardworking American," right? That's what we talked about. Not people somehow get money by tricking other people out of it.

VR: People do that, Daniel.

DG: All right. Let's get into the *MMWR*, where we read, “Outbreak of *Salmonella* Typhimurium Infections Linked to Commercially Distributed Raw Milk - California and Four Other States, September 2023 - March 2024.” Believe this, you can actually get typhoid not

from Mary, but from drinking unpasteurized raw milk. This report starts in the background pointing that out that unpasteurized raw milk has been linked to foodborne illness outbreaks caused by a number of different pathogens. We've got *E. coli*, certain species of *Brucella, Campylobacter, Cryptosporidium*, and *Salmonella*.

Now in California, raw unpasteurized milk is regulated by the California Department of Food and Agriculture, the CDFA, and the CDFA requires raw milk dairy farms to hold a permit, pass dairy farm and bottling sanitation inspections. The livestock must be tested for brucellosis and tuberculosis annually, and the raw milk must meet strict bacterial and cell count limits and be kept at 45 degrees Fahrenheit or 7.2 degrees Celsius or below. The raw milk can be legally sold at retail stores, but it requires warning labels alerting customers of potential contamination by disease-causing microorganisms.

Now in October 2023, the County of San Diego Health and Human Services notified the CPH, the California Department of Public Health, of eight cases of salmonellosis in persons who reported consuming this Brand A raw milk produced exclusively by a dairy farm, A. I'm sure their name's not actually A. I think that's a placeholder, but a total of 171 outbreak-associated *Salmonella* Typhimurium, so typhoid cases, were identified. Among the 171 cases, this is a lot, 70% cases, 82% of the cases requiring hospitalization were among children and adolescents, so these are folks less than 18. Among 159 patients confirmed to be infected with the outbreak strain, 70% of those with exposure data consumed Brand A raw milk or heavy cream.

Four of 40 samples collected from Dairy Farm A, retail stores, and patients' homes, including raw milk and raw milk cheese aged for 60 days, tested positive for the outbreak strain of *Salmonella* Typhimurium by whole genome sequencing. The dairy farm voluntarily recalled the raw milk, raw heavy cream one week after the initial outbreak identification. This outbreak is one of the largest foodborne outbreaks linked to raw milk in recent U.S. history.

VR: Let me understand this, Daniel. Despite these regulations in California, you still have some outbreaks now and then.

DG: Yes, we had this pretty big outbreak, 171 cases of people getting typhoid here in the U.S. We had a number of folks requiring hospitalization, particularly the young kids. Yes, so despite all these-

VR: Tell me, Daniel, does pasteurization remove something from milk that makes you better in some way?

DG: The whole history of pasteurization, going back to Louis Pasteur, is that just this brief heating will actually kill a lot of these pathogens, that you don't get them. There's this interesting idea, we've talked about it before, where people want that milk microbiome. They want these bacteria. Unfortunately, when you start doing it at scales like this, when you have a whole dairy farm producing raw milk, despite the regulations, you can have issues like we just saw here.

I don't know if people caught - but just a couple, I'll say, news items, and I'm not going to go much into these, but you're welcome to comment, Vincent.

“Top FDA Official Resigns Under Pressure,” forced to resign over lack of user fees for CBER despite turning down several new drugs and restricting use of another. Dr. Vinay Prasad

drew the ire of the right-wing influencer, Laura Loomer, and others. I'm not sure what they mean, lack of user fees. What was that? Anyway, Vinay Prasad has left the building, so he's no longer there.

VR: The reason why is he restricted the use of some new AAV therapy for Duchenne muscular dystrophy, right? Because a couple of kids had died of it, so it makes sense to restrict it. Senator Rick Santorum, who has stock in the company making that therapy, was not happy about it, so he told the White House, "This guy has got to go," and he's gone.

DG: It's amazing, actually, that a senator can have that much power in the current - Maybe someone, another senator, wants to step up about some other folks that might be restricting our access to -

VR: I never liked Prasad. I don't think he was suited for the job. He said, "Let it rip." Now, recently, he took away COVID vaccines from pregnant women and children. I'm glad he's gone, but you know, Daniel, he's going to replace them with somebody equally bad, most likely.

