Episode 386: What the Current Data Says About Viral Risk, Immune Function and Herd Immunity With Dr. Chris Masterjohn
This podcast is brought to you by Joovv Red Light Therapy. Red light therapy, also called photobiomodulation, has been a part of my life for a lot of years. I discovered this years ago when doing some research and specifically found the benefits for hair, skin, thyroid, energy levels, many other things as well. And the reason for this is that our bodies need light. We think about food as the fuel for our bodies, and it is, but light is also a very important type of fuel for our bodies and for ourselves. And many of us get too much of certain types of light, like blue artificial indoor spectrums of light, and not enough of other types of light, like outdoor light, all the spectrum that come from the sun, and including red light, which is why I love having an option in my house where I can make sure I'm getting enough red light daily. It's done wonders for my wellness routine, and that's why I've made it such a priority. I've noticed a difference in my energy levels and in my skin when I use it regularly. And I wanted to talk to you about Joovv today specifically because they have long been the leader in red light therapy. But they've also just now come out with a new generation of devices that have upgrades that are really exciting. Their devices are sleeker, lighter, and with all of the same power of their original devices. But they've intensified their coverage area so you can stand as much as three times further away and still get the recommended dosage. I find this lets me work out or do other activities still close enough to the light to get the benefits. They've also upgraded their setup, so it's very quick and easy to build and can fit in almost any space, depending on your size requirements. A couple really cool features about these new devices. They have something called Recovery Plus Mode, which uses pulsing technology to give yourselves an extra boost after a tough workout or a stressful day. And I find that sleep is one of the most important aspects of health. And I have used red light therapy at night to help wind down for the day quite often. But their new devices have something called Ambient Mode, which is calmer lower intensity lights, especially beneficial at night, certainly more healthy than the bright blue light from many of our screens and in line with our natural circadian rhythms. For a limited time, Joovv is hooking up listeners of this podcast with an exclusive discount on a first order. And you can find out all the details by going to joovv.com/wellnessmama and using my code Wellnessmama on any qualifying order.

This podcast is brought to you by Wellnesse, my new personal care company that is based on the recipes I've been making at home in my kitchen for decades. Many “clean” products simply don’t work and this is why I have spent the last decade researching and perfecting recipes for products that not only eliminate toxic chemicals but contain ingredients that work better than their conventional alternatives and that nourish your body from the outside in. I’m so excited to finally share these products with you and wanted to tell you about our brand new dry shampoo! It can be used various ways. You can sprinkle it in clean hair to add volume and to extend time between washes, sprinkle it in hair that has not been washed in a day or two to absorb oil or sweat and you can work in to color treated hair to maintain color-treated hair by not having to wash as often. It contains oil-absorbing kaolin clay and volume-boosting tapioca which work together to refresh hair at the roots. Lavender oil and cactus flower help to balance scalp and strands’ natural pH. We even added hibiscus for healthy hair growth. You can check it out and try it at wellnesse.com and my tip is to grab a bundle to save or subscribe and save as well!
Katie: Hello, and welcome to the "Wellness Mama Podcast." I'm Katie from wellnessmama.com and wellnesse.com. That's wellness with an E on the end, my new line of personal care products, like hair care, toothpaste, and hand sanitizer.

This episode has been a long time coming, but I wanted to make sure there was reliable data before having this interview. I am back with Dr. Chris Masterjohn, one of the researchers I highly, highly respect in the field of nutrition. And he has been very closely following the research on COVID, and not just what can help the immune system, what the actual studies are saying right now. We do have some studies that show some really fascinating things, especially related to vitamin D, which we go deep on, but also on things like long-term immunity, herd immunity, and what the likelihood of a second wave is. He's extremely data-backed and research-backed, and he has done interviews with many experts who are the ones doing the mathematical research on cases and mortality, and what we likely will face in the future. So I thought it was a very timely point to have him on and to go really deep on these topics. I learned a lot. He makes some really practical suggestions based on the current research for supporting the immune system and reducing the severity of a potential infection. He also makes some great points about societal trends when it comes to immunity. So like I said, I learned a lot. I know that you will too. And without further ado, let's jump in with Chris. Chris, welcome back.

Chris: Katie, thank you so much for having me back. It's great to be here.

Katie: I'm very excited to chat with you today. And I think this will be a very relevant and timely episode and one that I have waited a while to record. And I've largely held off from talking very much about COVID on this podcast until I felt like there was more data available and it wasn't just guessing. And I know that you have closely followed the data, especially related to specific aspects of this related to the immune system, like certain vitamins, and nutrients, and things we can do that may or may not be helpful. And so, you were the first person that came to mind when I wanted to talk about this, and I'm so grateful for you for being here today to delve in.

Chris: Thank you so much for having me. Can't wait.

Katie: So, I think to start, there definitely seems to be common recommendations around certain vitamins that are speculated to have a positive effect in supporting the immune system, which then, of course, might help in cases like respiratory illness. And I wanna make sure, obviously, that we're not making any medical claims. I know you are always very careful to echo that as well, and that none of this is medical advice. But you do have an expertise in the nutritional side of this. And I think this is where it's really important to go deep because this is a tangible thing that we're all very much in control of. And we have the ability to choose what we consume on a daily basis. So to start with some of the common ones that are recommended, I've even seen these in the mainstream media being recommended recently, things like zinc, and vitamin C, vitamin D. And I'd love to go through those almost just line by line and go through what is the research actually showing, now that we are starting to have some actual data. So, since it's still a little bit sunny outside in some places, let's start with vitamin D. What is the actual research and data showing on vitamin D and COVID right now?
Chris: Yeah, so out of everything, vitamin D has the largest body of literature behind it. And it has the strongest amount of evidence of any nutrient for COVID-19, whether for or against efficacy. And the evidence happens to lie right now very strongly in favor of vitamin D being very effective. Probably, it’s not that effective against getting COVID. But the evidence seems to suggest that it is somewhat protective against getting COVID. But the evidence is much stronger for restraining the severity and mortality of COVID. And so, in that case, we’ve moved from having a pretty strong foundation of a large number of observational studies that were all saying the same thing, that maintaining vitamin D status, at least 30 nanograms per milliliter is associated with a much lower severity and mortality of COVID. We now have moved from that to having a randomized controlled trial, where, yes, it was small and yes, we need to see it repeated by other people. But the first trial that was published, showed that supplementation with vitamin D reduced the odds of being admitted into the ICU by 98%. And so, that’s an extremely strong finding. And that, of course, is not about mortality. Now, it just so happens that in that study, there were two people who died in the placebo group and there were zero people who died in the vitamin D group. But that’s not enough people dying to run any statistics on. So it does look like it was strongly protected against mortality, but there’s just not enough mortality in that study. But it does show a very strong effect on severity by, you know, in this case, almost wiping out the need for ICU admissions.

