# Episode 108: Living with COVID

**Chris Dall:** [00:00:06] Hello and welcome to the Osterholm Update COVID-19, a podcast on the COVID-19 pandemic with Dr. Michael Osterholm. Dr. Osterholm is an internationally recognized medical detective and director of the Center for Infectious Disease Research and Policy, or CIDRAP at the University of Minnesota. In this podcast, Dr. Osterholm will draw on more than 45 years of experience investigating infectious disease outbreaks to provide straight talk on the COVID-19 pandemic. I'm Chris Dall, reporter for CIDRAP News, and I'm your host for these conversations. Welcome back, everyone, to another episode of the Osterholm Update podcast. Last year at this time, the highly transmissible Delta variant became the dominant SARS-CoV-2 variant in the United States, marking the beginning of a surge of new COVID-19 cases and bringing an abrupt end to the country's optimism that the pandemic would soon be over. It would be the beginning of a period culminating in this winter's Omicron wave, that may have been the very worst stretch of the pandemic the country has seen. A year and several variants later, we now have a newly dominant variant, BA.5, that is the most transmissible version of the virus we've seen. And we could be seeing another surge in cases. But with much of the country having moved on, it's hard to tell at this point. Today, on this July 8th episode of the podcast, we're going to talk about how the BA.5 Omicron sub-variant may or may not change the trajectory of the pandemic here in the United States and elsewhere. We'll also talk about how reduced testing and the drop off in official case reporting may affect our insight into what comes next, discuss the FDA's recommendation on updated booster shots, answer a COVID query about the definition of reasonable precautions in this phase of the pandemic, give you the latest on the monkeypox outbreak, and share a beautiful place from one of our listeners. But before we get started, as always, we'll begin with Dr. Osterholm's opening comments and dedication.

**Michael Osterholm:** [00:02:02] Thank you, Chris. And welcome back to all of you to another edition of the podcast. For all of you who are members of the podcast family who have been with us through this long and very challenging time, welcome back. Hopefully today we can again share with you useful and helpful information. For those who may be new to the podcast, I will say right up front, if you're looking for absolute answers, you're looking for predictions that are going to come true, this is not the place you want to be. But if you're interested in just trying to get through this as we all are, we welcome you on board and hope that you find what information you do get to be useful. This has been a very interesting two weeks and I say interesting in quotes because if anything, I think the uncertainty of what's happening, why it's happening, what we can do about it has actually grown, not been reduced by more information. We'll talk about that today. We'll talk about what are the challenges going forward, what do we know and what don't we know? What do we hope we knew but we didn't? And I think that this will at least give you a sense of perspective of where we're going. Also in this podcast, I'm going to stretch it a bit. This is a very uncomfortable place. I feel like I'm on a high wire about one mile above the earth with no net below. But I'm going to share with you what I'm doing right now personally to protect myself from the virus. And the reasons why I want to protect myself, not just do I get COVID or not, but the issue of long-COVID and share with you how I'm trying to live my life. You know, I, like all of you, want to move on from this virus. And unfortunately, many, many people have moved on from the virus, although the virus hasn't moved on from them. So today I will share with you just in fact, what I've been doing this past week in terms of trying to engage life, my friends, family and colleagues, and at the same time protect myself, as well as protecting my family, friends and colleagues. So so thank you very, very much for joining us today. Let me just briefly hit on what I think is a very important dedication today. And I hope that the fruits of the labors that I'm going to talk about will bear fruit soon, and you'll understand why that is so important. Today I'm dedicating this podcast to all of the health care workers in the country who are in training, who are entering the field for the first time. And this goes all the way from physicians in high level residency training programs to the nursing assistants, to the people who actually make our health care systems run. It's everybody in that group. We know we have suffered immeasurably throughout the pandemic in the health care worker field in terms of not only the issue of severe illness, hospitalizations, etc., resulting from your infections that you acquired while working. But in addition to that, it's also the stress that you've been put under, many of you who may again have any number of job descriptions what you do nonetheless have had to sit in day after day environments of extreme pain and suffering and often wondering, can I keep this up? As a result of this, we now know that about one out of five health care workers among the 18 million health care workers in this country have quit their jobs during the pandemic, just literally because of the challenges it is to be a health care worker today. Again, across the entire spectrum of job descriptions. Right now, as of February 2020, we know, for example, that upwards of one half million people have just quit within the last year. And so we're trying to replace these people. We need people to come in fresh. We need people to come in in form. We need people to come in educated, and we need people to come in with a compassion. And so this podcast is dedicated to you. Thank you for stepping up and stepping forward. We need you. We want you. And most of all, we hope that you find a satisfactory career in giving and in helping others struggle through this pandemic, as well as all the other health challenges. This podcast is dedicated to you. And let me conclude this opening of the podcast with something that many of you have come to either love or just wish I'd skip over quickly. And that's our sunlight. Today, July 8th as Chris noted, we will have 15 hours, 25 minutes and 54 seconds of sunlight here in Minneapolis, Saint Paul. Just two weeks ago, on June 21st, we actually had 15 hours, 36 minutes and 50 seconds of sunlight here. We have lost about 10 minutes. We're on that downward trend, but we still have a lot of good summer and sunlight left to go. So take that encouragement to go enjoy the world. For those in the southern hemisphere, your time is coming and we welcome the fact that you have just been through some very dark days and we will be getting ready for those. But in the meantime, we're going to celebrate what we have.

**Chris Dall:** [00:07:04] Mike, let's start where we always do with the international situation. After months of global declines, the World Health Organization's weekly updates the last two weeks have shown cases climbing around the world once again. Is this the result of the BA.4 and BA.5 Omicron sub-variants taking over?

