

Booster Coronasode: Shots & Holidays with Vaccine Infodemiologist Jessica Malaty Rivera

Ologies Podcast

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Oh hey, it's that squirrel building a winter nest in your barbecue, Alie Ward, back with an episode nobody wants but everybody needs. Here we are; we're on the cusp of 2022, it's still weird to wear pants with zippers, we live on Zoom... what's happening? So, after watching your aunt's forehead as she ate mashed potatoes last year on a screen, everyone is excited for hugs, and cookies, and layovers, and using their toiletry kits again, and scrolling on their phone as uncles watch football. So, I thought I would absolutely just break my brain by making an extra urgent Coronasode Booster... that we recorded yesterday. It's all about surges, immunity, booster shots, travel, the forecast of the pandemic... What are we doing?

Who better to ask than somebody you already love? An ologist you have met in previous Coronasodes, who is a microbiologist, who earned her Master's in Emerging Infectious Diseases from Georgetown University School of Medicine. She's an infectious disease epidemiologist, who was the sci-comm lead at the COVID Tracking Project and now works with Boston Children's Hospital. She specializes in explaining pandemics to people and 361,000 followers in Instagram, rely on her daily for up-to-date data, and flimflam busting, and peer-reviewed study links and more. So, I texted her a couple of days ago and was like, "Hey can you spare a little time to explain just, what in the hell to do for the holidays?"

So, before we get to that, a few thanks. Thank you to all the patrons at [Patreon.com/Ologies](https://patreon.com/Ologies) for supporting the show for as little as 25 cents an episode (it costs a dollar a month to join) and submitting great questions. Thanks to everyone who sends their friends episodes and who subscribes and rates and reviews, I literally read every review like a creep so that I can pick a fresh one, like this one from Nathan_Wilg, who wrote:

I'm in awe of how this podcast manages to get a whole community to rally around even the most niche, off-the-wall fields of study every week without fail.

Also, congrats on the double marathons, Drgsucre. And Beth, let's coffee.

Okay, so let's get ready to stuff your stocking with just a whole lot of updates. We'll be chatting about how vaccines keep you safe from infection, on COVID rates, forecasts, immunity, booster choosing, contagious explanations, reassurances, and the future of living with rather than dying from this spikey bitch of a virus, with a truly wonderful matriarch of metrics, a triple return guest, and a slayer of flimflam, Vaccine Infodemiologist, Jessica Malaty Rivera.

Alie: We have so many questions. No one's been on *Ologies* as much as you.

Jessica: [*gasps*] That is such an honor! [*both laugh*]

Alie: I'm sorry we've had to have you back so many times but thank you so much for doing this.

Jessica: I mean, can I also say maybe it's because we're, at this point, friends?

Alie: Yes! That's also true. [*Jessica laughs*] It's just nice to catch up. Oh my god. And I know, you know, obviously we're going into the holidays, this is going to go up, literally tonight. So,

this is also going to be a fresh as hell, like, steaming hot episode. The turnaround on it is going to be break-neck pace.

Because in North America at least, in the US, Thanksgiving is coming up, holidays around the world are coming up. Everyone is asking so many questions. And first off, I want to just ask, how are we with infection rates globally, around the world? I know we've got about 50,000 coronavirus patients in the hospital, in the US, right now. Are we seeing it rise with flu season, or what's going on?

Jessica: Yes, so there's kind of an overall increase. And having flu be worse than it was last year is definitely not helping this whole situation, especially as we're trying to protect our hospitals and our healthcare infrastructure from being strained. Because of that, it's so important that people get their flu shots and their COVID-19 vaccines to prevent another hospital surge that we saw last winter.

Thanksgiving, historically speaking, pre-COVID, has always been this catalyst for major flu transmission; you notice a peak in flu cases the week and the two weeks after Thanksgiving. And here we are, the week of Thanksgiving, all of us are kind of bracing for impact and hoping that folks are vaccinated before they start doing their large gatherings and family reunions.

Alie: I didn't realize that Thanksgiving was sort of like, kick-off season for flus every year. I didn't realize that. [*grunt*]

Jessica: Yeah, it really is.

Alie: Just like, [*nasal voice*] "Can I have a bite of that cranberry sauce? ... Same spoon."

Jessica: I mean, my most vivid memory of flu, for myself, was at Thanksgiving in high school and I was like, "I'm dying, this is it."

Alie: [*laughs*] This is what I get for putting olives on the tips of my fingers and then sucking them off with my mouth and touching everything... sorry fam. [*Jessica laughs*] Well gross, and also good to know.

Where are we with vaccination rates? Are we right under 60% in the US?

Jessica: Yeah, we're just under 60% which [*sighs*] is honestly painful, we're just inching along. I do think that the influx of this large eligibility population, ages 5 to 11, that's almost 30 million kids in this country, is going to help us. As of last week, I think 10% of that population is vaccinated, so that's almost 3 million more people at least getting one dose. But nationwide, we're still under 60% and that's just not ideal. I don't know if you remember, we had those very lofty goals of having 70% by the summer and we're still not quite there yet.

Alie: Right now, who can get the vaccine? Who is eligible, at least in the US, and how available is it in other parts of the world?

Jessica: Yeah, so anybody in the United States who is aged 5 and older can get the Pfizer vaccine. And that is pretty big, because like I said, that increases the population by at least 30 million people in eligibility. Pediatric vaccines are not nearly as available in other countries and that's because some countries were doing very different risk calculus on what was needed based on transmission there.

I think a lot of people often compared the US with the UK. The UK has kind of been slow to approve pediatric vaccines because they had such a high adult vaccination rate. But as

Delta swept through and as a lot of mitigation efforts were slowly kind of being eliminated throughout the community, you saw that the pediatric population became vulnerable again, kind of like what happened here in the United States. So, I think they're scrambling to get that data reviewed, to make sure that they can extend the eligibility there. Canada is going to be approving the vaccine for kids, I think... sometime this week maybe? I could be wrong on that, but it's imminent. I know that they are very eager to have that as well.

But when it comes to even bigger than these very privileged, very wealthy countries, the continent of Africa is, like, less than 10% vaccinated and that's horrifying. We know that variants and surges are very, very likely to emerge in under-vaccinated and unvaccinated populations.