Now, it's also the case that there are more than two dozen trials that are registered in the government database that are generally last I looked no further than the recruitment phase but are all designed to test treatment effects of vitamin D. And so, in probably three or four months, we will have a much larger body of research on treatment effects for vitamin D. But to have roughly a dozen observational studies all saying the same thing and to now have the first randomized control trial come out and confirm what those observational studies were saying is very strongly in favor of vitamin D, particularly in the context of reducing the severity of COVID. And my suspicion based... And I should say and completely acknowledge that, when this first became a concern, I was actually against vitamin D supplementation because there were legitimate concerns. And to be honest, I turned out to be wrong, but I think I was correct in being concerned about this. We know that the virus enters the cell using a protein called ACE2. And there were a number of studies suggesting that vitamin D increases that protein. And that happens to be a positive effect for health because ACE2 helps reduce blood pressure and helps maintain a healthy cardiovascular system and a healthy respiratory system. However, given that that protein is hijacked by the virus to get into cells and given a very large body of research, showing that it is basically the limiting factor for whether the virus can infect you, and what cells it can infect, and how big the infection will grow, it made sense to be concerned about that.

But it seems that vitamin D because of its effects on the immune system, besides that protein, you know, completely separate from that, because it appears to limit the... And of course, vitamin D does make antiviral peptides. But because the evidence is stronger for severity and mortality than for infection risk, I think what is more operative is vitamin D’s effect on regulating the immune system. And vitamin D happens to be capable of, for example, restraining the production of interleukin 6, also known as IL-6, which is probably the most central molecule that is responsible for inciting the cytokine storm that can make COVID much worse, and is a very strong predictor of respiratory stress and winding up on a ventilator. And so, my suspicion is that what vitamin D is mostly or at least most strongly doing, is that just having normal vitamin D status and not being sub-optimal, or inadequate, or deficient, basically puts you in a situation where you might get sick, but you're
not gonna have the inflammation, or you're much less likely to have the inflammation just totally spiraled out of control. Because the severity and mortality risk of COVID is much less about direct viral damage, not to say that that's not the case at all, but it's much less about that and it's much more about, do certain parts of your immune system responsible for clotting, and respiratory stress, and tissue damage. Do those just totally spiral out of control? And vitamin D probably is acting to restrain that and probably that's what it's doing. But I think the take-home message is if you have the foresight to be able to manage your vitamin D status before you get sick at all, just maintaining your vitamin D status in the normal range according to the laboratory, which means keeping it in at least the low to mid-30s in nanograms per milliliter.

So reference range is usually 30 or 32 or something like that. Just being above that bottom seems to account for almost all of the effect observed in these studies. And so, you know, you mentioned the disclaimer and yes, you know, I completely will voice the disclaimer. I'm not a doctor. I'm not a physician. I'm also not an epidemiologist. You know, vitamin D is well within my expertise, but we can't tell people what will have a treatment effect, what to do when they get sick. But also we're not talking about something with risk here. We're talking about what you should be doing anyway. Right? And so, I think it's incredibly powerful to say that simply maintaining your vitamin D status in the normal range, according to the laboratory, for which there are abundant reasons to do anyway regarding bone health most famously, and other things as well. That seems to take care of most of what's observed in the studies. And, you know, across observational studies and the first randomized control trial, it looks like that might be, you know, bringing the probability of having a severe or fatal case down tremendously and possibly very close to 0, probably not 0, but, you know, possibly 90% plus reduced. And so, we're not talking about going out and using experimental drug. We're talking about just doing what you should be doing with vitamin D anyway. And so, I don't wanna tell anyone what to do to treat a disease, but I also don't feel conflicted about saying, you know, it's okay to do what we in the know, have been saying you should do for the last 10 years on vitamin D and get your levels at least up over 30 nanograms per milliliter. And so I look forward to seeing the other trials that come out. But right now, everything looks very positive for vitamin D.

Katie: Yeah, and that's a great point. This is something that the body naturally makes from sun exposure, and that we do have, like you said, years of clinical data of what it should be as a minimum, that threshold. And that's an easy thing to test. Your doctor should be able to help you test that or there are now even places I've gone to that tested myself without a doctor. I feel like that is a really valuable metric to know, going into any cold and flu season, not just right now, but one that our family always test in the fall and winter anyway. For people who are wondering if they're gonna get tested and try to get that level up, or someone maybe is below that threshold, are there special considerations to be aware of on what form of vitamin D to supplement with if you're not in a sunny area to get your levels up?

Chris: I would use vitamin D3 as opposed to vitamin D2. But I wouldn't be too concerned beyond that, I mean, particularly if you're just trying to get your levels at 30 nanograms per milliliter. If you're mega dosing, there's concerns about balance with other nutrients and stuff like that. But, you know, just in terms of efforts to get up to 30 nanograms per milliliter or a little higher than that, you know, any vitamin D3 should be acceptable.
Katie: Gotcha. I feel like that study is so important as well because I know early on there was all the talk of needing to flatten the curve so that hospitals and ICUs wouldn't get overwhelmed. And so if there's now data showing that something like vitamin D can reduce the likelihood of someone ending up in the ICU by 98%, that's drastic, and it seems like it would make a huge difference for medical care and for going forward with battling this. The other things that are commonly recommended, of course, for any respiratory illness and now for COVID, Vitamin C is, of course, always on the list. Do we have any data directly with vitamin C and COVID yet?