DG: Yes, be interesting to see what happens. Yes, he, I guess, had made a lot of enemies, voodoo dolls of Trump with pins in them, and the comment you mentioned. We've got a lot of folks on all sides of the aisle who had some issues.

VR: What really bugs me is this right-wing influencer lady. Why does she have so much power? She gets to write opinions in the *Wall Street Journal*, and she trashes this guy. I don't really like Prasad, but the opinion piece is full of *ad hominems*, and that's -

DG: Oh, really? Wow.

VR: Why? She said he was an acolyte of Bernie Sanders, and all this stuff.

DG: Is that a bad thing? OK. [laughs]

VR: No, it's great. I like Bernie.

DG: Bernie is for Brooklyn, right? He wants what? Increase the living wage and healthcare for all. Did you know I worked for Bernie Sanders? I ran the sailing program in Burlington, Vermont, back when he was their mayor. [crosstalk]

VR: Did you get to meet him?

DG: Completely apolitical position. We just taught sailing.

VR: Did you meet him?

DG: No.

VR: OK.

DG: All right. Also, we now have a CDC director. The Senate confirmed Susan Monarez, health scientist, PhD, longtime civil servant. She can run the public health agency. Interesting. The vote was straight along party lines. The only comment I'll make is that there was a previous position from her on suggesting a link between vaccines and autism. At the

confirmation, she said, "No, there's no evidence for a link between vaccines and autism." Now that she's in this position -

VR: I don't understand why this is along party lines. If she's really good, it shouldn't be along party lines. Everybody should vote for her, right? I'm a little suspicious there. The other thing is, she agrees that vaccines are good, so how is she going to work for RFK Jr. with that position? I don't understand.

DG: Yes, it's going to be a challenge, right? Because those were a couple of things. She was very clear on vaccines are wonderful, provide a lot of benefits. She's very supportive of access to vaccines. Also, basically stepping back from that claim, which is not based on any science, and pointing out there's no evidence to go along with that.

VR: Another thing she said, Daniel, is she wants to return CDC to gold standard science. That bothers me because I think CDC has always used gold standard science in making decisions.

DG: Yes, I think that is a problem, return to, because I would agree with you. Over the decades that I've been in practice, I've interacted repeatedly with people at the CDC, these are top-notch individuals. These are public servants who are choosing to dedicate their lives to protecting us and others and helping clinicians on the ground. You've been doing a great job at the CDC, by the way. Don't let anyone tell you otherwise. You've always been doing gold standard stuff.

All right, we have a poll. I'm setting the tone for a paper we're going to get to here. A new poll from KFS, it's a Kaiser Family Foundation, tracking poll on health information and vaccine safety and trust.

I don't know if you know, a number of years ago, I published a paper on - It was really asking adolescents who do they trust most when it comes to vaccine information. I was entertained by this poll. Let's go through a little bit because we're going to set a context for a later paper. Most adults say they are at least somewhat confident in the safety of many routine vaccines, including those for measles 83%, flu 74%. Among adults aged 50 and older for whom these vaccines are recommended, pneumonia 82%, shingles 79%.

The public, however, remains less confident in safety of the COVID-19 vaccine amid continued partisan disagreement, and a little disappointing, just over half 56% of adults, say they are at least somewhat confident that the COVID-19 vaccines are safe. Again, it's this partisan divide: 910 Democrats, so 87% are Democrats, about half of independents 55%, but only 30%, Three in 10 Republicans.

A couple figures here, and this gets back to the paper I mentioned, where doctors and pediatricians are the most trusted sources of vaccine information among public and parents, while fewer than half trust Trump or RFK Jr. on vaccines. You can see the breakdown here, your doctor or healthcare provider, about 82% really trust them, pediatricians, a little bit lower than that public health department, CDC. Then you really start to move down where it was only 14% Donald Trump, a great deal, 23%, a fair amount, but not much or not at all, was the majority for both of those, Donald Trump and RFK Jr.

VR: They are missing one source here, the *TWiV* clinical update, it would have been 100%.

DG: Yes. Why was that? Why was not that in there? OK. [chuckles] Then the other, which is

also, I'll include here, and maybe on the YouTube, people will be able to see this, that it's different for each of the vaccines. There really is still a lot of confidence in the safety of the MMR, of the pneumonia, of the shingles, of the flu, but not quite as much when you get down to COVID-19. As I mentioned, only 56% are saying that they're somewhat confident with regards to the safety of the COVID-19 vaccines.