Aside: So big, big important data here. The CDC reports that between August and September 2021, when Delta was establishing itself as the dominant strain, that the infection rates per 100,000 individuals, were 6 to 10 times higher among unvaccinated people compared with vaccinated people of the same age group. 6 to 10 times more likely that you will be infected with this virus, suffer from it, and pass it on. It doesn't mean that breakthrough infections don't occur.

So remember, one benefit to vaccination is not only making sure that you stay out of the hospital and don't get critically ill. But also, the more it spreads, the more it mutates into variants. So, flashback to last summer anyone?

Jessica: Delta emerged in India in the context of a very unvaccinated population at the time, they've since now I think vaccinated over a billion people there, which is wonderful. But we, as a global population, have a lot of vulnerability pockets because we don't have equal distribution of the vaccine and that's very, very problematic.

Alie: And we saw a big surge in the South in the US in September after a lot of summer cases but now it's different parts, at least in the US, that are going up. It's what, the Northeast and the Midwest? Do epidemiologists know what's going on, what's happening with those patterns?

Jessica: Yeah, we've been following this pretty closely. I think some of the states that we're watching most closely are states like Michigan, Minnesota, and Colorado. Colorado and Michigan in particular have had to amend their crisis care in hospitals, which is always a big red flag too, when you have to start to determine who is most likely to survive as one of the triage questions when people are admitted to the hospital. It's a very, very troubling risk calculus that people have to go through in a hospital setting.

But it's kind of a cascade of consequences in that, you know, Colorado is a perfect example of mask usage and mask requirements are disappearing in a lot of different places. Occupancy limitations and limitations on gatherings, et cetera, have been evolving as people are getting tired of this, and as jurisdictions are ready to have more people become patrons of businesses as the holidays are coming up.

And then also, changes in weather. Michigan, Minnesota, and Colorado get really cold a lot earlier than a lot of other states so people are spending more time indoors, probably unmasked indoors for long periods of time, probably with people whose vaccination status they might not know or may be incomplete or not started. So, I think it's kind of a combination of the non-pharmaceutical interventions slowly disappearing in a number of places.

So far, we haven't seen any signals from sequencing data to show any new variant activity, which is encouraging. I think a lot of people are very concerned that maybe this is a new variant but so far there aren't any signals for that. But it's probably a combination too of even waning immunity from people who have been vaccinated several months ago, plus people letting their guard down a bit and doing more high-risk, indoor activities.

Now, I think that it's important to remind folks: all of this has to be considered as an additive combined effort to slow this rate of transmission. It's never 'one cancels out the other' and I think that's often where we get into this stop-and-go pattern with these trends. It has to be combined. It's not that vaccines cancel out masks, it's not that masks cancel out occupancy things, and I think that's a lot of times what's happening. And when you start to see all of these things decrease in urgency and priority, you start to see surges again.

Aside: So, vaccines are not a cure-all. They're best used in concert with other safety measures like masks indoors, not licking other people's pudding spoons, and outdoor gatherings. As a person who busts out a parka for 65° weather, I totally understand that northern climates might be struggling with at least one of those things.

Alie: That makes sense, I mean, yesterday I went to a birthday party outside, the whole thing was outside, because I live in California, and I was wearing a tank top. But if I were in Michigan, late November, that's not going to happen. [*laughs*]

Okay, so that's really interesting and that was one of my next questions about variants. Delta kind of surprised a lot of us in late June, July. Are we still dealing with this Delta variant? Has that been a big hiccup in not being where we want to be in terms of these rates going up? Is it just that it's that much more transmissible?

Jessica: Yeah, Delta was certainly a big blow when it came to our momentum in getting folks to get vaccinated and getting folks to slow the rates of transmission. You and I have talked about this before, it's two things that we have to balance at the same time: high vaccination and low transmission. And those two things happen together for the best optimal results. Delta came in and kind of impeded with both.

What's encouraging though is that the vaccine data, even in light of Delta, has continued to show that they offer strong protection against severe COVID, that they offer strong protection against hospitalizations and deaths, but even if vaccine effectiveness and immunity wanes a bit, it's not that Delta is canceling that out, it's just making it more challenging. And that's kind of why now, we're in this new phase of the booster conversation. It's very related to the fact that Delta has kind of complicated this. [*"So now my plans have changed."*]

Alie: Yeah, can you explain breakthrough infections? I think breakthrough infections took a lot of us by surprise, even though we knew that the vaccine would protect us against serious and life-threatening infection. We knew that it was always like, "We don't know transmission rates, that's kind of not the point right now." How likely is a breakthrough infection with the vaccine and the booster?

Jessica: So, it's a difficult question to answer very precisely, because we don't actually have a good handle on breakthrough infection data that involves mild to medium cases of infection. The CDC made a, in my opinion, very regrettable decision early on to say that they're only going to track breakthrough infections that involve severe illness,

hospitalizations, and death. And what that does is basically create this cloud of confusion because we could be knowing the incidence much more.

Now, what we do know is that the vast majority, over 95% of cases that are hospitalized, are among the unvaccinated. Those breakthrough cases that do happen that are acute are often in very, very specific demographics that have been identified as high, high-risk populations and those were among the first people to get invited to get an additional booster dose; those who were immunocompromised. The Colin Powells, right? Those who have a lot of conditions that make them more likely to succumb to this disease because of their pre-existing conditions.

Now, that said, breakthrough infections are also inevitable in all cases, in all vaccine cases. No vaccine has ever been 100% effective, but all vaccines have always been intended to do two major things; to keep you out of the hospital and to keep you alive. And the vaccines are still doing a remarkable job at both of those two goals. So, I think it's kind of calibrating expectations of what the vaccine is intended to do; it's not to prevent you from getting the slightest bit sick, it's to slow down the risk of that happening, to slow down the risk of transmission after you get sick, and to keep you alive and keep you out of that hospital, to free up those ICU beds.

Aside: So remember, when COVID vaccines were announced, we never knew how much they were going to prevent transmission. The goal is mostly to prevent y'all from dying on a ventilator, or from burying your loved ones, or orphaning your kids. The average funeral in America costs \$7,640... but vaccines, those are free. So, pretty neat vaccines! Thank you.