**Michael Osterholm:** [00:07:23] Well, the short answer is absolutely yes. The long answer is I still don't know where it's going or what it will look like two, three or four weeks from now. I will make just one very specific comment that I don't need to repeat, because if any of you have been routine listeners to this podcast, you know, what I think about this is please do not be swayed. Do not be convinced. Do not have any real hope for anything that somebody puts in a statistical model more than 30 days out from today. And so you're going to hear lots of predictions about what will happen and why it'll happen, where it'll happen. And I can tell you with certainty that almost every one of these models will be completely wrong. And therefore, you know at this point, I will give you our best shot at what we think will happen here. But knowing that there's a lot of uncertainty and that anyone who gives you certainty right now probably also has a bridge to sell you. Chris, if anybody needed a reminder that COVID isn't going to just simply fade away, look no further than what's happening internationally in just the past month, even in the past two weeks. As of Wednesday, the numbers posted on the WHO dashboard indicate that last week's case totals approached 5.3 million, up from four and one half million the week prior. In fact, with last week's total, we've now seen weekly cases jump by more than 2 million compared to where we were just a month ago. And remember, this is happening at a time when many of us actually know cases are not being reported throughout the world. We know countries are rolling back their testing programs. They're using more at home tests which are not being reported in terms of results. And for that matter, we know in many cases people aren't being tested at all, even in environments where it was obvious that this is what is happening, it's COVID. So for these reasons, I don't put a lot of stock in these case numbers. I can't even look at them from a trend standpoint, meaning that, well, it may not be all of the cases reported, but is it a representative sample? And at this point, we don't even know that. This being said, now, for the sake of context, let me point out what 5.3 million cases means. With Omicron, where we've seen weekly cases surpass 20 or even 23 million on several occasions, a total of 5.3 million cases doesn't seem all that significant. Remember that concept of shifting baselines? You know, once things get so, so bad, if they get kind of not so bad, still bad, hey, that's better. And that's what many people right now are feeling. However, let me just put this 5.3 number into context. Between January 2020 and December 2021, I know it's hard to remember back that far, and most of us don't want to remember, but that was a span of about 100 weeks prior to Omicron's arrival. There were only three total weeks where cases exceeded the levels we're at now. So just again, let me put this into perspective. If you look at what happened between January 2020 and December 2021, when things were surely challenging, there were only three weeks where cases exceeded the levels we're at now. So from that perspective, and considering we're almost two and a half years into this pandemic, it's surely not a trend we want to see happening. Otherwise, as to what's driving the latest wave, I have no doubt it's tied to the rise of BA.4 and in particular BA.5. Remember, these are sub-variants of Omicron. Both of them share multiple mutations on their spike protein, which improves their ability to evade the immune protection offered by vaccines or previous infection. And while they're often talked about in tandem since they both have growth advantage over previous sub-variants like BA.2 or BA.2.12.1, it's becoming evident that BA.5 is winning the race. It is now the sub-variant of real concern. According to the latest weekly EPI report that was published by the World Health Organization on Wednesday, 52% of the total sequences uploaded to an international database from June 19th to June 25th were BA.5. That was up from 37% the week prior, so up from 37% to 52%. Otherwise, cases of BA.4 have also increased, but not in the same degree, going from 11% to 12%. So it looks like one or more of the mutations that BA.5 has in a non-spike region which distinguishes it from BA.4 are allowing it to outpace its Omicron relatives. As a result, we're seeing cases climb in places where BA.5 has taken over. Based on the sequencing data this includes countries in Europe like Belgium, Germany, Greece, France, Italy, the Netherlands, Switzerland and the United Kingdom. In fact, according to the WHO dashboard, weekly cases in Europe as a whole have gone from less than a million in early June to almost 2.7 million as of this past week. Again, remember, this is at a time when testing and reporting are lagging substantially from what they were before. To give you additional perspective on what's happening in Europe, let me just cover a couple of the countries. For example, in the United Kingdom, where average daily cases have climbed from 5,000 a day in early June to over 20,000 a day now, the number of patients hospitalized with COVID has also risen from 5,000 to more than 10,000. Of course, during the UK's initial Omicron surge with BA.1 and even their previous surge with BA.2, hospitalizations reached 20,000. But at the same time, this is their third surge in what basically has been a half years time. So COVID's impact on the health care system there remains significantly greater than we'd expect with other well characterized respiratory pathogens like influenza. In addition, the UK has started seeing their average daily death toll from COVID climb once again going from around 40 a day in mid-June to nearly 70 a day now. And as I noted, similar things are playing out in other countries like Austria, France, Germany, Ireland, Italy, the Netherlands, Switzerland and a number of other European countries. They're all experiencing rising hospitalizations. In fact, in places like France, Germany, Italy, ICU admissions are climbing as well. Again, the overall number of admissions in these places remains below what they were during previous peaks. But with almost a thousand new ICU admissions each week in Germany, which is double the number they were at a month ago, and 600 in France, again, double the number reported at the same time last month, it's clear that COVID is still causing severe disease at levels that can bog down the health care systems and remains a serious and significant threat to the community. We look at Israel. There, where hospitalizations tripled in a month and a half, going from less than 400 in mid-May to now more than 1,400 in late June. And they are now just starting to decline. There are still at least ten hospitals in Israel reporting more than 100% occupancy as of today, driven