VR: I don't understand that, Daniel. How does it go along party lines, that one party likes it and the other doesn't? Doesn't make any sense. There's science behind it. The vaccines are great. Do people forget when you couldn't even get into a hospital during COVID before vaccines, and then the vaccines came, and that went away?

DG: We were sitting around in the doctor's lounge the other day, and this came up. It's always started by one doctor says, "Well, I'm not a conspiracy theorist, but -" I'm like, "OK, that usually means you are [laughter] when you start a conversation that way." I responded quickly with, "Hey, I just got back from Loch Ness, so I'm a conspiracy theorist also, and I did not see Nelly despite spending several hours looking."

We talked about the fact, like, did people forget over a million people died, and Judy Sung, one of the hospitalists who was sitting next to me, she's like, "I remember being on the phone calling and saying, 'Multiple members of your family died today of COVID.'" This was a horrible time, and the freezer trucks and the mass graves. Yes, people seem to have rewritten history and just forgotten we were up to over 2,000 deaths a day in New York during some of the worst of this.

VR: This idea that the Republicans think the vaccines are bad is ridiculous, and you're going to tell us about a study later that's going to - [crosstalk]

DG: Yes. No, it's painful, right? This was like Operation Warp Speed. This is something that Trump tried to celebrate and embrace, and somehow his followers turned against him on it. Rather than being remembered as the person who is in power when we came up with these amazing tools to end these really difficult times, it's gone this other direction.

All right, measles. Updates. They say updates every Wednesday. I just check every Thursday morning, so I'm not checking all day Wednesday, worrying that they're not going to tell me. More cases as of July 29, so we're still just a couple of days behind, a total of 1,333 confirmed cases, 40 jurisdictions. The numbers keep going up here in the U.S., but really bad up in Canada, over 4,200 measles cases, so another over 200 new measles cases confirmed. Really tough up there. All right, and we'll keep in all the links because people always email me with questions, and we'll keep in links to what you need to do.

We keep track of influenza, even though we're outside of the season at the moment. Another five confirmed influenza deaths were added to the total. We really won't get our total of pediatric deaths until the fall, but already a total of 266 children died of flu this last season. Remember, the majority of them were completely healthy, majority of them were not vaccinated. These were mostly vaccine-preventable deaths. There's even another article I didn't leave in, but 40 or 50 of these children died of this necrotizing encephalitis, where the flu triggers basically this destruction, this eating away of the children's brains. Just something we're seeing much more of because the traction, the anti-vaccine traction, so the number of kids being protected has been dropping, unfortunately.

The other article, I know some of our listeners will enjoy this. I know one in particular,

“Effects of Baloxavir Marboxil Plus Neuraminidase Inhibitor versus Neuraminidase Inhibitor in High-risk Patients Hospitalized with Severe Influenza. A Post-hoc Analysis of the Flagstone Trial,” was published in *Open Forum Infectious Diseases*. Really, this question, if you've got severe influenza, do you do better by maybe getting dual antiviral therapy? These are folks with significant issues, eligible patients, participants, met at least one of the following criteria: Immunosuppression, diabetes, chronic lung disease.

They're going to look at time to clinical improvement, TTCI. They're going to look at 28-day mortality. They're going to look at virological outcomes, safety. Among the 143 patients included in the efficacy analysis, 92 received baloxavir in combination with basically Tamiflu oseltamivir, so they're getting dual therapy. Fifty-one got the neuraminidase inhibitors alone. That's our mono antiviral group. In patients infected with influenza H3N2, the TTCI, the time to clinical improvement, was significantly shorter in the dual compared to mono, a median of 97 versus 172 hours. The dual antiviral group demonstrated significantly lower mortality. This was really impressive, 2% versus almost 12%.

VR: Daniel, will you be prescribing both?

DG: I think, particularly in our high-risk folks, it actually makes sense to jump in with both.