But if you're strutting around, alive, quite chuffed that you're vaccinated and thus you can't be responsible for spreading it, well... nnnhh. I don't have the best news for you. So, one study found that, "People infected with the Delta variant, generally do not have COVID-19 symptoms until two days after their start shedding the coronavirus." Or as one August 2021 headline in the journal *Nature* put it, "Delta's rise is fueled by rampant spread from people who feel fine." And while COVID vaccines do cut the risk of transmitting the Delta variant, some studies suggest that that capability wanes after about three months, which is why boosting up, especially before gatherings... great, great idea, it's aces. Do that.

So, a late October study, breezily titled, "Community transmission and viral load kinetics of the SARS-CoV-2 Delta variant in vaccinated and unvaccinated individuals in the UK: a prospective longitudinal cohort study" [*whispers*] casual... published in the journal, *Lancet*, showed that while the vaccine reduces the risk of infection and it helps your body clear the virus out – get out, get outta here – faster if you do have the vaccine, "Fully vaccinated individuals with breakthrough infections have a peak viral load similar to unvaccinated cases and can efficiently transmit infection in household settings, including to fully vaccinated contacts," it says. So, I can see your face right now, it looks like this: [*Price is Right loser horns*].

So, why is this happening? Delta, Delta, Delta. So, a study carried out by University of California at Santa Cruz found that a breakthrough case with the Delta variant was twice as contagious as one with the Alpha variant of SARS-CoV-2. So, one coauthor of this study said that their findings, "...possibly explain why we've seen so much onward transmission of Delta despite widespread vaccination." We wish that vaccination were a little more widespread, but it is what it is.

So, despite the vaccines not being totally impervious armor against transmitting, it still affords people a giant advantage in fighting off the virus and being seriously ill if you get it. And Jessica mentioned the death of Colin Powell, who was fully vaccinated and died following a breakthrough case. But he also had a type of blood cancer called multiple myeloma, which if you've listened to the Hematology episode from 2018, you might remember, my dad has that as well. So, folks even who are fully vaccinated might not make the goods when it comes to antibodies, putting them at risk, especially from asymptomatic folks at gatherings. And I've even heard that some cancer patients are confused if they should even get a booster shot as some information is out there that says that other parts of the world need the vaccine more so just hold off.

A bunch of patrons asked about that too, very big hearts. But should anyone in the US, at least, at this point be holding off on a vaccine in hopes that it gets reallocated? I'll give you a hint on that answer... No.

Jessica: Oh, that's such a good question and I've so many thoughts on this. Unfortunately, withholding from a vaccine dose here does not mean that that vaccine or a vaccine that is allocated in the United States will be on a plane the next day and then redistributed to a country or population in need. Unfortunately, it doesn't work that way. The doses that have been purchased and allocated and often already open vials that have a shelf-life of X number of days, you withholding from that doesn't have a one-to-one transfer rate to another place. I wish that were the case, I wish it were to say that "Hey, if X number of people decide not to get the booster dose, we can vaccinate this many people in this country." The issue of COVAX, the issue of donated doses, is so much more political and has to do with these big cold chain logistics that are out of reach from your local CVS and Walgreens.

Oftentimes I've heard from folks who've taken their kids to get the vaccine and they're saying, "Look, we've got all these doses that are going to be in the trash by the end of the day. Have you had your third dose, and has it been six months since your last one? Roll up your sleeve and take it because otherwise it's going to end up in the trash." It's not a one-to-one thing; I wish that were the case. And that brings up a lot of issues of why and how come we can't do things like speed up the process of donating these doses. And some of it has to do with, like, just really annoying admin and logistics.

Now, when it comes to folks who have very acute conditions that make them more likely to have bad reactions to this disease, that's why they were the first in line when it came to the eligibility extension. That's why organ transplant recipients were some of the people who experienced the weakest immune responses to the vaccine, which is why they were on the top of the list. If you received an organ transplant, if you were on immunosuppressant drugs, if you are chronically ill, if you're over 65, if you work in healthcare and high-risk exposure settings, or if you're pregnant. All of these things increase your risk of having a bad outcome.

Getting a booster dose, which, if you remember why it was a two-dose regimen in the beginning; the first dose was to prime the immune system and the second was to boost. The third is essentially another boost, it's another kind of like, "Hey, here's your reminder, this is what the spike protein looks like. If you see this guy, kill him." [*"That's our guy, right?"*] It's just another extension of that reminder to your body.

Aside: And some good news there is that in late October, the White House helped broker a deal between the African Union, which reps 55 African countries, and Moderna to get

110 million doses of the vaccine, 15 million of them arriving by the end of this year. So, do not be a hero having a half-used vial of vaccine in a dumpster behind a Walgreens is not saving any lives, especially yours, or your baby's.

Alie: You mentioned pregnant folks. Any new information that you would like to impart to people who are considering getting pregnant or are pregnant in terms of vaccine efficacy or safety?

Jessica: Yeah, so it has become very, very clear from data from the UK and from the US that pregnant people are at a very, very high risk of very severe outcomes from COVID-19. So, right now, the recommendation is that people who are trying to get pregnant, people who are pregnant, people are breastfeeding, they should – not they could, not may – that they *should* get vaccinated. Now, of course it's a personal decision and it should be under the counsel of your provider and your OB, but the recommendation is overwhelming from CDC, FDA, ACOG. Every sort of governing body in obstetric care and pediatric care has said that the evidence is overwhelming that the fetus and the pregnant person are so much better off from getting the vaccine than getting the illness.

There have been some really horrifying statistics about women who were 100% healthy and that end up on breathing machines, or end up having to go into pre-term labor, or having complications that cause the mom to actually perish from the disease. Now that we know that this is a very preventable severe illness for pregnant people, it's become a very strong recommendation that those folks get vaccinated.

Aside: If you're like, "Why is this even an issue? Especially if you were born in the '70s, when moms umbilically mainlined fetuses Diet Pepsi?" Well see, pregnant folks were left out of the first trials of the vaccines, so we had a big zero for data there. Now, it's proven to be safe and it's actually safer to have it. So, a study published last month in the journal *Science*, titled, "COVID-19 mRNA vaccines drive differential antibody Fc-functional profiles in pregnant, lactating, and non-pregnant women" – and people; I got you, trans friends – noted that baby carriers experienced both increased disease severity and morbidity upon infection with SARS-CoV-2.