Chris: Not that I've seen. So, there's reports of treatment using it. And to be honest, I haven't done a complete deep dive on all the literature, but I haven't seen data that could really tease out statistically how effective the vitamin C is when being used as emergency medicine. So, I do think that getting adequate vitamin C is a very, very, very smart thing to do. And based on other cases of respiratory distress, there is data suggesting that high dose vitamin C, when someone is in acute respiratory distress, can cut mortality rate in half. And it's possible that I've missed recent studies that have come out because it is very hard to keep up with everything that comes out because it's often dozens or more titles a day. But I haven't seen anything like what there is for vitamin D, in terms of getting a good sense of, you know, the exact dose that has the exact effect. So my personal opinion is, and this is more at the level of I guess, hedging against my uncertainty about whether high dose vitamin C could have harmful effects when used too early, which is based largely on mechanistic speculation. But at this point, I'm concerned enough that I would say, you know, get 100, 200, 300 milligrams of vitamin C a day as a preventative, but I wouldn't be taking, you know, 5, 10, 15 grams of vitamin C a day just as a preventative. Although I think medical use under medical supervision with high dose vitamin C or intravenous vitamin C, during acute respiratory distress makes a lot of sense. And I would love to see studies come out on the efficacy of that.

Katie: Gotcha. Okay. That makes sense. And another one that definitely is talked about right now is zinc. I know there's a lot of, it seems like a lot of data back and forth on this one and there's also various forms of zinc. Is there anything to know or be aware of when it comes to zinc for the immune system right now?

Chris: Yeah, so zinc is kind of in the intermediate stage, between vitamin C and vitamin D, in terms of the level of evidence. One thing that we're still waiting on would be a clinical trial with zinc. But we started out knowing that zinc is a very powerful inhibitor of key enzymes that the virus uses to replicate and that zinc inhibits a lot of... You know, a lot of what zinc does to the virus is the same exact thing that researchers are trying to develop drugs to do. So zinc looked very positive from the get-go. And then people started using it. And so there was a study that was done by NYU Langone Health, one of the hospitals in New York City during the height of the pandemic here. And this study was not very strong in terms of how it was designed. Basically, what they were doing was, they were using hydroxychloroquine and azithromycin as part of their standard protocol early on. And of course, these drugs have now fallen out of favor due to evidence about them. But this was back when it was still the normal thing to do to treat people with this. And then on one date, they started adding zinc to their protocol. And they basically looked at what happened after they started adding zinc versus what happened before they started adding zinc. And it suggested that adding the zinc was associated with a 50% higher likelihood of being released within the short timeframe of the study period. I think this was one or two weeks. And this was for people in critical care. So it was a 50% increase in the likelihood that they would be released on a short-term basis, which is very positive, and then they had cut in
half the likelihood that someone would be sent to hospice or would die. And so someone's sent to hospice care if they're expected to die.

So that, you know, on the surface, it looks like a, you know, pretty positive for zinc's ability to cut down on severity and mortality. But the fact that they didn't randomize people to receive the zinc or not, and simply looked at before and after, raises questions such as, you know, maybe had they not introduced the zinc, things would have gotten better anyway because of other things, you know, even around the viral spread or the other treatments, or the sun exposure. And I mean, vitamin D would be an example, right? Because this thing started in the winter. And so as time goes on, everyone's vitamin D status is higher, things like that. So, I do think the data look good for zinc, but to be as sure on zinc as we are on vitamin D, we need to start seeing the randomized control trials, and we haven't gotten that far yet. But things do look good for zinc. And, you know, again, these fall into the category of... Zinc supplementation has been studied in... You know, I guess a good example would be, like, who's at high risk for COVID? Older men, right? And so we have trials, lasting years, giving high dose of zinc supplementation to people in that category, to try to prevent age-related macular degeneration and things like that. And so, you know, we know it's safe for people in the plus 65, plus 75, or even plus 80 age group, to supplement with 85 milligrams of zinc a day for two years. And so, again, when we're talking about zinc supplementation, especially on a short to medium-term basis, we're not talking about something that risky. And so, I think that it just makes sense if you're in a high-risk situation to be proactive about zinc supplementation because there's very little harm in it. And, you know, the data might not be completely solid on the treatment effect, but it looks good.

And so, I think, you know, in terms of zinc supplementation, probably the... And, of course, this is a very complicated topic. But if I were to try to come up with a simple rule, I would say, if you're in a situation where you're really worried about coming in contact with COVID, and I would define that as there's an active and growing caseload in your area or maybe cases haven't been that bad, but schools just opened up, and you don't know what's gonna happen in the next two weeks, or cases have been really high, and they're not going down, or you're traveling, or you work in an indoor environment where people, you know... I guess, if you worked indoors in a restaurant, or a coffee shop, even if COVID is not that bad in your area, you're probably in a higher risk category, whatever. And you can define it how you want. But if you consider yourself in a moderate to high-risk situation, in terms of coming into contact with COVID, I personally would consider it wise to step up zinc supplementation on the order of maybe taking 15 milligrams of zinc three times a day. It's best on an empty stomach. But if it nauseates you, you should take it with food, but you should always try to take it with a meal that doesn't contain any whole grains, nuts, seeds, or legumes. And so it's better to space it out. But, you know, you also have to consider what's practical and sustainable for you. So, the ideal thing would be 15 milligrams of zinc. In terms of the form, I think a lot of different types of zinc are acceptable. I just don't like zinc picolinate or zinc oxide. But most other forms of zinc, I think are good. And so 15 milligrams of zinc, three times a day, either on an empty stomach or with some food that doesn't contain, like whole grains, nuts, seeds, and legumes.

And then I also think that it's very useful to have a store of zinc acetate lozenges. My preferred ones are Life Extension Enhanced Zinc Acetate Lozenges. And that's because, it's not just about the form of zinc, it's also about the rest of the stuff in the lozenge is designed to allow the zinc to maximally ionize in your mouth. And that allows the zinc to penetrate the mouth, nose, and throat. And given that viral infection will probably start
there in the nose, mouth, or throat, these lozenges can be very good at delivering zinc to those tissues. And so, you know, I live in New York City, and I consider New York City a low risk right now. But back when I consider New York City high risk and, of course, it was an extremely high risk back in April. The way I would do this would be, I'd be proactive with, you know, the 15 milligrams of zinc a few times a day. I'd be proactive with that, and then on a daily basis. And then, you know, if I go out to the grocery store, I'd consider that a pretty high-risk situation. So I'd take a zinc acetate lozenge before and after I go, or if I went... I guess as things got a little bit better and the state parks opened up, I'd go hiking. You know, I'd take the zinc acetate lozenges before and after. Because then, you know, outdoor risk of spread is low and yet I'm traveling to a different area and going to a place where I know people from all over the place are traveling. And so I think anytime you're mixing with travelers is kind of a higher risk situation. So just taking the extra zinc through the zinc lozenges or before and after, high risk, potential exposures, I think is a good idea. And the only downside with these zinc acetate lozenges is they have a few grams of sugar in them.

