

## TWiV 1298 Clinical Update

**Host: Vincent Racaniello**

**Guest: Daniel Griffin**

**Aired 21 February 2026**

**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 1298, recorded on February 19, 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:** It looks like spring is coming soon, right, Daniel?

**DG:** Maybe, except I think we're about to get hit with a nor'easter. Let's see.

**VR:** You mean like rain, whipping rain and all that stuff?

**DG:** Yes, wind blowing in from the northeast. I just got an email today from one of the guys I sail with. He's like, "Oh, we should sail this weekend." I'm like, "I think the bay is still frozen." I was running by it earlier today, and it's hard to sail when the bay is frozen.

**VR:** What's the red tie? I don't know if I've seen that one before.

**DG:** It's bright orange, and it's prions again. It's been so gray that I actually had a different tie. I had anthrax picked out, and I was like, I just need something to brighten up this dark.

**VR:** OK, well, that does it, but prions are not a good thing.

**DG:** Yes, so bright orange prion bow tie. All right, well, let's start off with the quotation. We have a lot to talk about. I even have stuff, I'm like, all right, I'm going to talk about that next week, because there's just too much stuff going on. "If we try, we may still fail, but if we do not try, we cannot possibly succeed."

**VR:** That's totally right. I was on a conference call, and I was suggesting things, and someone said, "That'll never work." I said, "Well, we have to try." [chuckles]

**DG:** You got to try stuff, right? If you don't do anything, then you're definitely not going to succeed.

**VR:** No, you have to try. You cannot give up.

**DG:** In these times, I think a lot of people are just overwhelmed. I got to admit, I just feel like, I don't know why we keep doing this, but I think we need to keep doing it because, like today, there was an outbreak, measles, on a pediatric ward, and people are desperate for guidance. They reach out to us, and they say, "Well, what do we do? Oh, my gosh, a newborn, and got exposed to measles, and this is what they're saying, and what's going on?" It's really tough. I think someone posted this in. I got a flood of texts and emails. "FDA reverses course and will now review Moderna's mRNA flu vaccine." What's going on, Vincent?

**VR:** Well, this guy, Prasad, he makes decisions, and then he changes them. It seems to me he doesn't think it through the first time because they could have gotten together last week, discussed this, come to this agreement, and not have all this brouhaha, right?

**DG:** Yes. We talked about it last week. There have been ongoing discussions. There was an agreement, understanding, and there's a lot of paperwork back and forth. There's so much paperwork, I think, Alan was commenting - at this point, it's not even paperwork because it had become like trucks of paper. It's actually massive quantities of electronic data. It's amazing how much detail, care goes into trying to understand if it's OK to introduce a new product.

There was this agreement between the FDA and Moderna. Really, ultimately, at a basic level, straightforward. "We'll compare our vaccine to the flu shot that everyone gets, the standard flu shot, and then we'll see. We'll look at safety issues, we'll look at efficacy issues." They finish the data. Prasad's like, "Oh, no, I changed the goalpost." You really should have compared it to high dose. It's like, really, where were you? Where were you when this was going on? You didn't tell us that. You didn't ask for that. Sure, that's something we could look at as well. I've actually had a chance to look at some of the data. It's good data, Vincent.

**VR:** Oh, good.

**DG:** The fact that they hadn't looked at it was just ridiculous.

**VR:** Basically, they looked for a 50- to 64-year licensure. They were good with that. FDA was good. Then when they came with the data, Prasad said no. Then they talked and they said, "OK, we'll probably license it for 50 to 64. Then if you want to do 65 and over, you need to get more data." Moderna said, "Fine." They could have said that at the beginning, last year, could have done it last week or whatever, but it's just a lot of nonsense. As you say, it gets people worried about the vaccine.

**DG:** It went from Moderna closing divisions, laying people off. Other companies saying, "If this is the landscape, then we're not going to invest in vaccines." This is just - I'm sure, this is not for the economy. It's not making America great. It's not making America healthy. It's not doing anything, but really just supporting this anti-vaccine, this anti-science agenda that some folks have.