largely by COVID. So despite this notion that we're somehow done with COVID, we don't need to worry about these surges, you can see this combination of new variants and waning immunity leaves us and our health care systems plenty vulnerable. However, COVID is not just a problem in Europe. In fact, every region of the world is reporting case growth right now, including the Americas, the Eastern Mediterranean, Southeast Asia and Western Pacific regions. Even Africa, where overall cases appear to be dropping, which is largely an artifact of what's happening in South Africa. There are at least 16 countries that have reported rising cases over the past two weeks. One of the countries that we've often been referenced to in terms of their performance versus ours is New Zealand. And if you look at what's happening in New Zealand right now, on Tuesday in New Zealand they reported 9,629 cases, more than 3,000 more than earlier in the week. Right now there are 493 people hospitalized where just one week ago it was 110 individuals. If you look at their deaths right now, they are at 18 deaths per million population, the seventh highest in the world. Ironically, the country right now with the highest case fatality rate for COVID is Iceland, a country that we once used as a comparison to show how good you could be in responding to COVID. On Tuesday, China, which has seen more flare ups across several provinces and cities in recent weeks, including Shanghai, announced that an outbreak in the city of Shiyan is being driven by BA.5. In response, the city and its 13 million residents will be locking down until at least next week. I also want to add that numbers have been climbing precipitously by W.H.O. reports for China, but know that that also now includes per W.H.O. protocol cases in Hong Kong and Taiwan. And so that when we look at the situation in China may be misleading where we have talked previously about mainland China. Let me just add one other piece that I think provides some context right now, and that is the issue of seasonality. How many times have you heard people say, oh, we're going to have this surge in the fall or in the winter, whatever. You know but suffice it to say, BA.5's impact isn't exclusive to any one area or even hemisphere, and that shouldn't be at all surprising. Again, as a reminder, we saw South Africa's BA.5 wave start in mid-April, peak in May, which is the country's fall season. Around the very same time, Portugal had their own BA.5 wave, which took off in late April and peaked in late May. So two countries with two overlapping surges. However, while it was South Africa's fall season, it happened to be spring in Portugal. I still don't put much stock into the notion of seasonality with this virus. That being said, I continue to see stories out there hinting that winter months are and will be synonymous with increasing activity. And while that surely could be the case, I think we're still in a position where the arrival of new variants or sub-variants will ultimately determine what happens. In fact, if you take a look at South Africa and what's happening there since the latest peak, you'll see that covert activity is actually at its lowest levels reported since last November, despite the fact the country is now in the midst of its winter season. So just because it's winter doesn't mean cases automatically will grow. In fact, I would even go one step further and say, because it's summer cases won't grow. A number of COVID experts talking heads out there had continued to make claims that aha, the Deep South suffered two very dramatic surges of cases in the last two summer seasons. And so, therefore, they predicted this would happen again. As you know, I have often used the analogy that, remember, a broken clock is right twice a day and that we had no reason biologically to explain why these surges would occur in the South. And right now, there is no evidence of any surge activity in the South this year. In contrast, to what was said. Now, all of this means said, where do we stand in terms of severe disease and deaths? In the end, that's what this pandemic really has come down to. People are willing to accept COVID when it's a milder illness, but not severe illness and deaths. As I've mentioned in recent episodes, global deaths from COVID have been down relative to previous points in the pandemic. In fact, last week's total of around 9,500 deaths is the fifth consecutive week where the death toll has been below 10,000. Again, I don't want to minimize what this virus is doing or make it seem like the current toll is somehow a success or even acceptable. We can and should do much better. But when you consider where we've been the past couple of years, which included a stretch of 48 consecutive weeks where weekly deaths surpassed 50,000, we've certainly found ourselves in a much better position in terms of the mortality. Now I'd like to think that the worst of the virus, at least in terms of mortality, is behind us. And barring the emergence of a new variant that is both more highly transmissible and more deadly, that could be the case. But what are we ultimately aiming for? Sure, we've seen previous surges that resulted in 70, 80 and even 100,000 deaths over the span of a week. In comparison, the 9,500 reported last week doesn't appear all that high. But should we really gauge where we're at now based on where we've been in the past? Remember those past peaks and also remember the issue of shifting baselines. In doing so, I think it can become easier for us to set the bar far too low. Instead, I think we'd be better off with a mindset that we found ourselves in a different position with this pandemic. We have vaccines, antivirals, and a better understanding of how to treat patients and improve outcomes. But what are we doing as far as expanding access to these resources? What's the plan for those suffering from the effects of long COVID? How long will vaccines really hold up? What happens if we start to see deaths go back up? In fact, right now there are signs of global death starting to inch up again from the BA.5 wave. And with rise in hospitalizations and ICU admissions in a number of countries, including the US, the UK, Germany and France, I think the death toll is going to increase over the weeks ahead. What impact will waning immunity or even new variants and sub-variants have on severe disease and death in six months time? What about a year or even five years ago? Again, I don't think enough of us are having these discussions or putting together these short, medium and long term goals. And without those, I think we'll continue to be in a position where we're two, three or even four steps behind the virus. So with BA.5 serving is our latest reminder that COVID is not done with this. I hope we can make some inroads in a new way of thinking about this pandemic.