VR: Unfortunately, it could be that baloxavir on its own does this, but you can't test it on its own, right? You have to give -

DG: Yes, that's the challenge here, because the standard of care is to do Tamiflu, the oseltamivir. It makes sense to say, "Well, let's add this and see what happens," because that's what we're seeing here. We're not seeing baloxavir versus Tamiflu. We're seeing Tamiflu as a base, and then what if we add it? We add a six-fold reduction in mortality, going from 12% down to about 2.

VR: It's very good.

DG: And very safe, I should point that out as well. No safety issues there. COVID. Look at that, Vincent.

VR: Daniel, last time we were very worried, weren't we?

DG: Yes, we were. You were worried that you were wrong, that there was going to be a surge. I was worried that I was going to be right and that there was a surge. Actually, it went up. Maybe we're going to be OK. I think I used the analogy last time of the guy who was working for the British government and said there hasn't been another world war today, and he was only wrong twice. At some point, I really think we're going to settle into a once-a-year seasonal pattern for this coronavirus, and maybe we're settling in. I would love that.

VR: Yes, I think we need to wait a couple of weeks as the data are behind. It's only July 19.

DG: Yes, that is true. I have to say, in the hospitals, we're not seeing a huge surge, so boots on the ground. Things are looking OK. So far, so good with COVID, and it's going to make a lot more sense with our vaccination booster strategy if we just have the one winter peak. Speaking about vaccine strategies, we have the article, “Safety of JN1 Updated mRNA COVID-19 Vaccines,” published in *JAMA Network Open*. In this analysis, all adults, capital, all adults in Denmark, recommended to receive the 2024-2025 JN1-containing booster vaccine,

and who are those folks? Folks age 65 or older or individuals in high-risk groups who had previously received three or more COVID-19 vaccine doses were included.

The study period ran from May 1, 2024, to March 31, 2025. The investigators analyzed 29 adverse outcomes adapted from prioritized lists of adverse events of special interest to COVID-19 vaccines. Outcome rates during the first 28 days after the JN1-containing vaccine administration, the risk period, were compared with outcome rates during the remaining period, this reference period, with follow-up from the study start or 43 or more days after any prior dose of the JN1-containing vaccine dose. Really robust, right? This cohort totals 1,585,883 individuals, and it's split, with a little over half of the individuals being females.

1,012,400 received updated mRNA COVID-19 vaccines containing the JN1 lineage vaccine during follow-up. No statistically significant increases in the rate of hospital contacts for any of 29 adverse events were observed during the 28-day risk period after getting that JN1-containing mRNA vaccine. There's really a nice figure here. I'll mention that most of the things are actually trending in the right direction. Now, for instance, what reached statistical significance, we actually had, it looks like a drop, about a 16% drop with non-overlapping confidence intervals for ischemic cardiac events. Also looks like pericarditis, about a 60% reduction in pericarditis. Really, just about every outcome better if you got a vaccine, and really not seeing any concerning safety signals here.

VR: Let me ask you, what is IRR, Daniel?

DG: IRR.

VR: The last column on the chart it's IRR.

DG: Yes, let's see. The relative risk, so incident relative risk, I believe, is what they're doing.

VR: OK. If it's one or below, then it's not happening, right? If it's above, it's a concern. The only ones I see that are above one, we have myocarditis, but it's just slightly above with a huge confidence interval, so who knows what that means, right?

DG: Yes.

VR: Then we have encephalomyelitis or encephalitis, which is also above, but again, it's a big confidence interval. Is myocarditis still happening with the COVID vaccines? I thought it wasn't anymore.

DG: Not really. Not really. If you look here, you're seeing basically very broad confidence intervals, not much of a suggestion. Nothing statistically significant. I think that was something that came up. When we're looking at these incidence rate ratios, we're actually seeing really encouraging stuff. This was something, actually, Vinay Prasad, who was going down that myocarditis rabbit hole, had pointed out and said, "Oh, we saw this early on, the FDA waited too long to respond, we're not seeing it anymore." I think this goes along with we're not really seeing it anymore.

VR: What's the best way to avoid myocarditis?

DG: The best way to avoid it, as we're seeing here again, is by getting vaccinated.

VR: Yes, because the incidence with infection is much higher. Right?

DG: Here we saw a 60% reduction in pericarditis, so lower risk by getting vaccinated. Yes, I do remember early in the pandemic, and people were still not sure back then, and saying, "Oh, my, I want to avoid having this happen."