**VR:** Well, I'm glad it's solved now. That's good, at least.

**DG:** At least it's going in the right direction. I'm not sure it's quite solved, but yes. Then what is this? Apparently running the NIH and the CDC, you can do both at the same time?

**VR:** Well, Bhattacharya doesn't do anything at either place, so it's no problem to have two jobs where you do nothing. I mean, this is crazy, right?

**DG:** It really is crazy. At least he's really well-trained in public health, right?

**VR:** I was going to ask you that. What's his training?

**DG:** Like zero experience in public health, pretty much.

**VR:** He's a health economist, right?

**DG:** Yes, but at least we're going to figure out how we can save money because it's really not about actually taking care of people. It all comes down to money.

**VR:** I know. Well, look at the EPA rule that they threw out last week. It's all about saving money. They don't care that people are going to get lung diseases from pollution and so forth.

**DG:** It's really crazy when you think about RFK's roots. RFK was this guy who rose to prominence, supposedly championing getting toxins and all this bad stuff out of the environment.

**VR:** It's crazy.

**DG:** Yes, you got to ask, is he really just in it for the money? I think we know the answer because it doesn't look like this administration is really focused on taking care of us. All right, well, I want to mention, I don't know if you guys are going to do a deep dive on this, but the article, "Adenoviral Inciting Antigen and Somatic Hypermutation in VITT," was published in *The New England Journal of Medicine*.

**VR:** Yes, we're going to do that tomorrow.

**DG:** Fantastic. All right. This'll be like a preview, a primer, an intro before the deep dive. Our listeners are probably aware of this issue. When the J&J vaccine was being introduced, a lot of us were excited. I have to say, in my position at UHG at the time, we helped finance, we helped in every way we could because you want to have options and you really want, in a lot of parts of the world, to have a one-shot vaccine because it is often hard to get the two shots. A lot of parts of the world, the mRNA and the freezing requirements were a huge challenge. We spent a lot of time, I spent a lot of time trying to help in that process.

We noticed that there were individuals, rare, prothrombotic complication where people would get this adenoviral vector-based vaccination against coronavirus disease 2019. They would end up with these clots, really was clots that would, in some cases, result in death. What exactly was going on? We learned early on that this VIIT, vaccine-induced immune thrombocytopenia and thrombosis, so a lowering of the number of platelets and then a thrombosis. It was vaccine-

induced, it was immune-mediated. We realized it was because they would develop these platelet-activating antibodies against this protein platelet factor 4, PF4.

The real question was, why is that going on? What is it about these particular individuals? The investigators here used antibody proteomics. They're going to look at the amino acid sequences of the anti-PF4 antibodies from 21 patients that developed this VIIT. They sequenced the genes that encoded the immunoglobulin light chain hypervariable region from 100 patients with VIIT. They're looking to identify either the adenoviral trigger or really what I'm going to say is they're trying to see what it was about these particular individuals.

What they found was that you've got a whole bunch of different light chains, a whole bunch of different heavy chains. They really found that these individuals shared a particular immunoglobulin or antibody light chain allele, that was IgLV3-21 and either 02 or 03. They would develop this critical somatic hypermutation, this K31E. A K changed to an E at position 31. Think about you've got this germ line coded in your genome, this particular light chain, and then it goes through the changes and it gets this particular change. That's going to actually result in this targeting.

They have a really nice figure because this stuff gets really complicated. VIIT occurs when people have this specific light chain allele, and then they get a specific change when they go through the hypermutation process. Then you end up with this misdirection of this antibody that then targets PF4. Then you end up basically activating the platelets.

**VR:** Because there's, of course, reactivity between the adenovirus protein and this PF4, right?

**DG:** Exactly. Starts off with a molecular mimicry, but then this particular mimicry is really going to create this issue in particular people with particular immunoglobulin genetics, and then the particular change. I look forward to you guys doing a deep dive because you're going to have, what, Brianne there helping us out?

**VR:** Yes, Brianne will be there. This is really interesting to figure out the mechanism so you can somehow avoid it in the future.