And the sugar is glucose, which I'm not so concerned about viral growth compared to fructose or sucrose. So that doesn't bother me too much. But I do know that some people need to just totally watch their sugar intake. And unfortunately, there is no zinc lozenge that is as well designed as these ones that doesn't have any sugar in it, but I think the next best thing would either be like spraying some ionic zinc in your mouth or using one of the, like, coldeeze or something like that with zinc gluconate. They do have some sugar-free versions of those. So, I don't think those are as good in terms of delivering the ionic zinc in the right way as the life extension lozenges, but I think if you can't take the sugar load in those life extension lozenges, then some sugar-free version of zinc gluconate, or zinc acetate, or an ionic zinc spray could be a substitute.

Katie: Gotcha. And that's a great point that this one, we don't have clear clinical data yet but it seems like a very low-risk thing that we can do that probably could have benefit. And so when kind of weigh that against it, it makes sense. You mentioned cytokine storms earlier in the interview. Are there any other things we need to be aware of to avoid creating a cytokine storm or any other things we can do to boost the immune system without increasing the risk of that?

Chris: Well, I think here also, we're in the zone of no clinical data and trying to speculate. And so, one thing that we know is that we do know that IL-6 is a key driver of the cytokine storm. And we know that not only from... You know, before, we strongly suspected this based on, you know, very consistent data coming in, showing its correlation with poor outcomes. But now we also know it because the first randomized controlled trial with a drug to block IL-6 was successful at reducing hypoxia or low blood oxygen levels. And so, the data on the use of that drug is starting to come in favorably. And that I think offer support to looking at nutrients or herbs, or whatever you might be considering to say, you know, if this thing raises IL-6, you should probably be a little bit more careful with it. If this thing lowers IL-6, that might be more helpful. And you definitely have to keep in mind that you're kind of playing a probability game here because there's no clinical studies on most of these things. Some people would invoke evidence-based medicine to say, "Well, we shouldn't talk about it at all, then." But I don't agree with that because I think we're always making judgment about things that we're uncertain about all the time. And so I think when we have a pretty good idea of the kinds of things that fire up the cytokine storm, and we're talking about, well, you know, I don't know if this is gonna work, or not work, or be harmful, or helpful. But I wanna make a good guess because I'm gonna do something that I think it makes sense to consider that. So, if I was to use one metric to look at the possible possibility of harm, I would be
looking especially at whether things increase or decrease IL-6. And one thing that looks positive for IL-6 is lactoferrin.

And lactoferrin is an iron-carrying protein that is present in colostrum and milk. And, interestingly enough, so lactoferrin has been used previously in pregnant women with a variety of different causes of inflammation, where it's been shown to help normalize iron metabolism in those women by suppressing IL-6. And its ability to suppress IL-6 has been shown in that context across quite a number of different inflammatory conditions. So it seems to be a general principle of lactoferrin. And there's also some in-vitro data, meaning in a test tube, suggesting that not only lactoferrin, but whey proteins, in general. And lactoferrin is one of the whey proteins have an antiviral effect. And so, I'm not so sure that, you know... It's not always the case that dumping something on a cell in a petri dish and trying to see if it blocks the virus. It's not always the case that eating that thing is going to do the same thing. But because lactoferrin has been shown in supplementation trials to lower IL-6, and because there's a possible effect of whey protein generally being anti-viral, and because the easiest way to get lactoferrin in is actually to take 20 to 40 grams of whey protein, then I think that getting 20 to 40 grams of whey protein is, you know, something that's more likely to have a positive effect than not. And then, you know, I know much more about protein, carbs, fat, vitamins, and minerals, and essential fatty acids than I do about herbs, but it would probably be best to talk to an herbal expert on the thousands of herbs and which ones increase or decrease IL-6. But I did do a comprehensive review on elderberry and I did this a few months ago on the... Many people were concerned about elderberry causing a cytokine storm. And I did a comprehensive review of all the literature on elderberry and cytokines. And the evidence just, I don't think it favors being concerned about elderberry.

Elderberry has been shown in some cell studies to raise certain cytokines. But in elderberry supplementation trials, elderberry is antiviral without affecting cytokines. And if you look at the specific cytokines and the specific cell types, every time you look at the type of cells or the types of cytokines that would be concerned about in COVID-19, elderberry is generally having a positive effect in reducing those. And when you look at the studies showing elderberry can raise cytokine production in certain cells, generally, the cytokines are the cells that we're not concerned about in COVID-19. For anybody that wants the details of that, if you just go to chrismasterjohnphd.com and search for elderberry or if you Google my name with, “can elderberry cause a cytokine storm?” you'll get my complete review with, you know, reference and with all those details. In terms of... I think there are a large number of other herbs that may have an increase or decreasing effect on IL-6. But because herbs are not my main thing, I can't really venture into that area beyond elderberry to talk much about it.

Katie: Gotcha. That makes sense. I know you've written on a lot of these topics, I'll make sure I link to those in the show notes so people can find them and keep reading. And I didn't know that about whey protein powder, that's really helpful. On a personal level, I've been trying to figure out how to increase my protein anyway. So, kill two birds with one stone with that one. You mentioned earlier on that, like, middle-aged or elderly men seem to be at higher risk. And early on there was... We didn't really know who seemed to necessarily be most at risk. And it seems like we have more clear data on that right now. I know from what I've seen, as a mom, I'm very not worried about any of my kids, since none of them have any pre-existing conditions and they're all pretty young. But what are you seeing in the data right now of who might still be at risk versus who's likely to have less of your case, even if they contract it?
Chris: Well, I haven’t looked at the latest data but as I’ve been following it over time, the last data that I was familiar with was all pointing towards greater age being a risk factor, male sex being a risk factor, black or South Asian ancestry being a risk factor, obesity, diabetes, blood pressure, cardiovascular disease being risk factors, and anything that can be associated with immunosuppression being a risk factor, anything being associated with respiratory distress being a risk factor. And so that's the general picture.

Katie: Gotcha. Okay. Another thing that is somewhat controversial from what I've read is, if there is long-term immunity conferred once someone has actually had COVID, it seems like there are kind of varying opinions on this. And I'm curious if you've seen anything really compelling in the data about if actually getting infected does lead to long-term immunity or not.