VR: The thing is, Daniel, this myocarditis thing really sticks in people's minds. That's why I think we have this low confidence in the poll that you just mentioned before.

DG: Yes. I think we need to point out, we're not seeing it with the boosters. If anything, we're seeing that your risk of pericarditis, of myocarditis, you're safer getting the vaccine than not getting the vaccine. All right. Continue to keep mentioning Pemgarda, the pre-exposure monoclonal prophylaxis. That's every three months. COVID early phase, just a reminder, we got those guidelines. Remember, we had tens of thousands of people die from COVID. We had over 100 children died from COVID, so we really want to jump in and target the people at risk of progression. We have those guidelines. Number 1, antiviral Paxlovid. Number 2, remdesivir, molnupiravir, convalescent plasma, and try not to get everyone around you sick. [chuckles] It is a contagious disease. It's not all about wet hair.

All right. Then COVID, that second week, that early inflammatory phase, that's when you consider steroids in the right patient at the right time. Anticoagulation, pulmonary support, maybe still a window for remdesivir, and in some cases, immune modulation.

All right. I'm going to move us into the last part, the late phase, Long COVID section. This is something I know that bothers some of the folks that are trying to minimize. It's all about case fatality rate. It's all about infection fatality rate. Unfortunately, we continue to see folks, they get COVID and then they have persistent issues.

Here we have the article, “Prevalence of Persistent Cardiovascular and Pulmonary Abnormalities on PET/MRI, and DECT Imaging in Long COVID Patients,” published in the *Journal of Nuclear Medicine*. The objective of this study was to describe the prevalence of inflammatory cardiopulmonary findings in a prospective cohort of Long COVID patients, LC patients, subjects with a history of COVID-19 infection, persistent cardiopulmonary symptoms, nine to 12 months after initial infection. A clinical assessment compatible with Long COVID underwent cardiopulmonary PET/MRI, dual energy CT that's the DECT, of the lungs, and plasma protein analysis only in a subgroup. A control group that included subjects with a history of acute, severe with respiratory syndrome, COVID, but without cardiopulmonary symptoms at recruitment were also characterized.

In total, we've got 98 patients, median age of 48.5, about half of them were men. The most common Long COVID symptoms was shortness of breath, that's about 80%. About a quarter of the participants were hospitalized. Of the subjects, 90% presented abnormalities on the dual-energy CT, with 67% and 59% of participants demonstrating pulmonary infiltrates, abnormal perfusion, PET/MRI was abnormal for 57% of subjects; 24% showed cardiac involvement, suggestive of myocarditis. This is post-COVID-19 myocarditis. Twenty-two percent presented uptake reminiscent of a pericarditis; 11% showed a perianular uptake, so uptake around, and 30% showed vascular uptake, aortic or pulmonary.

There was no myocardial, pericardial, perianular, or pulmonary uptake on the PET/MRI scans of the control group. Analysis of plasma protein concentration showed significant differences between the Long COVID and the control groups. Lastly, the plasma protein profile was significantly different among Long COVID patients with abnormal and normal PET/MRIs.

VR: Daniel, what does this mean that in these Long COVID patients, there are physical problems present that you can pick up by these imaging modalities?

DG: There's ongoing objective cardiac and pulmonary abnormalities that we're able to pick up. I think this is actually good again. In these individuals, there's always been like, oh, there's no test for Long COVID. Actually, here we are seeing that, for these folks, you can actually detect these abnormalities if you go ahead and use the CT and the PET scans.

VR: These are some of the symptoms of Long COVID. There are others which you can't pick up by any test. That's the problem, also, right?

DG: No, that is true. Just because you don't have a negative test, you can't rule it out, but in some cases, you can find supportive objective abnormalities. All right, well, as we've been saying for a while, and now focus more on the U.S., no one is safe until everyone is safe. Keep praying for us here in the U.S., but keep helping us do all that we're trying to do and all that we're trying to do to help everyone throughout the world. May, June, and July, we're in the midst of our so far very successful Foundation International Medical Relief of Children fundraiser, doubling your donations up to a maximum donation of $40,000. Thank you for all the people that have stepped up to the plate.