**DG:** Yes.

**VR:** Obviously, this is pretty rare, and it depends on you having that particular light chain allele, right?

**DG:** Yes. I think there's two ways to approach it. One is we might prescreen folks. The other is maybe figure out you make a little bit of a tweak in the vaccine so as not to trigger this, right?

**VR:** Yes. Although I think people are scared of this vaccine, this vector, I'm not sure that it would get accepted.

**DG:** This may be the end of adenoviral vector vaccines.

**VR:** At least for 100 years, and then everybody will forget.

**DG:** Yes. [laughs] All right. Measles. I have a lot to talk about with measles. First, let's talk about South Carolina. We're up to a total of almost 1,000, so 962. This is the number of confirmed cases. It really clusters right up there in upstate South Carolina by the North Carolina boarder. It's the same thing. These are basically unvaccinated individuals. Little over 900 cases, unvaccinated. It's really hitting these kids mainly in the 5 to 11. I'm going to talk about why that's so bad. The 0 to 4, about a quarter of them. Almost half are in the 5 to 11. Another quarter is in the 12 to 17, and then just a few past that point in time.

We've talked about this unvaccinated population has gotten to these critical ages where they're being hit by this. Not only do we have this going on in South Carolina, but there's also that Florida University outbreak. The headline, 40 people have fallen ill. It's actually already more than 40. Utah. Utah has confirmed 300 measles cases in an ongoing outbreak with the virus now spreading in Salt Lake County. New exposures at high schools. Leave in a link to that.

**VR:** Nels Eldy has a young child, and I'm sure he's vaccinated her.

**DG:** Yes. Just to remind people, we usually start vaccinating, we say 12 to 15 months or so. It's probably 12 months is time to start there because we're living in this different world. There's a nice, if you look at the Hopkins, it's a couple of different ways. You look at cumulative cases over a little more than the last year, and you can see where all the spots are. See, this is local. This is not people flying into the country, and even more so when you look at where measles cases are now, looking at the recent cases. It is a little crazy when you look at the Hopkins. What's that total number for this year? 259? We have almost 1,000 in South Carolina, and we've got over 300 in Utah. Even the Hopkins people, it's a little low compared to what we're seeing.

**VR:** CDC does measles, and they have more than -- they have 900 and some cases on the CDC website.

**DG:** Which is not even - add up 963 over three years. We're taking all the time.

**VR:** We should point out that these are all preventable. If we had comprehensive vaccination, there would be no cases of measles in the U.S. as there was in 2000, right?

**DG:** Yes.

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

**DG:** It really is. I keep beating this drum. I think people need to be reminded over and over again how bad a thing measles is. There was a nice review in the spring in the *The New England Journal of Medicine*. I'm going to leave in a link to that.

**VR:** That's good.

**DG:** It's really nice. One is, you have some nice photos, and this should help for clinicians. Looking in the mouth, seeing those Koplik spots on the buccal mucosas, that's the inside cheek mucosa. You can see the area where it's a little bit of red, and it looks like these little white spots there. You can see the rash, which used to be really the classic rash and everything, was

measles-like, more billiform, measles-like rashes. They have a picture. They say conjunctivitis, but the eye's closed. All right, you can see, I guess, the whole area there is swollen.

Nice time course where they start at day zero, so day zero is when you see the rash, but they make a point. It's like you go back day four, and you're already starting to see the three Cs, so the cough, the coryza, which is really this inflammation, and the conjunctivitis, so that really red, runny nose. Then when the rash comes, that's when you often see diarrhea. That's when you move into this period of time, which again, education for everyone, this immunosuppression period that really starts a few days, four days after the rash occurs, and can really last for quite a while.

That's when that diarrhea may not stop. The kids may end up with inflammation of their lungs. About 20% of the time, they're in the hospital, desperately trying to breathe, requiring oxygen support. The conjunctivitis can get so bad it can actually cause a keratitis and corneal ulcers. This is when they might get the otitis media and the deafness. This is when you might see that measles-associated encephalitis, so inflammation of the brain. Then it follows. You get a month out. It's not over yet. That's when you might see issues with nutrition. That's when you might see pneumonia and secondary bacterial pneumonias. That's when the kids, as mentioned with all these eye issues, might start to develop blindness. They might get other secondary infections.