It went on to explain that when you are cooking a babe, right, you've got one in there, your immune system has to adjust so that it doesn't attack this foreign body, AKA the small human you are growing. So, immunologically you're doing a dance of, "keep us both safe from outside things, but also, chill out immune system, don't treat my baby like a boil," and that can lead to higher susceptibility to infections in pregnancy, including more severe COVID-19 cases and, tragically, mortality. It also takes pregnant and breastfeeding people a little longer to respond to their first dose of the vaccine but after the second one, the response is closer to baseline, AKA, everyone else's. So, if your Thanksgiving has more buns in the oven than just some Costco dinner rolls, talk to your healthcare provider about getting those shots. Okay, but wait, which ones?

Alie: So many people, myself included when I went to get boosted on Friday, I suddenly was, like, when the waiter comes and asks what you want to order, and you suddenly realize that you haven't looked at the menu. And they're like, "Do you want Pfizer or Moderna?" And I was like, "I got Moderna last time, but does that mean I should get Pfizer now? Does that mean I should stick with Moderna? Moderna has higher rates of efficacy from what I've read but has Pfizer changed its formula at all?" So, I suddenly was like, "What's everyone else getting??" [both laugh] So, I got a third Moderna, but what is the general

thought on the cocktail of vaccines? If you got a J&J, should you just like, peace out J&J, I'm going to get a different... What do you do?!

Jessica: Yeah, so you know, they've done mix and match studies to find out what is the most effective booster or additional dose. In all three accounts: Moderna, Pfizer and J&J, Moderna performed the best when it came to increasing antibody levels and providing robust immune response. All that to say, you kind of have to base it too on what's available to you. The recommendation is right now, if you've had J&J, boost with an mRNA vaccine, so Pfizer or Moderna.

Aside: In case you're like, "Wait, is J&J mRNA? WTF?" Just a reminder, Johnson & Johnson plus the AstraZeneca, use an adenovirus vector, carrying genetic info from SARS-CoV-2 to school your immune system, so they use a little virus rather than Pfizer or Moderna's vaccine instructions that are delivered via messenger RNA.

Jessica: And if you've had Pfizer, boost with Moderna, that's great data. If you've had Moderna, I think a lot of folks are sticking with Moderna just because the numbers are so good. But in all cases, it seems like boosting with an mRNA vaccine is the recommendation.

Alie: Good to know. Can I ask you listener questions?

Jessica: Mm-hmm.

Alie: People are excited you're coming on, [*Jessica laughs*] they love you. They love you.

Aside: All right, but before your questions, we're going to aim a money cannon, toward a cause of the ologist's choosing. The past few times she's been on, Jess had us send it to 500 Women Scientists. But since this is her record third time on, she's switching it up and we'll donate to Doctors Without Borders, who care for COVID-19 patients in treatment centers and hospitals around the world, they offer health education and mental health support, they provide training for vital infection prevention and control measures, and they support response efforts by local authorities. So, that donation was made possible by sponsors of this show, which I genuinely like.

[*Ad Break*]

Okay. Thanks, sponsors.

Now, a big question is on all of our minds. I'm looking at you, patrons Jess Swann, Cate Strehlow, Raelee Grimm, Rebekah Hatherly, Margaret Downs, Alice Rubin, Ivelisse Sanchez, and... me...

Alie: Biggest question from listeners: Holidays, what are we doing? Should we be doing holidays? Is January going to be an absolute shitshow of hospitalizations? What are... haaaaa... [*"What's the matter, Pop?" "I'm confused."*]

Jessica: Yeah, it's a fair question and something that we've had to think about as a family as well. So, the landscape of where we are with data: cases are increasing, we've seen about a 30% increase in the last 14-day average, positive tests are increasing, even hospitalizations, which were static for a while, have now started to inch up, and I think that's likely due to this kind of flu activity we're seeing.

So, since I mentioned, Thanksgiving is oftentimes a big kick-off for flu season, I think it's extremely important that people have been vaccinated against the flu and for COVID-19. Dr. Fauci said the other day, and I agree with him, if you are vaccinated and the people that you are going to be spending your holiday with are fully vaccinated, that you can do

so, with ease, making sure that people are being mindful of any symptoms that they've had, or any high-risk exposure or activity that they've had.

If you feel like there's a question, take a test. I think that sometimes people use tests a little bit inappropriately for red-light, green-light of what they can do. It's important to remember that a PCR test is probably the gold standard for letting you know if you have the virus and an antigen test or rapid antigen test is great if you're feeling kind of crummy and you're like, "I just need to know this is not COVID." That's the best time to use that test, it will tell you if you have COVID-19 and especially if you're infectious. It's best if you take it if you're sick or symptomatic.

So, those are ways that you can have those holidays and do so with peace and not do so on Zoom. You can do it in person and enjoy a wonderful meal with family and loved ones.

Aside: So, to recap, get your eggnog on, as long as... everyone is vaccinated for both flu and boosted with COVID 14 days beforehand. And if you want a surefire way to know you don't have COVID, take a PCR test; and rely on an antigen rapid test really only if you feel sick but you want to make sure it's not COVID. Then you can eat string beads covered in mushroom soup. Hopefully outdoor dinner... anyone? Bust out the parkas.

Jessica: That said, it's recommended, and I agree with this recommendation, that if you're not vaccinated that you don't travel. Some people have a really, really hard time with that, they think that it's very discriminatory. But I also think that we are in a really difficult time right now with this pandemic, especially at this risk of a twin-demic of flu plus COVID, [*"We're twins." "That's right."*] that we know that if you are vaccinated you are less likely to get the virus, to transmit the virus, and to get really, really sick with the virus.

So, we want to eliminate as many variables when it comes to movement because a lot of people move during the holidays. They are on planes, and trains, and all kinds of things to see people. [*music plays "Are we out of the woods yet, are we out of the woods yet, are we out of the woods."*] [*record scratch*] I don't think we're out of the woods. It's not like everything's back to normal and everything's as bad as it was before because we have vaccines this year and that changes the game. We didn't have them last holidays, and so I think that people can still enjoy some holidays and some gatherings without as much fear and limitations as last year.

Aside: Now, what if you're cramming your pre-party immunizations into one afternoon, is that a terrible idea?