Chris: Yeah. So, one of the problems with trying to understand this is that the only way you could really know for sure is if you did a randomized control trial that involved exposing people to the virus to actually test their immunity. And so we're not gonna do that. We're never gonna do that. And so what we're doing instead is trying to understand the correlates of immunity and then trying to reason from that, based on surrogate markers. And so, that puts us in a position where we're saying, "Okay, we know one thing that should be a protective correlate of immunity should be neutralizing antibodies." And so, you develop an antibody response. To be neutralizing antibodies means that if you took those antibodies out of someone's blood and you mix them with a cell that you are trying to infect the virus in a test tube, that those antibodies will block the virus from infecting the cell. And so not all antibodies that are provoked to the virus will necessarily be neutralizing because an antibody can bind to the virus but not do anything to its ability or, you know, bind the virus or bind to a protein that the virus is supposed to bind to, but not necessarily do anything to actually prevent infection. And there are also sometimes enhancing antibodies that can actually make a viral infection worse. So just because the antibodies are raised to the virus does not mean that they're protective and does not mean that they're a correlate of immunity. But neutralizing antibodies are one of the correlates of immunity. And so, you know, if you see neutralizing antibodies rise in response to treatment or in response to infection, then that is, you know, you could say bullish for lasting immunity. But then if you see the neutralizing antibodies fall off, you could say that's bearish for lasting immunity.

And so one of the concerning things that we've seen is that the neutralizing antibodies do seem to drop off even when the total antibodies remain elevated after 2 3, 4 months. On the other hand, another apparent correlate of immunity is T-cell immunity. And that's when you can take a T-cell out of someone's blood and you can show that not only does it respond to the virus or not only does it match the virus, but it will grow its population and expand the colony in response to the virus and it will attack the virus, etc. And in that case, the data seemed to suggest that the T-cell immunity will last for decades. Now, obviously, no one's had COVID for decades, so we don't know for sure, but what we know is that as long as people have had a recovery from COVID, the T-cells remain very robust, even after the neutral neutralizing antibodies drop off. And then we also know that people who had T-cell immunity to the first SARS virus, which was well more than a decade ago, almost two, they still have T-cell immunity to the first SARS virus. And so given how similar these two viruses are, with the first one being called SARS coronavirus, and this one being called SARS coronavirus 2, that's very bullish for lasting T-cell immunity. Now, the question is, how much immunity from which mix of
these things do you need to not get sick? And we just don't know and we'll never know the answer to that. All we could do is estimated or model it. And, you know, just because you have an immune response to something doesn't mean you didn't get sick, right? However, even in the cases where let's say you got sick, neutralizing antibodies disappeared, but you have a very active T-cell immunity, even if you can get sick, you're probably not gonna get anywhere near as sick as you got the first time around when you have no T-cell immunity, right?

So it's very, very, very unlikely that after being infected, someone's resistance ever drops to baseline. It might drop low enough to get infected again, but it probably is not gonna drop in almost anyone low enough to allow, I mean, a second infection that was as bad as the first infection. And then also just because the neutralizing antibodies drop off, doesn't mean that they're not gonna rise back up if you were to get a second infection. And so there are circulating B-cells that have the potential to produce those antibodies that will stay there, even when the neutralizing antibodies die off. So we don't know the answer. But we have some reasons to say, you know, maybe the immunity might start dropping off in a few months. But we also have other reasons to say, there's a strong chance that even if it drops off somewhat, it's not gonna drop off completely, possibly for decades to come. Now, the other kind of piece of the puzzle looking at that is what happens in the real-world data. And so one thing that's interesting to me, as someone who lives in New York City, and someone who was exposed to all of the tangible ways this virus permeated everyone's life, I mean, obviously, you know, it hurt some people much worse than others. But everyone who lived in New York experienced the sights and sounds of ambulances driving by all the time and so on. What's interesting to me is that if you look at the data for cases hospitalizations and deaths in New York City, they have been declining since April 7th, if I remember, right? And for the past three months, they've basically been bottomed out. And so it seems like, you know, with four-and-a-half months of straight decline, and with three months of being very much bottomed out, it seems like if some people can get reinfected after three months, they're not large enough in number to dominate a trend.

You know, so reinfection may be possible but it just seems to me like if immunity only meaningfully lasted three months, that New York would be in a complete state of disaster right now, with a second wave as big as the first one. And it's not. And you can't blame... You can't attribute that to behavior change, or to the careful and phased reopening, or to the testing. I mean, you can give that some role, but the fact is that in March, when we started to lock down in New York City, we went in a matter of days from having, like, 100 cases to 1,000 more cases. And we are, you know, about as open duck as we were in the sort of the middle of closing down back then. And so, if the immunity only last three months, and if everyone who got sick in March and April is able to get reinfected now, they should all be getting reinfected. And we should have a devastating second wave, and that's not happening. And so, you know, I suppose you could say, "Well, the neutralizing antibodies drop off after a few months, maybe the T-cells drop off after nine months, we don't know that they don't, maybe it's after nine months, you're gonna get these massive wave of infections." But I mean, I would think if that was the dynamic thing happening, that we were moving towards, there would be some sign of it. And there's just no sign of that happening. So, I don't doubt that reinfection can happen. I just don't think that it's going to be a force that can make a trend.

Katie: Yeah, that makes sense. And that's a really important distinction, I think. It feels like the conversation is still kind of just concentrated on general cases and the assumption that there will be a second wave or there is
no long-term immunity, which makes kind of the future look very uncertain as far as what the end of this is gonna eventually look like. And I think the other piece of that that is starting to be talked about more and more is the herd immunity factor. And certainly, there's a lot of debate going on right now about what the number looks like for herd immunity and if certain places have hit it or not. And you, I feel like having a very unique perspective on this having lived in New York City and seeing the worst of the first wave, and then now seeing both the data and the day-to-day of what life looks like right now. So I'd love to hear your opinion on what you think about herd immunity and what that would look like and what kind of timeline we might be on for that.