Then what I really want to spend a little time just to remind people about this really devastating immune amnesia and talk a little bit about what causes that. The problem is the measles virus uses receptors that are present on the macrophages. That's OK. We all like the macrophages, but more importantly, the same receptor, SLAM, is on your T and your B memory cells. Measles virus gets in. Those cells then get targeted by the whole immune system. We wipe them out. In a mild case, you lose about 30% of your antibody repertoire and your T cell repertoire. In a severe case, that can go up to 70% or 80% depletion.

These kids, if you're vaccinated, you're just fine. You don't get that. If you get measles without the vaccine, even a "mild case," you're going to lose about 30% of all your immune memory. You're going to have this prolonged period of immune suppression and vulnerability. If you end up, 20% of the kids are sick enough that they're in the hospital, 70% to 80% of your memory and T - B and T cells gone.

**VR:** I was talking about the complications of measles last night on the stream. People were saying, "Oh my gosh, I didn't know this. Why doesn't the press ever mention all these things that can happen?"

**DG:** We're happy to talk about it.

**VR:** It's bad. It's not an easy disease, as RFK Jr. always says.

**DG:** Yes. It's not like the Brady Bunch, where everyone is just all OK at the end.

**VR:** The SSPE, it's six to eight years after you recover. We're going to start seeing, in 10 years or so, cases of that in the U.S. That's horrible. It's fatal.

**DG:** That is correct. You think everything's fine. You think you made it through this. Then six to eight years later, all of a sudden, your child's maybe not acting well and you get a call from the school. Now Sally's got this encephalitis, which could be fatal. Really horrible. I think we need to keep reminding people this is not OK. As we warned, when you mix medicine and politics, you'll end up with dead and sick children.

All right, Flu A. Flu A and Flu B. All the flus. At least here in New York, we shared our data and it's good. We're down to low levels. You guys there in Jersey, I know you're recording from New York, but Jersey's looking pretty good.

**VR:** It's good.

**DG:** South is not looking so great.

**VR:** South, Midwest, West, man.

**DG:** Actually, if you look in the whole Texas, Midwest area, it's actually growing in some places. Florida's definitely growing, Alabama, Mississippi. It's like the coasts are getting better. The West Coast seems like it's getting better, but somehow it's growing in Nevada. People are moving all around there. Minnesota's not looking great. We ran into that thing that I was saying, a 50-50 chance of you're on your way down. Then I blame the Super Bowl. It's the Patriots' fault.

We had a patient today. He came in. He's like, "Oh, I had this back pain. I got really bad Super Bowl Sunday." I was like, "Were you rooting for the Patriots? Is that what triggered?" No. Then if it doesn't get down quick enough, then you can have either another peak or this plateau. We're sitting on a plateau now for a couple weeks now. Hopefully, it's plateau and down and not rise, but I think it's plateau and down at this point.

Pediatric deaths are up, 66 children have already been counted as died from flu this winter. Flu is not so great either, by the way. Remember, there's treatments out there. There's post-exposure. There's things we can do. By the way, there's vaccinations. If you get them, they might work. If you don't get them, they don't work, actually.

**VR:** I think a lot of people feel that flu is not serious, so they don't bother to vaccinate, and it's not right. It can be very serious.

**DG:** It can be really serious. We lose tens of thousands of people every winter from the flu, and they're not necessarily people that are going to die anyway. As we see with the children, half of the kids that die, they were completely healthy before this happened. RSV levels are still high. I talked about that they haven't quite gotten to the same levels, but they're high. It's really weird. Here we are in February, and in a lot of the country, it's growing. It actually hasn't really moved out. This RSV season is stretching out for some odd reason this year.

I'd like to point out, RSV is also not something to take lightly. We've talked about the fact that it's not just, "Oh, I got RSV, and I have some trouble breathing," and the RSV lung issues, but the fact that these viral illnesses can actually trigger cardiac issues. You think, "Oh, I got RSV," but it's really having that heart attack, going into heart failure, having these rhythm disturbances.