VR: It's time for your questions for Daniel. You can send yours to danielandmicrobe.tv. Marie writes, "My daughter is being followed at Kaiser for her pregnancy. Now in her third trimester. I had her ask about the RSV vaccine, and she was told, 'They are not doing that anymore due to finding Guillain-Barré in pregnant women getting the RSV vaccine.' Do you have any information on this, and can you guide us?"

DG: Wow. Marie, I would love to get more information about this. When they were looking at the RSV vaccines, there were a few cases of Guillain-Barré. What is that? You get a vaccine or you get an infection, there's an inflammatory sequelae, and you can get this ascending weakness paralysis. There was a signal only in South Africa, it was joked a little bit, probably off-color, about the fact that it was only seen there. This is not a signal that has continued to be an issue, and so really concerning here.

What we do know is right now, RSV vaccine is recommended during that last trimester. There's some batter back and forth about is that the best way to protect the infants, because it does protect the infants for the first six months. Mom gets vaccinated, pass the vaccination to the kids, but most of that benefit is probably the first three months. Is it really a better strategy to vaccinate mom, or is it a different strategy where when the child is born, they get the nirsevimab, or we now have a competitor, another monoclonal RSV that the infant can get? This is concerning. I hope this is some sort of a misinformation by a provider there and not a Kaiser policy.

VR: Jenn writes, "Love the podcast. I was wondering what your thoughts were on safety and efficacy of the live attenuated chikungunya vaccine. I'm going to France in a couple of months, and I'm trying to weigh the pros and cons, but I don't trust the data about the prevalence and severity of adverse effects coming out of the CDC or FDA right now for obvious reasons."

DG: This is, I think, a very timely question. There was a little bit of a pause with the chikungunya vaccine because there were some safety concerns, and they wanted to review that. There were a number of adverse events, there were a couple deaths, and so an issue

on what might be going on there with the chikungunya vaccine. The other, I think this is a very important part of your question, it's always a risk-benefit. Am I going to somewhere where it's worth taking what risk might be there based on the prevalence of this? There's a little bit of concern about how good is the data that we're getting currently on the prevalence of chikungunya in different areas. I'm not aware of any concerns currently in France. From a risk-benefit, going to France in a couple of months, probably not very compelling to go ahead with this vaccine.

VR: The IXCHIQ was suspended for people 63 to 89 years of age, so if you're under 62, you could get it if you wanted. Because in that age group, I think there are a couple of deaths, two deaths, and other serious adverse events. Grant writes, "I really enjoyed my first episode of *TWiV* with you, number 1238. Although agricultural practices can vary by region, the statements made regarding dairy cows were quite inaccurate and will hurt your credibility with some rural people who don't want to believe your other messages. OK, so a number of points about cows. Here we go.

Dairy cows cannot reach their own udder. It is just not physically possible. Cows do not steal milk from each other. Occasionally, a yearling may, the occasional thumb sucker, so to speak. Cows don't generally tolerate. A farmer may put a ring in its nose with some barbs that will make the cow jump away if the yearling tries to suckle. It's very rare to find dairies still set up as stanchion barns.

Generally, cattle are free to wander around a sheltered area or even a pasture until it's time to milk. They enter a milking parlor at that time and are secured only then. Some milk parlors sit on a bearing-mounted large circular concrete disc. Cows enter one side at a time of their own choosing, a barcode reader identifies the cows. It knows when the cow was milked in the past, how much milk it provided, how much feed it was given. A computer adjusts feed amount provided during this milking accordingly. This method maximizes the productivity of the cow while providing the most natural experience. Just as a cow would provide its calf several feedings a day, she can choose to provide the farmer with several milkings a day.

No doubt modern agriculture has adopted a lot of automation. The term factory farm will not endear you to that constituency, however. A lot about agriculture is misrepresented. I don't know how many people realize in Alberta, Canada, at least the vast majority of our beef cattle are born and raised on the range. They may spend as little as three months in feedlots. In those situations, often cattle are fed an 80% chopped barley plant or chopped corn plant, green feed or silage diet, 20% supplemented with rolled barley grain. Corn may be occasionally substituted for barley when the price of the latter gets too high. Across the 49th on your side of the line, the preference is the opposite.