Alie: A lot of folks had questions about the flu shot as well as getting the booster. Taking them at the same time, some people, like Vanessa Frey, wanted to know: Is it safe to get a booster shot and a flu shot on the same day? Other folks, like Kathleen Sachs, said: I got the Pfizer COVID booster and the flu shot on the same day; the combination knocked me on my ass. Their husband says it was the combo that knocked him out, but Kathleen says: I think he's making things up. Vesper Holly says: I was told it was "not recommended" to get them both on the same day. So, if you're going to get shot up, should you do them both on the same day or should you give yourself some time in between?

Jessica: So, it actually is totally fine to get it on the same day in the same visit. Especially now that we're kind of already well into flu season and the recommendation to have gotten your flu shot was ideally before Halloween. And so, I would say, nobody would recommend you delay that. You can get it on the same day, the recommendation is you can split the arms, have one on one arm, one on the other.

I think that most people often have a reaction to the COVID-19 vaccine more so than the flu vaccine, just generally speaking from people's experiences so far. And typically, people have their reaction to the booster dose that is similar to or maybe a little bit less than the second dose. So, kind of go in expecting that you could feel a little crummy but it's not going to be harmful to you. I think delaying one or the other would create more harm than getting it on the same day and there's no recommendation to space them out.

Alie: Okay. And as long as you're going to be having soup... have that soup, hang out in bed.

Jessica: Yeah, plan it on a day when you can be low-key and just watch Netflix.

Alie: Exactly. Kata Zarándy and Vesper Holly, a bunch of people want to know: What's up with the effects of the second and third shot, why is it worse than the first one? Real question: Why did I get so miserable after my third vax? Vesper Holly asked me too. Can you explain a little bit of what our immune system is doing to, kind of, knock us on our ass while we are making more antibodies?

Jessica: Yeah, that's such a good question. So, remember we were talking about earlier, the two-dose series was intended to give a preview, to prime the immune system, to give an introduction to the antigen, which is the spike protein of the virus and say, "Hey, this is what this looks like. It's not the whole virus but all you need to know is what the spike protein looks like because then the antibodies can attach to the spike and make it impossible for it to enter the cells. So, be on the lookout."

The boost is kind of like a... the first one is like a quiz and the second one is like a test. Where it's like, "Here we go, reminding you once again that this is the spike protein," and the body kind of kicks into gear and says, we've already seen this guy and it sends all those immune cells to the injection site and starts fighting it and creating more antibodies. That process can make you feel kind of lousy. That process is your body kicking in and saying, "Hey, there is something here that shouldn't be here, let's fight it, let's kill it," and it can cause your physical body to feel a little crummy in the process of it kicking into high gear.

The third dose is essentially a second boost, a second reminder to the body to say, "Hey, this is what you should be fighting if you see it." But again, it's not the actual virus so it can't get you sick. It's just a preview of it saying if you do see this, kick its butt, make sure it doesn't infect cells, make sure it doesn't replicate inside cells so that you don't get very sick.

Aside: Okay, so the vaccine absolutely puts those spike proteins on blast. It's like this Facebook group I was in full of LA girls that would screenshot dating profiles and be like, "Do not date this guy. Girl, don't. He will give you a scabies scare and then steal your PlayStation before ghosting you for a former American Apparel model." And yes, like the vaccine booster, it might make you feverish and achy but you're much safer.

So, how often will our immune systems need to be reminded what this jabroni looks like? Or, if he has a new alias? Kata Zarándy, Rob Lara, Jessi M, Sara Wells, and Elina all had annual-type questions and so did others.

Alie: We had some questions about yearly boosters. Cameron Brown and Kata Zarándy want to know: Will we need to get boosters once a year? Or what will be the procedure to remain fully vaxxed? Alia Myers wants to know: So, is corona officially endemic? Is it like the flu? Is it like the cold?

Jessica: Yeah. Your listeners ask the best questions; they're legit so, so good. So, first question. The definition for fully vaccinated has not changed and will likely not change for a good bit. And I think that should provide some comfort to folks. It's not that we are changing this and saying, "In order to be protected you must get a booster." I think if you look at the language of what the CDC, FDA, and ACIP said this last week, it said that those who are in these high-risk populations should get boosters, the rest of the population that's 18 and over, *may* get boosters. So, it's not an obligation to do so, it's saying, this would be nice to have and it's available to you if you would like it. But the definition of fully vaccinated has not changed. You are still fully vaccinated if you've received two doses of the mRNA vaccine. Now there is that debate of course, whether it should have always been two doses for J&J? But regardless, the definition has not changed.

That said, when it comes to the frequency of boosters, we don't know yet. Time and data will tell and so much of that depends on how many more people get vaccinated and how slowly we can reduce the rate of transmission.

Aside: Jess says that so much of that depends on how much we can slow that transmission rate and how many people get vaccinated. Because remember, you are contagious for less time if you've gotten the jab. And right now, people are just straight-up over quarantines and 30% of the adults in the US have yet to get their first shot. So...

Jessica: If I were to bet or predict, I can see a COVID-19 vaccine becoming an annual vaccine, similar to the flu vaccine. But I don't think that we are ready, because of the data, to say anything like, it's going to be every 6 months.

Now, when it comes to endemicity, that is very much the future of COVID-19. And I don't think that we should be sulking or looking at it as a failure; it's a very common outcome for an infectious disease. H1N1 became endemic; it's a very regularly circulating flu virus now. And endemicity is something we can manage through what I just mentioned; through high vaccination, low transmission, and over time, a human immunity, what we were talking about before, herd immunity. Where this disease becomes more of a nuisance and less of a catastrophe to our society. So, it's very likely that this virus is here to stay but we are going to be, you know, better for it over time, as we have more people immune, and more people vaccinated, and hopefully less and less disrupted by this disease. It won't be a pandemic forever, but this disease isn't really going anywhere.

Aside: Isn't that wild? I keep thinking back to March 2020 when I thought that two weeks was just an extraordinary amount of time for everyone to hunker down and Marie Kondo their closets. "What a historic two weeks this will be," my tiny, optimistic, naïve brain said to itself.

Alie: Some folks like Celeste want to know why natural immunity is not being considered as protected in the US, but it is in Europe? So, if you've already had COVID, what's your antibody statty- [*chuckles*] antibody statty is a new term. [*Jessica laughs*] What's your antibody status if you've had it maybe once or twice or whatever?