**Chris Dall:** [00:21:02] Here in the US, we continue to see between 105,000 and 115,000 daily new COVID-19 cases, a level that we've seen for more than a month with modest but continuing increases in hospitalizations and deaths. And BA.5 is now the dominant sub-variant in the country, accounting for 53.6% of new cases. So, Mike, with what we know about BA.5 and combined with waning immunity, could we be on the verge of another wave of infections and more concerningly, a more significant increase in hospitalizations and deaths? In other words, is there something about BA.5 that concerns you more than the previous Omicron sub-variants?

**Michael Osterholm:** [00:21:44] Well, Chris, this is where the clarity becomes very, very foggy. As I've said numerous times on this podcast, I often feel like when I wake up in the morning, I have to chip five inches of hard and mud off my crystal ball in order to even get the day started. All I can say is, is that mud is getting thicker and it's getting tougher to get off the crystal ball. But let me give you some perspective of where I think we're at. I've already noted the fact that while our cases continue to hover here in the United States, around 100,000 per day, I have no faith in that number. I will say right now, and I've said it consistently over the last three podcasts, and I can't wait until I can't say it anymore. And that is, I know more people in this past week who have been infected with COVID people with three and four doses of vaccine under their belt who are now actually quite ill. I think that is a function of BA.5 as the sub-variant that is now dominating much more infectious, evading immune protection, some waning immunity in humans and all this new activity. You know, the public is done with COVID, the virus isn't done with them. How do we interpret what's happened in the US? Well, I don't find that the kinds of data that we're reporting out, such as CDC's community transmission map are necessarily that helpful. Right now, 86% of the US counties are seeing high levels of community transmission and that compared to 81% of the counties two weeks ago at the time of our last episode. I think this conclusion is valid. The problem is we don't really understand how much transmission is out there even when we see high levels. What does high mean? 3,10, 20, 500, 1000? I don't know what it means. If we look at the wastewater data that is being collected by a number of state and local health departments, academic centers and collaborating with the CDC. The challenge with understanding what's happening in our community is that much of these data points are from two, three and four weeks ago and BA.5 is taking over quickly. I can say here in our own state of Minnesota, where we have a very active wastewater surveillance program ongoing, the numbers have risen quite remarkably just over the past 10 to 14 days. So data that's a month old may not all be reliable. And we've been talking about BA.4 and BA.5 for weeks. And right now, as you noted, BA.5 is now the dominant sub-variant in the US. In our last episode on June 23rd, BA.5 made up 11% of all cases and BA.4 made up 8%. And remember, for a case to be confirmed with a sub-variant means they have to get infected, they then have to get tested. That virus then has to be brought to a laboratory that can do the actual evaluation to know what sub-variant it is. Well, this all takes weeks, so when we report out data for sub-variants, among cases is not tied to cases from this week. In many instances, this case is three and four weeks ago. So while we say 54% of the new cases are BA.5 and 17 are BA.4, remember that these are often data reflecting several weeks ago and what happened. So this isn't a good way to continue to monitor what's happening. Rather, I'm looking at things like hospitalizations and deaths. For me, this is the most reliable way of understanding what BA.5 is doing in our community. Hospitalizations are on the rise. Now, 13% higher than they were two weeks ago. Oftentimes it's said that these are people who are hospitalized for something, only to find COVID as a co-infection to that condition. That is surely possible when you have something widespread in a community. But what we're talking about here are cases that are attributed to a COVID related illness. If you look at the rate of hospitalizations, there have been 2.6 new hospitalizations per 100,000 population per day. I know that's an abstract number. I'm going to come back to it, though, to give you a comparison based on what's happened before. So at 2.6 new hospitalizations per 100,000 per day, there was an average of 35,000 people hospitalized for COVID in a given day, or about ten per 100,000 population this past week. The current numbers are still much lower than during any surge. For context, the last time we saw new hospital admissions at this rate was right before and right after the winter omicron surge in November of 2021 and in February of 2022, during the Omicron Surge, new daily hospitalizations peaked at 8.5 per 100,000, which is the highest they've been at any point in the pandemic. So again, that abstract number I mentioned a moment ago, we're at 2.6 new hospitalizations during the very worst of the Omicron Peak we were at 8.5. If we look at the Delta surge, there were 5.3 daily new hospitalizations per 100,000 or almost twice as much as we see now. ICU numbers are also slightly increasing, with 3,800 patients in ICUs daily for COVID. 11% of patients hospitalized with COVID are in ICU, which has been consistent since early May. During the Omicron surge, during the winter of 2021, 17% of hospitalized COVID patients were in the ICU. So again, this compares to the 11% that we're seeing now. Deaths have slightly increased and as of Thursday, there was an average of 323 lives lost every day in the US. This is surely lower than that of the 2 to 3000 lives we lost each day during Delta and Omicron. But this does not take away from the fact that 323 people are losing their life on average every day. This is not just a number, but these are people's loved ones and we cannot forget about that. We are still not seeing any kind of sense of regionalization in hospitalizations or death trends. If we look at the top ten states with the highest hospitalization rates right now, we see that one is in the Midwest, three in the Northeast, three in the South and three in the West. Of the ten states with the highest death rates, we see two in the Midwest, two in the Northeast, three in the South and three in the West. The bio wastewater data I referenced earlier did show some regional differences. From the week of June 22nd to June 29, which is the most recent reporting and of course, the challenge that I mentioned earlier in terms of timeliness, COVID-19 concentrations in wastewater increased slightly in both the Midwest and Northeast, but slightly decreased in the South and the West. Remember, again, this is that whole prediction issue where if we had listened to some of the talking heads right now, the Deep South should be overrun with COVID cases. Of note, the actual virus levels in the wastewater are hovering around the concentration was measured during the Delta peak. This is all to say that with transmission being high, it is certainly not a time to let our guard down. The coming weeks will be very telling with the rising BA.5, which is better at evading immune protection than previous variants. And last weekend being a holiday weekend, we could be in for a flurry of cases. Nearly 2.5 million people went through airport security checkpoints last Friday, which makes the last weekend the largest travel weekend we have seen since the beginning of the pandemic. The pre-pandemic travel record was 2.46 million passengers in 2019. We could have the perfect storm here with the transmission levels high large numbers of people traveling, shifting attitudes about the pandemic, and a new dominant strain that has been shown to increase hospitalizations levels in several countries across the globe. We all need to keep our eye on things in the US for the coming weeks. Remember, this pandemic is not done with us. I know no one wants to hear that, but it's such an important message.

**Chris Dall:** [00:29:25] The New York Times this week noted many experts are concerned that the combination of reduced public testing, home test results not being reported in official data, and fewer states providing daily case updates means we have a much cloudier view of what the virus is doing and how the trajectory is changing. Mike, do you share those concerns?

**Michael Osterholm:** [00:29:46] As an epidemiologist, the most important four letter word that I know from a professional standpoint. Data, data, data. That's how we make our living trying to understand the reality of the current moment through data. So, yes, absolutely. I'm very concerned because I see an ever eroding basis of data for which we can make the kinds of decisions we need to about what's happening. So I share these concerns and at best, I know we have an incomplete picture of what is happening with this virus. We know that throughout the pandemic, the number of recorded COVID cases has been an undercount of the true number of cases. Not all people with COVID infection were tested, meaning that the number of cases reported has always been an underestimate. But as you mentioned, Chris, there are three other factors that make understanding what is happening with the virus a real challenge. First, it's reduction in public testing. Beginning in the spring of this year, many of the mass testing sites across the country closed or scaled back their level of operation, leaving public testing capacity at about half of what it was earlier this year. Second, is an increase in the number of at home rapid tests. While these tests are a game changer for identifying infection quickly and at a large scale, there is no systematic way that these cases are being reported and most go uncounted in official numbers. And of course, we also have to note that even with the at home test, we know there are many examples where there are false negative test results, meaning that it's clear that the individual has COVID. They're in a family setting where some have already tested positive by PCR. They all have the same illness, yet they test negative on lateral flow. So even if those cases were reported for lateral flow testing, these would never have been reported because they would still be considered as negative. And third, most states are only now giving official case updates weekly as compared to previously when states were reporting daily case counts. This means that the initial signals of upticks in case numbers may be delayed. We may have some days, if a number of states already decided to report cases on Friday or on Wednesday or Monday, where we could see big peaks in cases. And then just for the next two days, really major valleys in case reporting. So it's much harder to understand what's going on in terms of that kind of situation. So if not testing, what other options do we have for monitoring community transmission levels? As we've talked before, one way is to do this for wastewater sampling or through the monitoring rates of hospitalizations and deaths over time. But each of these metrics have limitations, including being a lagging metric of transmission, impeding our ability to reduce transmission quickly. I would have to say right now that none of the official numbers we have are at all giving us an adequate look at what's currently happening with virus transmission in our community. They may tell us what happened two or three weeks ago, but not now. And that's a challenge. So I look at this as how many people do I know with clinical illness that either test positive or there's every reason to believe that they have COVID is probably the best indicator. And I know that this feels like a meteorologist walking outside, wearing their finger, pointing up in the air to see which way the wind is coming from and saying, Yeah, we got strong breezes from the southwest. I feel like that's where we're at from an epidemiologic perspective. The kind of case numbers I'm seeing among friends, colleagues and family surely support that we're seeing lots of transmission right now. I think that's really, really, really an important point. So while this is not completely flying blind, imagine that the cockpit has no radar. The windows to the cockpit are completely fogged over and we're trying to take off or land somewhere. That's kind of how I feel about where we're at with our numbers.