Chris: Yeah. So I mean, my interpretation of what happens around me is driven by the science. So before I... So, okay, background is... What most people are saying about herd immunity is based on... Most people are saying we need 60% to 80% of people to get infected in order to reach herd immunity. And maybe a few months ago, we had 10% of the country infected, maybe now we have 16% of the country infected. We are nowhere near that. And we don't wanna... You know, if it was the total disaster of the last of the spring and summer, that got the first 10% down, we don't wanna see what happens to get the next 50% down. Now that 60% to 80% figure is based on a mathematical formula that is used to calculate the herd immunity threshold for randomly distributed vaccines. And what some scientists have pointed out in several papers that have been published by different groups. And these papers are generally coming out from mathematicians, but they're not all, like, disconnected from epidemiology. So, I did a two-hour interview with the corresponding author of one of the papers that came out of Europe. And this was with Gabriela Gomez. And her entire career, basically, even though she's a mathematician, her whole career has been modeling infectious disease epidemiology, and that's what she was doing way before COVID. And so, you know, it's not like these are people who were in the math field. And just because everyone wants to do COVID research now, they thought, "Oh, I'll do it too." These are people in mathematical epidemiology. And what they've pointed out is that when you have a natural pandemic, the herd immunity threshold will usually be much lower than it would be for randomly distributed vaccines.

And that's for this reason. When you randomly distribute vaccines, you have no idea who will get infected and you have no idea who will be most likely to spread the virus. So you vaccinate everyone. And that means that while you are by random chance, immunizing some of the people who are most likely to spread the disease, you are also immunizing all the people who would never get sick in the first place, who would get sick but not spread, or who would spread the disease very little. And the reason is obvious. And that's that you have no idea who would spread the disease and who wouldn't. By contrast, that is not at all what happens when a virus spreads naturally. What happens when a virus spreads naturally, is that it infects the most vulnerable first. In general, the people who are most vulnerable are also the people most likely to spread it. And that's not a one to one, hard and fast universality. It's just the general correlation. So, there's a couple of reasons for that. Number one, if, from a biological perspective, you are more vulnerable, because you have lower immunity, the virus, you'll be more likely to get infected. If you get infected, you're more likely to spread it. And then on a social level, if by your behavior, you are more likely to engage in behaviors that get you infected, those are the same behaviors that will get other people infected. So, from both a biological and a social perspective, the things that get you infected are the things that make you spread it. Therefore, the people who would spread it the most will always get the most infected first. And so the virus doesn't have the inefficiency in... And of course, when I'm speaking from the perspective of the virus, this sounds morbid but, you know, imagine the virus is trying to take people out, right?
The virus is not gonna have the inefficiency in immunizing people or simply removing them from the population because the virus, obviously, when we vaccinate people, we want to prevent people from dying. But the virus doesn't care about that. If the virus kills off the most vulnerable people, it also stops them from spreading the disease. And so we don't want that to happen but it does, right? Everyone was trying to prevent death from the get-go with this, and still, in New York City, we had over, you know, 400 or 500 people per day dying at the peak of this pandemic. And so, you know, the virus did that, whether we wanted it to happen or not. And so as an unfortunate fact of the people who were most vulnerable, dying, before anyone was anywhere near able to develop a vaccine or an effective treatment, the most vulnerable people and the people most likely to spread the disease had been removed from the population already. And among those who live, the people who are most likely to... You know, even when you’re talking about 30-year-olds who could get infected, probably won't have serious consequences, although they might, but probably won't, they can still spread it. And the ones who have the lowest immunity and are most likely to get infected are the ones who do get infected. They're also the ones who are most likely to spread it. So if they get infected first, and they become immune first, then they also are removed from the population of people who can spread it. So because the virus when it spreads naturally, removes transmitters from the population selectively, it hits all those potential transmitters at the beginning of the pandemic. And because of that, it doesn't need to hit 60% to 80%. So, if you vaccinate people, and you need 60% to 80% of people to be vaccinated, that's because you're vaccinating, you know, all the large bulk of people that wouldn't be transmitters in order to get to the transmitters.

The virus just comes and selectively picks off the transmitters, and so only needs to get 10% or 20% of those people. Now, before I read these papers and before I did my two-hour interview with Gabriela Gomez, and before I really grappled with this interpretation, I was still aware that the virus had largely disappeared from New York City life, at least as a medical force. So if you look at the data, in April, at the peak of the pandemic, the mortality rate from COVID was four times greater than the usual total mortality rate per day. And now, yes, COVID still exists, but it's 2% to 3% of the usual total mortality rate. And so, you know, people are afraid of the second wave, people make policy around the second wave. And so the shock effects of fear of COVID still are present. But in terms of, you know, are the hospitals filled up with COVID cases? No. Is COVID a dominant force in daily mortality? No, it's there but, you know, 97% of the people dying every day in New York City are dying from completely different things. And so, before I looked at this herd immunity research, I would basically argue the opposite of what I'm saying now. You know, people would show... I remember someone on Twitter showed a graph comparing New York and Texas. And he was saying, "Yeah, Texas might be in a peak, but look at the peak of Texas per capita, compared to New York." Yes, New York's is over and yes, Texas is rising now, but the per capita number of cases or hospitalizations or deaths or whatever metric you wanna use, never got anywhere near what the peak of New York was. So, I would respond to that and I would say, "Hey, look, that's because New York, jumped on the lockdown very early on, acted very swiftly, and we've been very careful about reopening. We've been very good about testing."

But now that I've read the research arguing in favor of New York City having hit herd immunity, I cannot help but see that we've had our cases and our mortality being in steady decline since the early to middle of April, more than four-and-a-half months ago, and for about three months, we've had completely flat bottomed out stats for this. And that's despite the fact that we are in phase 4 of a reopening that started in June. And so,
how can reopening, and reopening, and reopening, and reopening in these phases, how can that not have any perceptible increase in the caseload? And I think, now granted just in the last week, they are talking about the cases increasing but I think this is because they're testing people so systematically. And so they are seeing the percent positivity rate increase in their systematic testing of people. But if you look at the cases, the data for cases, you know, you can barely tell whether there's any signal rising above the noise. It's not clear that there's an uptick yet. But more importantly, there's definitely no uptick in hospitalizations or deaths. So whoever's getting infected right now, it's just not that serious. And, you know, this also would be predicted from the same exact principle, right? Because just as the virus would pluck off the people most likely to be a transmitter early on, it's also plucking off the people most vulnerable. So, you know, if the virus first hits the people with the least immunity, then six months in, even when it’s infecting people enough to make them positive, it should be infecting the ones who had good enough immunity that they didn't get infected back in March. So, because of that better immunity, when they do get infected in September or October or November, it's not as likely to be serious.