Jessica: Yeah, another great question. So, there's no denying here in the US that natural infection elicits an immune response. What is not usually included in that conversation is that it's not standardized. Person A could get COVID, person B could get COVID, person C could get COVID, and they could have three wildly different immune responses. Some could have some antibodies, some could have a ton of antibodies, some could have zero.

Sometimes it's dependent on whether it was a mild infection or a severe infection and sometimes it's just completely random.

So, because of that, and I've actually read some papers that are very interesting about how COVID-19, it almost doesn't really act like a normal virus in the sense that usually you do have memory of a virus when you've been infected to protect you from getting sick from it again. But that memory isn't as strong as it is with other diseases. People often try to compare it to, "Oh remember back in the day when they would send us to school to get chicken pox?" Well one, that was pre-varicella vaccine and two, we didn't know any better. We knew that that was the best way to prevent a reinfection, to prevent getting sick again. But it's also proven to be a complication for other folks; it increases your likelihood of getting shingles later in the future, it made other people have other issues down the line. I think comparing the two is not apples to apples.

So, because of that, we know that the vaccine actually elicits a much broader immune system response that includes things like B cells and T cells.

Aside: What do those do? Okay.

Jessica: B cells are amazing because B cells create more antibodies over time, they create more antibodies even after you get infected and it's like, "Oh, hang on, I need more of these guys to come kick in and fight this antigen." And T cells are like killer cells, they go in and they actually kill the virus. So, because of that, it's not a fair comparison. It's not that they don't mean anything. In fact, there is data from here in the US, and from Israel, and the UK to show that folks who were previously infected *and* vaccinated are among the most protected in the population which is pretty cool.

Aside: Heyooo! Who there had COVID and a vaccine? Who? Yes? You? Treat yourself to a tiny, imperceptible butt dance in celebration, you deserve it. But...

Jessica: But getting an infectious disease is not a public health strategy to manage infectious diseases because of the unknowns COVID-19; the unknowns of who is going to get really sick, the unknowns of who is going to get long COVID. And that is something that we are still learning about, and it is way too risky to play that game.

Alie: And is long COVID considered kind of like a chronic inflammatory situation at this point?

Jessica: It really depends. Again, it's not a very uniform condition. Some people recover from COVID and then have a re-emergence of symptoms. Some people experience anosmia, which is the loss of smell and taste, and then months later develop parosmia, which is an altered sense of smell and taste, where food smells rancid, and tastes rancid, and they can't really tell what's spicy and what's not. Some people have prolonged tinnitus, which is the ringing in the ear. Some people have chronic inflammation because this disease is respiratory, it's vascular, it's neurological, it's all these things. Because of that, especially in kids, this complication, MIS-C the multisystem inflammatory condition, is very risky for kids because essentially it is a very severe inflammation response that can cause things like myocarditis and pericarditis and in many cases, if it involves hospitalization, it involves death in that pediatric population.

Aside: Now, a few folks asked about vaccine side effects and if there are any common lasting ones, other than just better survival rates. I've never died, but it seems like survival is a nice side effect.

There are databases that collect info from people about their side effects, mild side effects, how long they last, their severity. Although Jessica notes that because those are open databases, it's a little bit harder to parse out who has been logging what side effects and the legitimacy or motivation behind reporting them. But if you get an annoying text from V-safe after you receive a COVID-19 vaccine, let 'em know, because it helps scientists and your fellow humans.

Now, as far as deaths resulting from the vaccines, among 442 million doses of vaccine, five deaths have been directly linked caused by blood clots resulting from the Johnson & Johnson vaccine. And now that doctors know this correlation, they can better prevent and treat it if it happens in the future.

Jessica: The experience of severe adverse events are exceptionally rare. And the CDC and the FDA review every single report of a severe adverse event, especially those that involve death. They go through everything like medical records, and coroner reports, and autopsy reports, et cetera, just to make sure they understand what the actual risk-benefit profile is for these vaccines. And so far, it seems that these vaccines are very well tolerated in every population, even more so among the kids. And that's probably because they got this perfect dose for them; these 10 micrograms seem to be clutch for that age group where they have very, very mild reactions, very short-lived reactions that resolve between one to two days. Most reactions, post-vaccine, happen within hours, days, maybe weeks after vaccination. So, it's very unlikely that something were to happen like tinnitus or like chronic inflammation several weeks later after the vaccine.

That said, there is a concern with the incidence of myocarditis among adolescent boys post-vaccination. Now, that risk if you actually look at the incidence of myocarditis with COVID, is less than that. Not to mention the fact that myocarditis is an exceptionally difficult thing to diagnose, you kind of have to do an invasive biopsy to really get confirmation of it, and there's actually a plethora of viruses that can cause it. So, it's not something specific to COVID-19 or even COVID-19 vaccines, and so I think this is where risk and hazard get a little bit cloudy because you're dealing with the kids and people get really anxious about that.

Aside: Okay, I looked into this and one expert on pediatric heart inflammation, someone named Dr. Brian Feingold at the Children's Hospital of Pittsburgh, echoed that COVID-19 itself is much more likely to damage the heart permanently, for those worried about their little ones. Now, from smologites to other little critters.

Alie: A couple more questions, if you have a [*hesitantly*] few minutes?

Jessica: Of course, I love it.

Alie: You're the best! A lot of folks, Derrick Allen, Kathleen Sachs, Alia Myers, Annalise De Young, Lauren Harter, Susan Gottlieb, all had great questions. In Annalise's words: Cervidological or zoonotical illness question. Annalise lives in Michigan where white-tailed deer are almost as ubiquitous as squirrels and some recent studies have come out saying that deer are just lousy with COVID. Whaaaaat? Are they getting it from us? Are they giving it back to us? What's happening?

Jessica: Yeah, it's so, so interesting. Zoonosis, and zoonotic diseases... I studied emerging and infectious diseases in grad school, so we spent a lot of time talking about animals. And if you look at the history of human diseases, about 50% of them have some sort of animal

origin. So, it's not that surprising that we are dealing with something that spilled over from an animal species to humans.

Now, it can go the other way too. If you remember, I think it was either earlier this year or late last year, because... what is time? [*Alie laughs*] There were minxes on a farm in someplace in Europe that got it from the people who were on the farm, and they had to cull all those minxes, it was horrible. Because diseases can transfer from host to host, when there are sufficient mutations that allow it to be transmissible and infect another host species. Now, there is some really interesting data to show that deer are catching COVID, likely from humans...