By the end of the three-month period, the animal's feed regimen will have transitioned to 80% rolled grain and only 20% green feed. This marbles up the meat to suit eating preferences. I've been assisting my brother on his grain farm. I'm not an active beef or dairy producer, but I've spent time around those operations, and I did confirm the points made above with a dairy farmer this morning. Perhaps young calves are infected orally and then pass on to the cow udder when suckling. Dairy cows must calve before they lactate, of course.

Thanks very much for what you do for all of us. I will continue to attend your programming. It is an amazing thing to have access to the talent and knowledge you both have and share.

It also creates a burden of responsibility for us to attempt to do something good with this knowledge." Grant is in Alberta, Canada.

DG: Great. Thank you, Grant. As we said last time, I'm hoping - and this is one of the reasons I do this with you, Vince. We need to keep fact-checking each other, and it's great when our listeners fact-check. Based on that study, I think it was out of Japan, they were actually putting forward this as the idea, this is how the dairy cows infect the udders that they're somehow reaching around. I'm going to have to go check out a local dairy and see if I see any of this milk-stealing behavior, and see if it's physically possible for them to wrap their head around there.

VR: He says it's not, and you can imagine, it's way in the back.

DG: I'm trying to picture my cows because I own some cows, seeing if they could somehow get their head wrapped around.

VR: You weren't making anything up. You're just saying what was in the article, basically, right?

DG: Exactly.

VR: And what CIDRAP was also reporting.

DG: Yes. We need to see some videos here.

VR: Look, you and I don't know anything about cows, so I can't help you there.

DG: Yes. [chuckles]

VR: Alessandro writes, "With the current administration's dismantling of the advisory committees of the CDC and FDA and the unopposed unilateral and unqualified decision-making by HHS secretary to undermine the science-based recommendations of those institutions, there is a great deal of concern surrounding reimbursement by insurers, especially as it relates to vaccines and childhood vaccine schedules. Medical organizations and influential members of the public health community, such as yourself, that have expressed grave concerns about these exploitations of our federal health infrastructure, need to remind themselves that most insurance, including health insurance, is regulated by the states.

As such, organizations such as the American Medical Association, the American Pediatric Society, the American College of OBGYN, and the Infectious Diseases Society of America need to lobby state regulators to ensure that science-based vaccine schedules and health care protocols sponsored by these organizations continue to be reimbursed by insurers, even if the guidance from CDC, FDA, and HHS suggest otherwise.

State regulators could require insurers operating in their state to follow the schedules set out by APSA, COG, and IDSA, ensuring that citizens of their states receive coverage based on scientifically validated standards and not the whims of an unqualified demagogue bent on destroying evidence-based medicine in our country. Thank you for your efforts in presenting the science behind the medicine to a wider audience in order to get us to a point where we can say everyone is safe."

DG: This is reassuring. Thank you for writing in.

VR: Volker writes, "Here's a quote from the episode with the number of your Apple Watch password. That's one, two, three, four." Daniel, a lot of people are very concerned that you gave away your Apple Watch password.

DG: Oh, no. Now they're going to steal my Apple Watch and my fortune. [laughs]

VR: OK. Remember, these are children, 256 pediatric influenza deaths. As we talked about before, over 90% were not vaccinated, so 90% of these little children could be alive. OK, that was your quote. Then back to Volker. "If the unvaccinated 90% could have been saved, that would imply the flu vaccine is 100% effective against death in children, but then why did the 10% who were vaccinated still die? I ran the numbers, assuming a vaccination rate of 55% in children and 10% of the deaths occurring among vaccinated children, the vaccine effectiveness against death works out to roughly 91% using the screening method. At a 100% vaccination rate, the expected number of deaths would be below 50, so about 80% of the 256 deaths might have been prevented.

That's still a remarkable effect, and it likely remains so even after considering possible adverse effects and costs, especially when weighed against the medical and societal costs of treating severe flu in children. Since you often emphasize sticking to the science, may I suggest phrasing this more precisely to avoid overstating the wonderful effectiveness of vaccines, even if you meant that 90% of the unvaccinated children might have been saved, a clearer wording would help. Thanks very much, and keep up the great work."

DG: Thank you, Volker. [chuckles]

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

DG: Thank you, and everyone, be safe.

[music]

[00:48:20] [END OF AUDIO]