**Chris Dall:** [00:33:33] Mike, last week the FDA's advisory committee recommended that new COVID-19 booster shots contain an Omicron variant. And the FDA subsequently said that those updated shots should contain a BA.4/BA.5 spike protein component. That means the bivalent boosters developed by Pfizer, Biontech and Moderna, which were based on BA.1, likely won't be ready now until mid fall. Is that too late? And are we in a situation where the vaccines are always going to be a step behind this virus?

**Michael Osterholm:** [00:34:05] Well, Chris, I think I'm beginning to sound a bit like a broken record, but anyone who has listened to this podcast over recent months will tell you that I have been saying time and time again we cannot boost our way out of this pandemic, even with the use of Omicron specific boosters. In addition to the concerns about boosters themselves, we've already discussed on this podcast the very low vaccine uptake in the US and the lack of access to boosters in many parts of the world. I'm concerned that the use of a variant specific booster is actually going to ultimately be an unsuccessful approach. Don't forget that right now we have thrown out over 90 million doses of vaccine in this country because of it expiring or unable to use because of how it was handled. There are tens of millions of discarded vaccine doses occurring every month now worldwide. So this is not a shortage of vaccine as such. It surely may be a challenge to get vaccine to the right location, but more often than not, this is about getting that needle in the arm, that last inch. So let's just be clear that there are several issues that are really operative with this discussion. Now, I want to be really also very clear that I don't think right now this country or for that matter, anyone in the world has a strategy for where we're going with these vaccines. Don't forget, when the first results of the vaccine trials were announced in 2020, there was a certain sense of euphoria. Ha ha. We have found the answer. Two doses of vaccine, and it seemed as if somehow you might be protected for life. Remember all of that when we told people that was all they needed to do? And the challenge is, is that unlike a measles vaccine model approach, where two doses may cover you for a lifetime in protection. This is much more like an influenza vaccine model where you may be lucky if you get protection of any magnitude, at least against infection within months of the last vaccine you got. And so what we're in right now is a situation of where the vaccines we have are not doing the job we want them to do. They're surely still powerful. They are still reducing serious illness, hospitalizations and deaths. But waning immunity and immune evasion are really important right now. So what we need are new game changing vaccines, vaccines that can, in fact, provide durable immunity. Are they possible? I don't know. I hope so. I, as you know, as part of a CIDRAP team here, are leading an international effort to define a roadmap process for coming up with these better coronavirus vaccines. But none of those are going to come any time soon. It's going to take months to years before we might realize better vaccines. In the meantime, we have to figure out how we're going to use the vaccines we have. And I think in the very nature of your question you asked is how might this all work in terms of even timing? I'm certain that if we go into the mode of chasing variants to find the one that should be in the vaccine so that it can protect people, by the time that that could even happen, that variant will actually come and go. And we have to understand that it's not just a simple matter of protection with a variant vaccine. It's of note that right now we have many, many people who are infected with BA.1, the very first emerging variant of Omicron back in January and February that are now cases again with BA.5. So that really highlights the fact that just because you have a variant specific vaccine, it doesn't mean that even within that variant, you may be protected with that vaccine if natural infection doesn't do it, protecting you against BA.5 by having had BA.1, how can we be certain that vaccines themselves will do it? We have to be able to communicate much more effectively what these vaccines can do, how they can do it. Will they in fact reduce serious illness and hospitalizations, but not necessarily impact on the overall issue of clinical infection? We don't know and I don't see this discussion going on in any meaningful way right now about what to do. I think the VRBPAC meeting was all about one specific issue. Do we make this a bivalent vaccine with an Omicron specific sub-variant antigen included, or do we not? But there really wasn't any discussion at all about what is the future of these vaccines? How do we use them? And if we look, as I pointed out a moment ago, from those who did not get fully vaccinated by the CDC definition, a terrible definition, by the way, they've got to change that fully vaccinated of two doses versus someone who's had an additional booster dose or three doses or somebody has had two booster doses, a four dose vaccine. We cannot continue just to assume that people are going to get these doses. Look at the loss of participation from dose one to dose two to dose three to dose four. You know, we're going to vaccinate very, very few people over time. So in short, I'm convinced that the announcement by the FDA about BA.4/BA.5 component is going to be too little, too late. And as they would say in my small Iowa farm town, a day late and a dollar short, that's what's going to happen. So what does that mean? Well, even more important than just BA.4, BA.5. What else is coming down the line? We're going to have a BA.8? A BA.12? Are we going to see Pi as a new variant? Sigma? If you talk to the viral geneticists and the people who I have a great deal of respect for, they'll tell you, surely we've got to expect that Pi and Sigma are going to show up. So how is the strategy in place to begin to assess that and what to deal with it? So we have imperfect tools right now. Do not mistake that for saying that they are not helpful. They can be helpful. They can reduce serious illness and hospitalizations, but they are not the final end product tool we need. But in the meantime, between now and then, how are we going to handle this? And I got to honestly say, I don't know. We will continue our work at CIDRAP to do whatever we can to bring as quickly as we can the sense of a roadmap for new and better vaccines. But in the meantime, we've got to figure out how to use these. I do not believe that a variant specific vaccine approach is going to really accomplish much at all in the days ahead.

**Chris Dall:** [00:40:42] This brings us to our COVID query segment. Today's question comes from Philip, who writes, "It seems like people who understand the risks of both COVID and long COVID will take reasonable precautions, like wearing N95 masks, avoiding crowded indoor places and limiting travel. But this definition of reasonable is highly subjective. So I'm wondering how Dr. Osterholm balances the risk calculations involved in his personal and professional life at this particular moment in the pandemic." And Mike, I think this is a question that a lot of our listeners have. How are you living in this moment?