Here's the article, "The Risk of Cardiac Disease Events After Respiratory Syncytial Virus Disease: A Systematic Literature Review and Meta-Analysis," published in *European Respiratory Review*. It's a standard review. They search Embase, PubMed, gray literature sources. They don't do from inception. I like when they say inception, but between the 1st of January 2006, March 2024, reporting on cardiac events in adults with RSV disease. They use a validated checklist to look at study quality. Absolute and relative risk of cardiac events following RSV disease were summarized, pooled estimates.

So, 3,887 publications, 28 met the inclusion criteria among hospitalized patients with RSV disease, 25 studies. The pooled estimate showed that 19.2%, so almost one in five, experienced any cardiac event. This could be heart failure 16% of the time. 15.7, heart failure. Acute coronary syndrome was 5.4% of the time. Cardiac event-related mortality, that looked at different studies. Some, it was as low as 1.1%, but it was as high as 9.8%. Actually, it was higher when they compared this to the folks with flu, about 10%, 20% higher.

**VR:** What is going on here? We have oxygen deprivation, heart has to work harder, also inflammation going on. Is that all playing into this?

**DG:** We also think there may be an inflammatory component that's increasing potential for these. Not good, right? All right.

**VR:** Another reason to get vaccinated, right?

**DG:** Yes. Thinking about we need to market these vaccines differently. I was having a conversation the other night, in-laws were in town, about if they market that one vaccine as, "Hey, you're 50 years old. You want your dementia vaccine? You want to reduce your chance of dementia by 50%?" it's better than, "Do you want your shingle shot?" Right? People will definitely rush out and get their dementia. Here, we're seeing, "Do you want to get a vaccine that's going to reduce your risk of a heart attack by 20%?" We need to start saying, "The flu, the RSV, the COVID, they reduce your risk of dying of a heart attack." Who wouldn't want a heart attack vaccine?

All right, SARS-CoV-2. Levels are still high. The Midwest is still sitting up there in the very high level. Maybe it's going to come down.

**VR:** No, it looks like it's trending downwards.

**DG:** It's doing that bumpy thing, right?

**VR:** Yes, bumping on its way down, maybe.

**DG:** [laughs] I hope it's bumping on its way down. Nationally, we're still at the moderate level when you look at the trend lines. We'll keep an eye on what's going on there. It's different areas. In Florida, Texas, it's growing. Up here in the Northeast, it looks like it's declining. Different parts of the country, but a lot of parts of the country is just holding steady.

All right, so you get COVID. What about actually getting some antiviral treatment? The *MMWR*, just hot off the press today, "COVID-19 Antiviral Prescription Receipt among Outpatients Aged ≥

65 Years, United States, June 1, 2023 - September 30, 2025." Here we read that despite the proven benefit of COVID-19 antivirals in preventing severe outcomes, data suggests that their use is low among older adults. They looked in outpatient settings at people who had a positive SARS-CoV test result, that COVID-19 diagnosis during this block of time.

The percentage of COVID-19 outpatients aged 65 or older who received an antiviral prescription was lower in spring 2024. I'm going to put "onlys" in here, only 21%. Fall, winter, 23%. Spring 2025, 16%. Summer 2025, 19%. Then during other season ranges where it was up at almost 40%. Almost everyone, 99%, got those within seven days of a positive test result. 80% was nirmatrelvir-ritonavir, so the Paxlovid.

Now, the odds of the adults getting an antiviral prescription were higher if you were older, so 75 to 84 and over 85, about a 10% higher risk. Apparently, if you're Asian, it was about a 40% higher.

**VR:** Interesting.

**DG:** Higher in Hispanic or Latino, about 24% higher. Interesting, it was also higher in those who received one or more COVID-19 vaccine doses, about 70% higher. That's probably like your educated consumer saying like, "Hey -

**VR:** They know the value of proper healthcare. Don't listen to the naysayers. I think the low numbers are in part because people are dissing Paxlovid, for example. Even physicians say, "Oh, the side effects, you don't need it. Let's wait and see." Also, the cost, right?