And so I think that's probably what we're seeing. And the general trend that there's just been this completely flatline, that has basically not changed for all these months, I just think that it's far more likely that what happened is, we got hit so hard, and despite our best efforts to stop it, that we can never get hit that hard again. And, you know, I think it's important to note that herd immunity doesn’t mean the end of caution. It just means that that enough of the transmitters had been infected, that you're not gonna have exponential growth. You are instead going to have all things being equal, a decline in caseloads, whether it's fast or slow. And it also doesn't mean if you make some dramatic change to policy, where you open back up, that you're not gonna see some temporary, small uptick. It just means that that uptick is not going to create a second wave that looked anything, even 10% like the first one. And so, no, I don't think the end of caution has come. But I think, you know, for New York City, I think we clearly got hit so hard, that we have overshot herd immunity. Caution shouldn't be, you know, thrown away, but we do need to balance that in perspective. And I think there's a lot of other areas where, you know, if you see them spiking... And I think this is a great test to do. Like, if you hear someone talking about a spike in cases in a particular area, then what you should do is you should go to Google, and you should google the case number in that area, then you should open a new tab, Google the population in that area, divide one by the other, and see whether it's gotten up to the level of New York City or not. You know, so when Spain was having its second wave, or Spain is having its second wave, even with the second wave peak, even now Spain has, you know, 70% fewer cases per capita than New York City had in total.

And so, when you look at that, you have to keep that in perspective that the places that are really getting hit the hardest, now are generally the places that didn't get hit hard before. And there's not really anywhere that got hit as hard as New York City did, that is having a second wave that looks like the first one. You know, Spain's second wave in caseload looks as bad as its first one. In hospitalizations and deaths, it does not look as bad as its first one. But in cases, it does. But you know, you take the first wave and the second wave, add them together, and it still doesn't get anywhere near New York City's first wave. And so that's why the second wave is that bad. And I think that that's a... Look, I'm not an epidemiologist. I do not have the final say on this stuff. But I think we really need to open up the conversation around this because there are very good mathematical epidemiologists who are coming up with these models. And I think they need a voice in policy decisions at the local, state, national, and global level. Because, like in the case of New York City, you know, it made complete sense when we had four times more COVID death cases in a day than any other death. It made sense to ignore
every other cause of death and focus on COVID. But excuse me, when COVID mortality is 2% or 3% of total mortality, we can't... You know, yes, if the prospect of a second wave is bad as the first one is right around the corner, then yes, we should only be thinking about COVID. But if there's a very strong case to be made, that that second wave, as bad as the first one, is not right around the corner, then, you know, it behooves us morally, ethically, and rationally to not ignore the 97% of mortality that isn't COVID.

So I think it's a discussion that has to be had because there's an opportunity cost to everything that we do, and we can't ignore COVID. But if there's a strong case to be made, that not everything else has stopped to matter, then we can invest so much...then we have to question whether when we invest in preventing COVID at the expense of taking care of all the other things that need to be taken care of, whether we're making the wrong decision not to reappropriate some of that mental energy, and some of that monetary investment, and some of that analytical investment and understanding, a little bit away from COVID, to not forsake all the other things that are important.

Katie: Yeah, I think you put that so well. And this is one of the reasons I love your work and the research you do and how intellectually honest you are. And even the number of times in this conversation that you said, you know, early data looked like this, and then I changed my mind, in light of new information. I think we need more voices like you and, like, these epidemiologists and researchers that you're talking about to have an honest conversation about this going forward. Because, like you said, we're at a place where we need to look at cases versus the mortality and hospitalization. And I feel like those just keep getting lumped into the same conversation. And I think you put it so well, it's not the time for the end of caution, but it is time to consider other potential consequences and look at total harm minimization, not just number of cases of COVID when we're seeing businesses shut down, and the economy decline, and kids not being able to go to school.

And my opinion is at this point, we all need to be responsible for doing our own research and looking at the data. And I love Charlie Munger's idea of, you know, earn the right to have an opinion by knowing the other side of that opinion, as well as your opponent, might actually look at the conflicting data and challenge yourself, make sure that your conclusions are backed by research and data, and not just, you know, alarmist post on social media. And so I will make sure I put links in the show notes for people to follow you and to keep up with the nutritional side of this. And you've been doing, like you mentioned, some great interviews that I think really bring some important points to light. And this is why I felt like it was finally time to open this conversation on here and to share this data with my listeners because like you said, I think this is a really timely and important topic right now, as we look forward to what will policy be for the rest of the year, for early next year? And will there be as dangerous of a second wave as we keep hearing there might?

This podcast is brought to you by Wellnessse, my new personal care company that is based on the recipes I've been making at home in my kitchen for decades. Many “clean” products simply don’t work and this is why I have spent the last decade researching and perfecting recipes for products that not only eliminate toxic chemicals but contain ingredients that work better than their conventional alternatives and that nourish your body from the outside in. I’m so excited to finally share these products with you and wanted to tell you about our brand new dry shampoo! It can be used various ways. You can sprinkle it in clean hair to add volume and to extend time between washes, sprinkle it in hair that has not been washed in a day or two to absorb oil or
sweat and you can work in to color treated hair to maintain color-treated hair by not having to wash as often. It contains oil-absorbing kaolin clay and volume-boosting tapioca which work together to refresh hair at the roots. Lavender oil and cactus flower help to balance scalp and strands’ natural pH. We even added hibiscus for healthy hair growth. You can check it out and try it at wellnesse.com and my tip is to grab a bundle to save or subscribe and save as well!