Aside: Ohhh deer. Cervids with COVIDs. Okay, so according to a study published by the National Academy of Sciences... literally today, it was just published today, this is a fresh as hell episode people. The researchers wrote, "We evaluated 624 serum samples from wild deer in four US states for SARS-CoV-2 exposure and antibodies were detected in 40%." 40% of the deer! So, Illinois, let me hear you say, "COVID deer." Michigan, COVID deer. New York, you have COVID deer. Pennsylvania, don't feel left out, throw your hands up for COVID deer. And Iowa, a recent study also suggests 80% of your deer have a touch of the COVID. So, what if you're one of the 45 states that were not included in these studies? Don't worry, you probably have COVID deer too, and scientists just haven't tested yet.

So, how are the deer getting it? I read this whole damn article to find out. Who is sharing smoothies with deer? What's happening? Are people going to the movies with deer? Casinos? So, scientists postulate, "Multiple activities bring deer into direct contact with people including captive cervid operations, field research, conservation work, wildlife tourism, wildlife rehab, supplemental feeding, and hunting... Contact with contaminated water sources has also been suggested as a potential transmission route," they say.

Now Atlanta, let's hear it for COVID otters. Yes, seven at the Georgia Aquarium are recovering behind the scenes after showing some symptoms of sneezing, runny noses, lethargy, and coughing. Which, I'm sorry, but a lethargic otter... augh! They only get cuter. They're very much on the mend, they're going to survive. But zoo tigers, gorillas have tested positive for COVID. Some apes at the San Diego Zoo are even vaccinated, which I think should count toward California's vaccination rates. They did their own research, and they were like, "Jab it up."

Jessica: There is probably going to be a ton of research on other populations to see which animals that are in close proximity to humans have detectable antibodies or who have culturable virus in their body. But it's something that we're still learning about. Because we know that this disease is not done evolving, because it continues to spread, and that presents a challenge to not just humans, but to animals that live in close proximity to us.

Alie: That stuff is so, so fascinating. Not something I thought, you know, as they say, would be on the bingo cards. Deer having COVID, didn't even consider it. Bats are like, "Don't look at me, man."

Aside: Speaking of cards, how about vaccine cards?

Jessica: I mean, even the idea of a vaccine "passport" is not something new, right? If you've been a traveler, and you've traveled to places like Southeast Asia or to Africa, you've likely had to get a yellow fever vaccine and you've had to probably present what we call a yellow fever card. That is considered your passport to allow you to enter a country that has a

high incidence of that disease. In the same way that, you know, in order to enter a college, especially if you've traveled or you're an international student, you need to do a TB test regularly to make sure that you are not carrying this very, very transmissible disease.

Vaccines have always been intended to be part of a way for a community to continue to be a community, to exist together. And anytime there are situations in which the incidence of a disease could present a barrier to those communities existing, whether it's schools, military, or people getting on airplanes and traveling to other countries, there has to be a way in order to protect the general public. Vaccine mandates and requirements have been very, very standard in that case.

Now, when it comes to things like healthcare settings too, think about all the vaccines that your provider has to get so that they, as your provider, are not causing harm. When you're in the hospital, you see them wearing badges that say they got their flu season vaccine. There are just so, so many instances in which this has been part of the process.

I think that right now, because all eyes are on the regulatory system – which previously only had, like, us nerdy eyes really looking at it because we were the only ones who really cared – everybody is scrutinizing things like Emergency Use Authorization versus FDA approval. And I've said this multiple times and it's worth repeating: the standards for things like safety and efficacy and no different. We have EUAs in the case of emergencies and we are still in a public health emergency. So, when it comes to these vaccines being mandate-able, there is still precedent for that because we have provided enough data, in fact more data than any vaccine in the history of vaccines, to show that these vaccines create benefits to our communities. And I think that once these vaccines in all age groups receive their full FDA approval, Pfizer having already received that for the adult population, we'll start to see more.

But I'm very grateful at the end of the day that we used this EUA so appropriately to show the sense of urgency, without cutting corners, without taking any shortcuts on things that matter like safety and efficacy, to make sure that we have these tools in our toolkit to help actually alleviate the burden of COVID-19 in our population.

What I wish could have been more prioritized was a Comms campaign to go with it. We spent all this money on the regulatory process to make sure that Operation Warp Speed was able to develop and distribute manufacture, et cetera, all these vaccines. But my job is endless because we haven't really put all the messaging and communication strategies necessary to make this easy for people to make an informed choice, and that's why we're still at 59.1% vaccinated. And I think that's what's the most frustrating, thinking of science communication as an afterthought and therefore kind of fueling things like vaccine hesitation, and vaccine confusion, and even allowing the space for misinformation to take hold in people's minds.

Alie: Yeah. Have they done any data crunching on how many deaths these vaccines have prevented?

Jessica: Well, I do know that most recently, when we hit that horrible milestone of 750,000 deaths in the United States, which is already an undercount, that the last 200,000 deaths in that amount were vaccine preventable. And that really shook me, to hear... to know that that number did not have to grow. That number continued to grow in the absence of vaccines at a rate that was very troubling. When I was working at the COVID Tracking

Project, when we hit these huge milestones, we would just face it with such dread. But now we have these tools to prevent death and it kills me that the number is not actually stopping to grow.

Aside: But throughout the pandemic, Jess has been such a trusted and reliable source for information; answering questions via Twitter and her Instagram stories, and I'm 100% positive that her work in this space has saved lives, full stop. Rather not... full continue.

Alie: On that note, last question from listeners, Jazmine Alexandra says: What are some good resources to share with family members who haven't or won't get vaccinated? And what's the most effective way to approach the conversation? Obviously, I think a lot of that is fear-based, so it never seems good to try to discuss fears with anger and condescension. Any thoughts on that?

Jessica: Yeah, I recently shared a post about this because the holidays are coming, we're probably going to be seeing some of those family members whose politics and views on science we wildly disagree with, and it can be very difficult to be in close fellowship with them. But I will say that listening is actually more effective than you think. At the end of the day, it really is sometimes fear, or it really is sometimes history, or trauma, or really, really real experiences that are ignored by either their medical provider or their community or people around them who can't help them cross over from fear into knowledge and empowerment to make those choices.