**DG:** Cost is an issue, yes. We've talked about that. There was also what was a big issue is people who, ready for this, who had at least one comorbidity. That's like you should be getting it, and rural residents. If you lived in a rural area, you had lower odds of getting an antiviral prescription.

**VR:** Maybe it's harder to see a doctor. I don't know. I don't know what rural is. Is New Jersey rural?

**DG:** Parts of it.

**VR:** Is Long Island rural?

**DG:** Again, parts of it.

**VR:** Parts of it. OK. We're not talking about Arkansas here.

**DG:** Well, I think it's all across when they looked at areas where - yes.

**VR:** I'm just joking.

**DG:** We can actually probably break it down that way too. All right. Let's see. Two articles here to wrap up the Long COVID section before we get into our emails. The article, "Assessing the Impact of SARS-CoV-2 Infection and Vaccination on Fertility and Assisted Reproductive

Technique Outcomes: An Umbrella Review." I discussed this on the *Infectious Diseases* podcast. This was published in the journal *Vaccine*. I speculated a little bit upon the selective pressure.

They ultimately are going to look through and identify 647 studies. Fourteen studies with 40 outcomes were included. Now, based upon these studies, it appears that COVID-19 infection may decrease semen quality in men, including semen volume is going down, total sperm count is going down, sperm concentration is going down, viability and total sperm motility are reduced. You actually end up with elevated levels of estradiol.

**VR:** What age men are we looking at here? Do you know?

**DG:** This is a wide swath. Over 600 studies, 14 get included. It would really matter. It was interesting hearing some of the latest stuff going on at government levels where they're bemoaning the fact that older men have low sperm counts. I'm like, I don't care. [laughs] The guy is 70. He has low sperm count.

**VR:** Well, some billionaires want to have more kids. They want another wife and they want more kids, so they're worried about that.

**DG:** Sorry. Not a lot of empathy here, Vincent. What about from you? Are you feeling bad for the old billionaires?

**VR:** No, I'm not feeling bad at all. They're just evil. This is interesting. It says it remains low over 90 days after recovery, or after recovery, 90 days after infection. It's crazy.

**DG:** Now you got a vaccine. This doesn't do all this bad stuff. This is like the "natural SARS-CoV-2 infection." Here was what I was thinking, Vincent. This is evolution selecting against the people that are going to go out there and keep getting COVID-19 infections. We're going to have a society of introverted, thoughtful -

**VR:** (chuckling) Darwin at work. Interesting, the female reproduction, the ovarian reserve, follicle count, and other things, oocyte number, is not affected.

**DG:** Yes, they were fine. The ladies were fine.

**VR:** I wonder what the basis for this is in men, if it's inflammatory effect.

**DG:** Be interesting, yes, the mechanism, what exactly is going on.

**VR:** I assume at some point you recover, right?

**DG:** Yes, then those old billionaires can have those trophy wives and more kids.

**VR:** Young people who get COVID and want to have a family, they have to keep it in mind.

**DG:** We already have so much sperm and semen and stuff. Even if you reduce, they're like, 50% reduction, is that still enough?

**VR:** That's true. It may not make a difference. I just don't know. It's not my area, but maybe you don't take much of a reduction to have an impact, right? It's like a virus finding a susceptible cell. They've got a lot of sperm and they're swimming around and most of them die.

**DG:** You only need one, right?

**VR:** You see the Woody Allen movie, right?

**DG:** [laughs] Oh, yes, I remember that. All right. "Long-Term Risk of Incident Type 2 Diabetes Following SARS-CoV-2 Infection: A Population-Based Study in British Columbia, Canada," published in *Diabetes/Metabolism Research and Reviews*. Here, the investigators conducted a retrospective cohort study of all British Columbia residents aged 18 or older tested for SARS-CoV-2 by RT-PCR, this block in time, January 1, 2020, to 31 January 2024. You couldn't have diabetes before, so you had to exclude a certain number of people. Incident type 2 diabetes identified more than 30 days after testing was ascertained.