**Michael Osterholm:** [00:41:16] Well, thank you, Phillip, for this very, very thoughtful question, one that makes me incredibly uncomfortable. You know, talking about my own personal life to this group on one hand, is obviously something I should do. I have to walk the talk and talk the walk. And I think that in this case, it's a situation where I do not pretend to have all the answers. I'm at a place right now where I'm taking in lots of information and I'm kind of almost in autopilot as to how I act or react. I feel like I'm looking at that center fielder in baseball, the all star who, upon the pitch being thrown, watches it go to the plate, knows where the bat comes around and hits the ball, can tell by the sound of the ball leaving the bat where in fact, that may mean that the ball will go long distance, short distance, and then reacting without any regard to thinking about it. But knowing what are the winds like inside that stadium? How does the ball carry? Was the pitch a curveball that might have made the hit one where the ball itself will take a curve as it comes out from home plate? All of those things happen automatically, and never once does the player sit there and think, Now, I thought this one through. And to me, I'm almost in that same mode. I'm in a world where, number one, the one condition I know is that that in fact, this virus is being transmitted at a very high rate in our communities right now. It is a virus that likely takes no more than a long elevator ride of exposure before one can get infected. It's a virus that clearly, as we've already discussed in this podcast, is causing less severe illness, less in the way of deaths for the total number of people infected. But it is still causing a substantial challenge to us. And long-COVID is a reality. It is a reality. I look at the fact that I am you know, almost 70 years old. I have had four doses of vaccine. I should feel good about the doses of vaccine. The age thing, not such good news. But then I look at also a number of my friends and colleagues who they themselves have now recently become infected with BA.5. And in many instances they are also recipients of four doses of vaccine. They believe that they've been relatively careful. I hear from unfortunately, far too who many said, well, I went to the restaurant just once and I took my mask off just that one time, and then three days later they're sick. So the way I process this is to say I do not want to get COVID. I am not a fatalist who believes I will. I surely could. But I'm going to do what I can not to get it. But I'm not going to change my life to be a cloistered individual with no contact. If this pandemic has taught me anything, it is the beauty, it is the grace, and it is the gift of relationships. So I'm at a place now where these relationships are so valuable to me that I'm not going to jeopardize my life. I'm not going to jeopardize that my health. But I am going to find creative ways, in a sense, to be, in fact, able to have these interfaces and relatively safely. It's in this regard that I will tell you that my partner and I Fern just came back from having spent a week driving out to the East Coast and driving back, and the trip culminated in a wonderful evening at Tanglewood in the Berkshires at the James Taylor July 4th concert, for which we had tickets for over two and a half years that we're not able to be used. Now, this was an outdoor concert in that there were lots of people there, but it was outdoors. But the entire trip my partner and I wore our N95s any time we're in public places any time. And we did not eat in restaurants unless we could eat outdoors spaced away from people. We are very carefully even just getting gas know, using the restroom in our hotel lobby, wearing our N95 respirator. Here I sit here today, now, almost four days later and I'm still healthy. I test negative today. I think I've actually successfully completed this trip and have not caught COVID and yet enjoyed it immensely. If anything, I must tell you there were moments throughout this concert where there were abundant tears out of just the excitement, the appreciation, the realization that I was there. And while Fern and I surely looked as if we were kind of the odd person out one of the very, very few that had a respirator on, I felt so good to be there and yet safe. So I think what we're all looking for right now is how do we get together safely? You know, I wrestle with contact with my family. You know, I have two adult kids and five grandchildren. Unfortunately, because the schools COVID has made their way through the kids and into the parents. So they're veterans of having had COVID. Fortunately, none seriously ill. They've all been fully vaccinated using the definition of how many doses they can have at this time. And so I feel more confident being around them. But at the same time, I also recognize that you know, they are a risk to me. So one of the things that I spend a lot of time doing is attending outdoor baseball games at some distance with my grandkids. This is not the same as wrestling with them in the playroom, but it's it's a great option to be there. So I think the message I would give is that what I'm trying to do is not surrender to this virus and not give up. I'm waiting for better vaccines. I know it could be some time before they come, but at the same time, I'm going to continue to try not to get COVID. I've watched too many of my friends and colleagues have rough courses. I know too many people have died. I also am very aware of people who are suffering long-COVID, and I think that the kind of long-COVID that we all worry about is one where it is truly a challenge that until you have long-COVID, you can't appreciate and understand it. And I just want to share with you an email I just received in the last day from a dear friend and colleague, and I get a lot like this. This email begins. "So I have to say BA.5 is no joke. I tested positive on June 20th and for that week experienced severe fatigue, a fever as high as 103, and a feeling like someone had shoved broken glass down my throat. So painful. But that's where it starts. Since testing negative, I've developed a horrible cough to the point where a few times a day I'm doubled over in pain, coughing. My internist has prescribed several prescriptions for me and none of them are working well. I'm going to a pulmonologist later this afternoon for a thorough evaluation. I can only imagine what it would have been like had I not been vaccinated times four. I hope you are well. All the best." Now, when you hear about that, this is an otherwise healthy guy, an adult who has got four doses of vaccine. So this is not an illness that I want to get. I just don't. At the same time, I want to live my life. So I will continue to try to thread the needle. If you have respiratory protection, I think that's a really important friend to have with you right now, as well as the vaccines and then modify behavior. You know, I'm not going to restaurants. I know the restaurant industry doesn't want me to say that. But you know, how can anyone imagine that this virus knows to take a vacation when you have your respirator off so you can eat? I mean, they don't go on vacation. And with the transmission we're seeing right now, it is such that I'm certain if you spend enough time in a restaurant and I don't mean a lot in the next week or two, you have a good chance of getting infected. The public's moved on. They are not going to change what they're doing to protect themselves or others. You have to protect yourself. So I'm living in the moment. I'm not giving up. I'm still seeing people. We have people come over to our condo for dinners. We all agree that we limit any kind of outside contact for the days before the event. We all test before we come together and we do eat with a respirator off. And, you know, that's not 100% perfectly safe, but it's my way of saying this is the risk assessment I'm taking. And so I will do those things. We need each other. We need people. We need ourselves. So in this regard, don't give up either to the virus or don't give up that you still can't have a life even with the virus there. And I'm trying my best. If any of you have good suggestions for me, I welcome them. If you have criticisms of what I'm doing, I even welcome that to better understand and learn how you think what I'm doing is not necessarily in the best interest of either myself or my friends and colleagues. So, Phillip, thank you for the question. I wish I could provide you more information. I can only tell you that right now I am traveling. I'm using my respirator. I'm fully vaccinated with four doses. And frankly, I'd have my fingers crossed.

**Chris Dall:** [00:51:01] And now for the non-COVID portion of the podcast. The World Health Organization concluded recently that the monkeypox outbreak does not yet warrant the declaration of a public health emergency of international concern. But monkeypox cases continue to rise in Europe, the United States and other non-endemic countries, and there is a shortage of vaccines. So, Mike, do you think that public health officials have a good handle on the situation?