So, I think listening first, before reacting, and before trying to out-data somebody, or out-fact somebody, or to question their sources, and to mock, and name-call; all of those things, at the end of the day, cause more fear, cause more division, cause more shame and isolation. And people don't make good choices when they're bogged down by those sentiments.

So, I think that helping folks understand that there are trusted reliable resources, helping folks understand that this isn't about politics, this is about community public health, and that those are very good, altruistic things that we should all kind of ascribe to. Think about us who have children, how many times a day we spend teaching our children to be good humans, to be better members of society. This all boils down to this; how are we going to be better people in our communities and not live like we make individual choices and only exist as individuals? When you kind of wrap those messages together and show people that vaccines are not just for you, they're for everybody, it can kind of soften some of those very strong feelings of isolated individual health.

Aside: But on the bright side...

Alie: Favorite thing about what you do? I already know the most frustrating thing. *[both laugh]* Obviously, it's pretty clear. Favorite thing about this work?

Jessica: To see people desire to do this work, knowing how frustrating it is, and feel inspired to enter a career of public health, epidemiology, and even science communication is very inspiring to me. I've spent a lot of time doing teaching and education and actually doing so in formal classroom settings and I didn't know how much I enjoyed that. And to see folks be like, "How do I do what you do when I grow up?" is deeply, deeply motivating to continue doing this work.

Alie: And you're obviously, you give out so much good information on Instagram, on Twitter... Are you being pressured into TikTok?

Jessica: I'm being pressured constantly to do TikTok, but it scares me. I'm so scared of TikTok.
[both laugh] It stresses me out.

Alie: Same boat. I just did an episode with Hank Green about TikTokology and... I just joined, I have two videos, it's going poorly, but I will text you on the side if I figure out how to use the buttons because obviously your services are needed on as many platforms as you possibly have the bandwidth for. [laughs]

Jessica: I mean, your push has a lot of weight in my brain so that's very motivating for me to give it another shot, or at least think about it. [Alie laughs] Pray about it. [laughs]

So, ask smart people questions that seem obvious but are really not. So, for more on [Jessica Malaty Rivera](#), follow her at the links in the show notes, pressure her to learn TikTok so she can teach me how to get better at it.

Find us @Ologies on [Twitter](#) and [Instagram](#). I'm [@AlieWard](#) on both and @Alie_Ologies on TikTok, I do that... poorly. Thank you to Erin Talbert for adminning the *Ologies* Podcast [Facebook group](#), full of great people. Hello, *Ologies* sub-[Redditors](#). Thank you to sister team, Boni Dutch and Shannon Feltus for the [merch](#) help, as well as Noel Dilworth and Susan Hale for helping so much behind the scenes.

Emily White of The Wordary is a professional transcriptionist who makes transcripts which are free at [AlieWard.com/Ologies/Extras](#), alongside some bleeped episodes by Caleb Patton if you need them. Steven Ray Morris and Zeke Rodrigues Thomas help make *Smologies* which are small, shorter versions of classic episodes that are classroom safe. Those are up for free every other week in the feed. Nick Thorburn wrote and performed the theme music. Lead editor is the exceptionally, infectiously witty, Jarrett Sleeper.

And if you listen to the end of this, I tell you a secret and this week it's that, number one, this episode was so stressful to make just because it's such a quick turnaround. And also, some people's families you're gathering with, everyone is vaccinated, you're like, "Eugh, who doesn't get vaccinated?" But there are a lot of us out there who might be attending gatherings with a mixed vaccine status for various reasons and, honestly, I'm not going to lie, it's a little stressful to be like, I hope no one has this and passes this on, because honestly, everyone just wants everyone else to be okay. It's a little difficult. So, if you're out there and you're like [deep breath and exhalation] and doing some breathing exercises to try to figure out your holiday plans and try to forecast your entire future, I get it and I see you. Anyway, stay safe as you can. Another episode will drop later this week which I think you will like, it'll come out on Sunday, and then we're back to our regular schedule. Okay, be safe! Masks up, if you can. Berbye.

Transcribed by Aveline Malek at TheWordary.com

Some links which may be helpful:

Follow Jessica Malaty Rivera on [Instagram](#) and [Twitter](#)

[More info on Jessica](#)

A donation went to [Doctors About Borders](#)

[The first Vaccine Infodemiology episode](#)

[The Quarantinology episode from June](#)

[Who is traveling for Thanksgiving?](#)

[Breakthrough infections in vaccinated folks](#)

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[Delta's rise is fueled by rampant spread from people who feel fine](#)

[Community transmission and viral load kinetics of the SARS-CoV-2 delta \(B.1.617.2\) variant in vaccinated and unvaccinated individuals in the UK: a prospective, longitudinal, cohort study](#)

[COVID-19 mRNA vaccines drive differential antibody Fc-functional profiles in pregnant, lactating, and nonpregnant women \(and people, I gotcha my trans friends\)](#)

[Covid-19 found in deer across at least 4 states](#)

[Brand new study on Covid-19 in deer](#)

[Breakthrough infections in Washington State](#)

[Slower immune response in pregnant people](#)

[NY Times article on new cases](#)

[J&J and AstraZeneca: not mRNA](#)

[Transmission rates in vaccinated COVID patients](#)

[Oh deer! Cervids with Covids](#)

[Iowa deer, kinda even worse?](#)

[Deer in 4 states have covid!](#)

[Selected Adverse Events Reported after COVID-19 Vaccination](#)

[Coronavirus disease 2019 vaccine response in pregnant and lactating women: a cohort study](#)

[V-safe After Vaccination Health Checker](#)

[COVID vaccines cut the risk of transmitting Delta — but not for long](#)

[COVID-19 among folks with Multiple Myeloma](#)

[Delta's rise is fueled by rampant spread from people who feel fine](#)

[Community transmission and viral load kinetics of the SARS-CoV-2 delta \(B.1.617.2\) variant in vaccinated and unvaccinated individuals in the UK: a prospective, longitudinal, cohort study](#)

[COVID vaccines protect against Delta but don't fully stop disease spread](#)

[Twin State biologists checking deer for COVID-19](#)

[Understanding How COVID-19 Vaccines Work](#)

[Multisystem inflammatory syndrome in children \(MIS-C\) and COVID-19](#)

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