They look at over 2 million individuals. 296,390 were SARS-CoV-2 positive, 1,748,031 were negative. 2.3% incident type 2 diabetes cases were identified over a follow-up of 874 days. When you compare the SARS-CoV-2 negative, you see about a 20% higher risk of getting diabetes, being diagnosed with type 2 diabetes, SARS-CoV-2 positive folks. Now, no evidence of associates was found among the vaccinated subgroups. This is what happens to you when you don't get your vaccines. You got no sperm, you get diabetes.

**VR:** You get heart attacks.

**DG:** You get heart attacks. I'm just seeing more and more reasons why I want to be in the vaccinated group in all these studies.

**VR:** This information has to be spread. We're doing our part. Folks, you have to hear and tell your friends and family, this is all a problem.

**DG:** Yes. All right. No one is safe until everyone is safe. We're in the middle of our Floating Doctors fundraising, hoping to double your donations up to a maximum donation of \$20,000. Go to [parasites.borders.com](https://parasites.borders.com). Click on the Donate button. If you like what we're doing, or you just want us to keep doing it, or you want to support Floating Doctors.

**VR:** It's time for your questions for Daniel. You can send yours to [daniel@microbe.tv](mailto:daniel@microbe.tv). Daniel writes, "I would like to thank you and Professor Racaniello for your outstanding, inspiring science communication. It's currently -27C in Edmonton, Alberta. I have a question about travel safety for young children. What steps can parents take to minimize a nine-month-old and a three-year-old risks from infectious diseases in rural Zimbabwe during August, the dry season? Our niece and nephew's parents are planning a trip to Zimbabwe in August. My partner and I are wondering about any advice that you could provide to help reduce their risk of illness so everyone can have a happy and healthy trip. Thank you again for your time and expertise. A very worried uncle and aunt."

**DG:** OK. First thing, it sounds like going during the dry season because that really does matter. There's a much higher risk of issues during the wet season. The other is I'm going to say, when

you're talking about a nine-month-old, a three-year-old, this really a case where you want to ante up and go see a travel medicine expert. They have excellent travel medicine doctors in Canada. Our guest, Aisha, right? Aisha is a travel medicine expert there in Toronto. Really, this is a question. Reach out. They're going to give you all the advice about chemoprophylaxis, what medicines are safe, ways to protect oneself from insect bites, things like that. I would really, in a case like this, spend the time and effort getting that expert guidance.

**VR:** We're talking about a lot of insect-borne diseases. Not just malaria, but a lot of the parasitic diseases as well, right?

**DG:** Yes. Waterborne, foodborne. There's a lot going on to think about. When you're talking about travel protection when it's 27C in Edmonton, my travel advice is going to be stay home. That's too cold.

**VR:** Mikayil writes, "Firstly, thank you for all you do to keep the public informed. I'm a first-year veterinary student at the University of Tennessee, and our school is potentially starting a program with Floating Doctors. I'm lucky enough to be one of the first students to volunteer with Floating Doctors as part of that. With that in mind, I'm trying to plan vaccinations and other precautions before I travel to Panama this summer. With all the unfortunate changes at CDC, are their travel recommendations still reliable? If not, are there any alternate resources you would suggest I utilize?"

**DG:** Mikayil, the cdc.gov travel section is still reliable. Little subtleties. They often give whole-country recommendations. For instance, in Panama, you're going to see malaria south of the Darién Gap. You're not going to see it up there on the Costa Rican border where Floating Doctors is. I've been talking to Ben LaBrot. You'll get to probably meet or interact with some of his staff there who runs, founded Floating Doctors. Try to keep track because there's always the possibility that malaria could move into some of these communities, so we need to keep an eye. For now, the CDC travel recommendations are still reliable.

**VR:** Kathleen writes, "Dear Daniel, an issue to review on Clinical Update. I get my immunizations in the vastus lateralis after extended shoulder pain from COVID immunization in my arm." Kathleen sends a *Nature Vaccines* article entitled, "More than Half of Shoulder Vaccinations May End Up in the Subacromial Space." I don't know what any of those words mean.