**Michael Osterholm:** [00:51:25] Well, thank you, Chris. This is a very complicated issue. Let me try to tease apart the various component parts of it in such a way that you can understand how there may be both real challenges and problems, but also real solutions. Just to underscore the situation, as of this past Wednesday, there have been over 7,000 confirmed cases of monkeypox in 66 non endemic countries, meaning the countries outside of Central Africa. 559 of these cases have been in the United States. These cases in the US are still mostly but not exclusively occurring in men who have sex with men who have multiple partners. There are two major issues regarding monkeypox I want to cover today's episode. The first is the current vaccination strategy in the United States, and the second is the ongoing transmission of monkeypox in Africa and the need to vaccinate the population there. But before we cover either of these issues, I want to give an overview of the two vaccines that are currently available for monkeypox, the JYNNEOS vaccine and ACAM2000. The JYNNEOS is a newer two dose vaccine that protects against both smallpox and monkeypox and has fewer side effects than the ACAM2000, an older vaccine for orthopoxviruses, including smallpox and monkeypox. Though most individuals who take ACAM2000 get only mild side effects, some individuals, including people with HIV/AIDS or other forms of immunocompromised conditions, can have very serious reactions. For this reason, most clinicians, in the US are choosing to use a JYNNEOS when vaccinating patients for monkeypox. The main issue with this is that we do not have an unlimited supply of this vaccine. While HHS is planning to provide a total of 1.6 million doses of JYNNEOS by the end of the year. This will clearly not be enough for everyone who is at risk to receive the recommended two dosages in a timely manner. Remember, we're in this situation in part because we have let the level of protection against the pox virus, in this case smallpox, specifically lapse when we stopped vaccinating the world against smallpox back in 1980. For the past 40 years in Central Africa, where most persons were protected both against smallpox and monkeypox because of the previous smallpox vaccination program, that entire cohort, 40 years worth of of individuals being born, growing up, living in Central Africa, now have no protection against any of the pox viruses. So in a sense, this by itself is a challenge of trying to deal with what's going on in Central Africa. And I'll come back to this in a moment. But this really brings me to the issue that I want to cover what I consider to be here in the US and for unfortunately a number of areas of the world, a disjointed approach at best for what to do. For example, here in the US, the current vaccination strategy is one where only laboratory workers that work with orthopoxviruses and certain health care and public health workers identified by public health authorities actually should receive the vaccine in this case either ACAM2000 or the JYNNEOS before a potential exposure. Others can receive the vaccine if they are presumed contact. Previously, people could only receive a vaccine after having contact with a confirmed case. So this does broaden the population eligible to be vaccinated, but is still unclear who exactly is included in this group. The CDC specifies that this may include people who have had multiple sex partners in the last 14 days, but does not state that everyone in this group should receive the vaccine. The guidance also does not say anything about men who have sex with men, despite the fact that most of the current transmission in the US is occurring in this group. I feel like there are several real challenges here. Number one, we have a lot that we've learned from the days of HIV intervention and what that means for monkeypox. Back in 1983, 13,300 individuals died from HIV/AIDS in this country. We knew a lot about the virus. We knew it was being transmitted sexually, particularly among men who have sex with men and have many anonymous partners. And despite this information, despite what we knew about safer sex practices that could be used by 1995, realizing this is a chronic disease 41,700 people died from HIV/AIDS in the US. The number kept skyrocketing. The only thing that changed the course of this was the advent of the retroviral therapy that we have. That today has been a godsend in basically keeping people alive for decades with HIV infection, and even more specifically now keeping people from getting infected with pre-exposure prophylaxis or use of the drugs before one's ever exposed. So how do we deal with this? Well, I would strongly urge that we adopt a policy much like we have the HIV drugs. If you have multiple partners with unknown partners, you should qualify to get vaccinated. And at this point, to me, that's the same as we're seeing with the HIV drug prophylaxis picture. So this is an important point. We can't wait. Now, the challenge is there's not enough vaccine. We need to move as quickly as we can to produce as much of the JYNNEOS vaccine as we possibly can do. And we need to have a plan for how do we distribute that into the communities that are at greatest risk now, because by many who perceive this disease to be mild, it's not killing people yet. That, in fact, don't worry about it. On the other hand, there's also enough horror stories coming forward from individuals who have contracted monkeypox, who have been seriously ill, who are saying, no, you don't want to get this. This is now clearly a sexually transmitted disease, just as any ulcerative disease is that it's sexually transmitted, whether it's syphilis, Chancroid I don't care. Herpes. This is like that now. And we should get off the debate about is this a sexually transmitted disease or not? It is. Maybe there's also respiratory transmission that could happen, but clearly it's sexually transmitted. So my whole approach right now is to say that, number one, is be straightforward and public about what's the risk factors are. And you may say, well, you'll stigmatize gay men. While, to not tell the truth as to what's happening is, in a sense, not giving them the information they need to act upon. You know, I was very involved in the early days of HIV/AIDS with heterosexual transmission studies and particularly among swinging groups. We had increased HIV transmission in swingers people who would get together for weekend orgies, for lack of a better term, at hotels. And we worked long and hard with them. We saw HIV transmission in those groups. And guess what? Nobody characterized them as being the traditional heterosexual sexual partners. So to me, it's the same situation. We just have to clarify who is at risk. And right now are these gay men with the large number of partners, many of them anonymous, you can't do contact tracing with anonymous partners. And that's where we should be moving towards. As far as trying to blanket this, this is for the world. This is in a sense, a new pandemic, but it's one that's very, very different than COVID. The respiratory transmission aspect of this disease is so limited that in fact it will be a slow, insidious spread, much like we saw with HIV/AIDs taking years to unfold. I don't see this going away any time soon without a really proactive international vaccination effort, particularly those at highest risk. And for women who are having sex with bisexual men who may also have large numbers of partners, we're going to see spillover. And this is going to be a challenge. They, too, should be targeted for vaccines. So I do believe that this is a public health challenge, but I also believe it's one that's manageable. We just need to keep getting vaccine out. We need to be very clear who needs the vaccine. If you look at countries like Canada, the United Kingdom, they are starting to do that very effort of getting vaccines out to at risk people and not waiting for a contact to follow up or the fact that somebody is known to have been in contact with an infected person. We need to expand testing. It's starting to happen, but testing needs to be expanded tremendously so that people are not challenged finding test sites or having doctors who can in fact evaluate a patient and immediately submit a sample for testing. We need to have that happen right away. Most of all, we will not stop this situation from continuing to occur if we don't shut down transmission in Central Africa. And for the sake of the residents of Central Africa, we owe them this. You will continue to see the spillover from rodent populations into humans in Central Africa until we are able to bring that population to a high level of protection. So we need W.H.O. and the countries of Africa where this virus is endemic in the rodent population to also vaccinate their populations. And this is going to take a comprehensive effort over the course of months to years, but it's one that's really necessary. If we don't, these sparks of monkeypox virus will keep flying out of Central Africa, and it'll just be deja vu all over again. Last but not least, we got to do this quickly and we've got to really understand how important it is any time someone with monkeypox is in contact with certain animal species such as having pet rodents at home. It's really important to understand that they could transmit the virus back to them. And should that animal ever get out into the wild, we could see a major zoonotic foci start in a given area. People say, well, that can't happen. Well, I can tell you right now, in 1899, when ships came over from China to San Francisco with plague-infected fleas and rats on board the ships that started the very first plague challenge in wildlife here in North America. And today, when you go look at particularly in the prairie states, North Dakota, South Dakota and the prairie dogs that go through this, you see how much plague is there? That all came from an introduction just 120 years ago. And so we could have the same thing happen with with monkeypox. We have got to understand that the rodent population is the primary reservoir for this, and we've got to make sure that it doesn't expand anywhere beyond that of Africa. Finally, let me just say that, you know, this will be a challenge and lifestyle issues will come to play here. And that is terribly, terribly unfortunate. As a public health practitioner, when I talk about who's at risk and why, it's all just about trying to stop the disease. And I know that there will be people who'll be critical of comments but we have to be very blunt and we have to be very open about who's at risk and why. But if we don't, I think we do a disservice to those who are at risk for not trying to deal with this virus in an effective way. And right now, I don't see that happening in the United States, and that's a challenge.