This episode is brought to you by Joovv Red Light Therapy. Red light therapy, also called photobiomodulation, has been a part of my life for a long time. I discovered this years ago when doing some research and specifically found the benefits for hair, skin, thyroid, energy levels, many other things as well. And the reason for this is that our bodies need light. We think about food as the fuel for our bodies, and it is, but light is also a very important type of fuel for our bodies and for ourselves. And many of us get too much of certain types of light, like blue artificial indoor spectrums of light, and not enough of other types of light, like outdoor light, all the spectrum that come from the sun, and including red light, which is why I love having an option in my house where I can make sure I’m getting enough red light daily. It’s done wonders for my wellness routine, and that’s why I’ve made it such a priority. I’ve noticed a difference in my energy levels and in my skin when I use it regularly. And I wanted to talk to you about Joovv today specifically because they have long been the leader in red light therapy. But they’ve also just now come out with a new generation of devices that have upgrades that are really exciting. Their devices are sleeker, lighter, and with all of the same power of their original devices. But they’ve intensified their coverage area so you can stand as much as three times further away and still get the recommended dosage. I find this lets me work out or do other activities still close enough to the light to get the benefits. They’ve also upgraded their setup, so it’s very quick and easy to build and can fit in almost any space, depending on your size requirements. A couple really cool features about these new devices. They have something called Recovery Plus Mode, which uses pulsing technology to give yourselves an extra boost after a tough workout or a stressful day. And I find that sleep is one of the most important aspects of health. And I have used red light therapy at night to help wind down for the day quite often. But their new devices have something called Ambient Mode, which is calmer lower intensity lights, especially beneficial at night, certainly more healthy than the bright blue light from many of our screens and in line with our natural circadian rhythms. For a limited time, Joovv is hooking up listeners of this podcast with an exclusive discount on a first order. And you can find out all the details by going to joovv.com/wellnessmama and using my code Wellnessmama on any qualifying order.

Just on a personal level, what does your day-to-day look like? What does your personal risk assessment of the virus or how has your life changed in New York now versus a few months ago?

Chris: So a few months ago, I would say I... You know, what I was just saying I think it was actually very well reflected in what I’ve done personally. So, when we were in lockdown, a lot of my energy was invested in buffering the psychological stress. So I deliberately made some choices with my diet, for example, to allow more comfort foods, you know, still trying to select from the healthiest of comfort foods, but still... You know, like, pre-COVID, my diet was very much built around most of the time, the functionality of getting my nutrients in. And, you know, yes, I enjoyed home-cooked pleasurable meals, went out to eat and whatnot. But during the height of the COVID lockdown, you know, I very much acknowledged that many of the things that were fun and interesting to me, that existed outside of my apartment, were no longer available to me. And knowing that... And, of course, this is a very financially stressful time as well because, you know, especially in
March and April but, you know, small businesses are having a difficult time this year. And so, you know, I made the choice to say, like, "Okay, I'm gonna allow myself to gain some weight. I'm gonna allow myself a glass of wine every night, instead of two nights a week. I'm gonna, you know, eat some more comfort foods. I'm gonna put cream in my coffee." I usually avoid dairy because it causes a slight inflammation for me, and I also tend to gain a few pounds if I put cream in my coffee because it's just added calories that don't make me eat any less. But I just sort of, like, shifted the allocation and mental energy towards just increasing the comforts available to me, inside my lockdown apartment, and just trying to buffer some of that psychological stress.

And then my supplement regime was largely built around preventing COVID. So, like I said before, with the zinc, also with elderberry, and garlic, and a couple of other things, I would have my daily COVID prevention supplements. And of course, you know, as we said, early on, there wasn't that much data. So this was all built on what I think is the most probable outcome if I take elderberry or garlic, or whatever. And I'd have certain things that I'd do before and after high-risk exposures. And so the zinc lozenges were one. Eventually, a nasal rinse with povidone-iodine at 0.5% concentration became another thing that I added to that. And then as we've opened up, the opening up has been very gradual. So, probably the first thing that I started doing was once the state parks opened up, my girlfriend and I would go hiking on a regular basis. And, you know, that was one of the... Like, we couldn't go to a play or go... You know, at first, we couldn't go to restaurants either. Couldn't go to most entertainment, right, but we could go hiking. And that's number one gonna get us physical activity when all the gyms were still closed. Number two, gonna get us outside, where we get the benefits of sunshine, including the vitamin D, as well as many other things. Number three, just, you know, the whole forest bathing concept, just very much needed stress relief. And as that started, I said to myself, "Okay, I'm gonna sort of, like, gradually shift. Let's say we're 10% back to normal compared to lockdown, okay, I'm gonna start taking a 10% allocation shift from my psychological stress and COVID prevention bucket," and shift it back into, you know, what was I doing before to keep optimal body composition, to, you know, sort of have a stoic, non-inflammatory vitamin and mineral positive diet, and just gradually shift things back there.

So, I've just gradually decreased my... So, as an example, now I put cream in my coffee on weekends and I do black coffee during the week. Started to gradually decrease my alcohol consumption back to what it was before not quite, but, you know, gradually. I've started to eliminate the most of the comfort foods and eat a more, you know, vitamin and mineral, non-inflammatory sort of oriented diet similar to what I had before. And then I guess my supplementation regime is very much not focused on COVID prevention and much more focused on what do I think are the things that I'm not hitting with my diet, where I get the most benefit out of adding a supplement in. And so now my supplements look very and a lot, like, what they did pre-COVID and sort of nothing like what they did during COVID. But I still do have elderberry, garlic, povidone, iodine, zinc, vitamin D. And I have those kind of in line for if I do something out of the ordinary where I'm expecting that I'm mixing with travelers or I spend a lot of time, you know, now that indoor dining is around, say I participate in indoor dining, you know, things that are theoretically a higher risk, I'll still add some of that sort of before and after high-risk potential exposure prevention protocol. You know, take zinc lozenges, take some garlic elderberry, do a nasal rinse with the 0.5% povidone-iodine, but that's become a very intermittent thing that is no longer the dominant force in my life.

Katie: Got it. I think that's a super balanced approach. And I feel like this episode has been packed with so much practical information. I know that you have written so much and done interviews on a lot of these
topics. So I'll make sure all of those are linked in the show notes at wellnessmama.fm. For any of you guys listening, I highly recommend following Chris on social media and keeping up with all of his research. He's incredible. Chris, thank you so much. I know I always say this, we're gonna have to do another round sometime soon...

Chris: Happy to do it.

Katie: ...because you're such a wealth of knowledge. I'm very appreciative of your time. Thank you for all the research that you are doing in this and for sharing such a well-informed and balanced approach to this. So thank you for your time today.

Chris: You're welcome. Thank you so much for having me on. It was great.

Katie: And thank you as always for listening and sharing your most valuable resource, your time, with both of us today. We're so grateful that you did. And I hope that you will join me again on the next episode of "The Wellness Mama."

If you're enjoying these interviews, would you please take two minutes to leave a rating or review on iTunes for me? Doing this helps more people to find the podcast, which means even more moms and families could benefit from the information. I really appreciate your time, and thanks as always for listening.