**DG:** [chuckles] When you get a vaccine, you really want it to be in the meat, the muscle, but if you go up a little bit, you'll feel that, oh, it can get a little bit above the meaty muscle, and then you're going to get into that space that she describes as subacromial space. You get into the bursa, all kinds of other issues. A lot of people still old-fashioned, giving you shots in the butt. We don't recommend shots in the butt, so what we're hearing about here is getting your vaccines in the lateral thigh, which is a great meaty muscular place to throw those vaccines. The vaccines were studied. You can do that as well.

**VR:** All right, we'll put that link in the show notes. It seems to be an open access paper.

**DG:** Fantastic.

**VR:** Rich writes, "Isn't it true that the amount of chronic Hep B circulating in the general population increases without vaccination at birth, creating greater risk of transmission for a wide range of health practitioners, first responders, and anyone coming in contact with blood from a carrier? I'm a retired dentist from a family of dentists and dental hygienists. My uncle, a dentist, was infected with Hep B in the office. He suffered and survived the acute infection. There was testing showing no chronic disease, and he was not assigned carrier status.

"A few years later, five to 10 years, he succumbed to a cerebrovascular event accident. Conceivably, the Hep B infection contributed to his passing due to inflammatory changes weakening the cerebrovasculature, in light of data linkage of all-cause mortality to viral infections. These events and my close association with the situation, owing to covering for my uncle during his illness, have left a lasting impression and have heightened my disgust over the charlatans and their decisions at HHS, CDC, FDA. Thank you for your continuing work. Fight on."

**DG:** Thank you for sharing this. I think we've been pretty clear that we're disgusted with these changes, which are putting the little kids at risk. You get exposed, 90% of those infections are going to become chronic. Quarter of those kids are going to go on to have a shortened life due to chronic hepatitis B, and we left in links when we discussed that, so really horrible.

**VR:** He's right. There's going to be more circulation in the general population, so health practitioners are going to be more at risk, right?

**DG:** Yes. Fortunately, we have the ability now to get vaccinated, but yes, not only is it horrible for the kids, but you're just increasing it in the population, so it's horrible for them, it's horrible for everyone else who might get it from them. What a backward approach.

**VR:** Lisa writes, "Hello, very good doctors. When persons have been vaccinated for measles and they contract a mild case, do they still suffer the immunity amnesia?"

**DG:** This is great. Yes. I preempted this. I didn't talk about this. I left some links up above. We get this huge range. They say that immune amnesia can be a decrease in your T and B cell repertoire of between, we'll say, 11% and some number in the 70s, but as I pointed out, the severity of the case is going to affect that. You might see a 30% reduction in a mild case where the severe cases are going to have more, but the whole idea that, "Oh, I had a mild case, I don't need to worry," unfortunately, we actually see, even in mild cases, we see this immune amnesia.

**VR:** I put a figure in here from the original paper, and you can see the kids with mild had reduction in their antibodies to different viral epitopes.

**DG:** Then there's this effect. Once you lose those T and B cells, there can be this repertoire depletion, where you have trouble getting those back. Even though we say, "Oh, we've got to re-vaccinate and bring them back," it's not clear. I left some links into this where you end up with this depletion.

**VR:** It's interesting. I don't know if the depletion is 100%. It's less than that. You're not going to get every cell. Maybe in time, you would self-regenerate because some of the cells are still there, it would just take time. I just don't know.

**DG:** I was surprised looking at this. A lot of this research was not back in the day. It's been in the last few decades that people started really looking into this. Unfortunately or fortunately, depending on how you look at it, probably going to be some more studies trying to better understand this. Then what kind of repletion do you see? How do you potentially enhance that?

**VR:** This was first reported in a paper by Michael Mina, who you may remember.

**DG:** Yes. Stacks. Stacks of stacks. [laughs]

**VR:** Stack. We had him on an early episode of *Immune*, actually, to talk about that. It was really a good finding. That's *TWIV* weekly clinical update with Dr. Daniel Griffin. Thank you, Daniel.

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

[music]

**[00:43:32] [END OF AUDIO]**