**Chris Dall:** [01:03:03] Mike, what can you tell us about this week's Beautiful Place submission?

**Michael Osterholm:** [01:03:08] Well, first of all, Chris, let me say that again, this is one of the most wonderful parts of this podcast is interacting with our podcast family members. And the fact that from my perspective, they helped me so much get through this pandemic, I owe the listeners who participate in these efforts to find beautiful places to find beautiful moments. These are really I think it's just special gifts to all of us. And I thank them. I thank them from a lot of my heart. I know that all of the podcast crew does, too, and while we can't use them all, we can't respond to all of them. Please note what gifts they are. This particular one comes to us today from Christina, and it's a bit unusual. This is about some art as a beautiful place, but it's also a story that is all about what I think is the very best in the human soul. And, Christina, you are that. She starts out by saying, "Thank you, Dr. Osterholm for your informative podcast. I've been listening through much of the past two years. You've been spot on for good advice all along." She obviously doesn't talk to my kids. "You give me strength to carry on during these difficult days. It seems like your topic for the week is usually what I've been thinking about all week, as if you were addressing my concerns all along. I just finished cancer treatments in February 2020 and was ready to start living life fully again, only to have COVID come along. So I had a hard time physically and mentally adjusting. I am an artist for over 40 years and struggle to do good artwork for much of the first year plus of COVID. I finally realized that through all the history, artists, poets and writers have addressed the important issues of their day in their art to deal with it. So I found my special place with a big outpouring of a series of what I call COVID Guernica paintings. I have a couple of dozen oil on paper, a new medium for me, paintings that deal with COVID in some personal way. I have no end goal for when I finish them. I want to work on them as long as it takes. I had many shops and galleries that I had my artwork in before, but I pulled out of them all with COVID. So now I paint freely and I'm finally having a great time and thinking out current issues in a healthier way. Here were a few of the images." And there's a series of pictures that we will include on the website for you. But let me just tell you what she said about some of them. One, this is a neighbor's girl who spent almost half of her life in COVID. "This painting reminds me of my Ukrainian grandmother who always wore scarves like this. But this has a contemporary twist. I call this one Isolation for all the forgotten elderly and immune compromised, locked in their small spaces for months on end." Another one. "This is the first painting I started on and has a long way to go before it's done." Most of the paintings are quite large. Another one. "I did this one early in the pandemic. I'll call it Tears to Come." Then there are two beautiful pictures of a very, very special young lady. And Christina says "These are smaller studies of my neighbor's girl again." She went on to say, "I have many more, but here is one I think is done. I love the independence learned and the ability to entertain herself with joy. I'm not sure that's such a bad thing. These COVID children may be very thoughtful, resourceful adults someday. Thank you again for helping so many of us get through these times. Christina." The website will have the pictures as well as you can read her Beautiful Place again. I cannot begin to adequately express my appreciation to you, Christina. You know, I'm just a messenger. I'm not the message. You are. And I hope you know that. We so appreciate that. And I know as listeners on this podcast, they, too, appreciate what you've done here. It's beautiful. I wish you the very best. Thank you for what you've done. I know that this has been a tough time for all of us, and your artwork truly brings a beautiful place for this moment to the podcast. Thank you.

**Chris Dall:** [01:07:17] Just a reminder to our listeners that if you want to share your beautiful place with us or a celebration of life for a loved one friend, neighbor or coworker who died during the pandemic, please email us at osterholmupdate@umn.edu. Mike, what are your take home messages for today?

**Michael Osterholm:** [01:07:35] First of all, let me just say I wish I knew where we were going with this pandemic. It's not done. Even though, as I've said many times, many in the public are done with the virus. The virus isn't done with us. And it leaves me at a loss for prediction. I've tried to be very thoughtful about making any kind of predictions. I've tried to make certain that if there were predictions made, what are the data that support them? What are the conditions that could cause it to be go this way or that way? And I can tell you right now, I'm as confused about what our future is as anybody could possibly be. So from that perspective, I will only tell you I know that this virus isn't done with us yet. But I know that BA.5 is not likely to be as severe a challenge for our population as was the original Omicron or the Delta variant. But at the same time, I don't know what's coming after it. There will be something soon after BA.5. And what we don't understand yet is that good, bad or indifferent. So the first point is, I don't know. As I've said to you, far too often, the three most important words I think I own right now in my own world is I don't know. Second of all is that we clearly need an international vaccine strategy and we don't have it. These vaccines have been remarkable tools, but we're seeing all their weaknesses. We're seeing the inability for them to really bring an end to this pandemic. So please don't get me wrong. I still will get every dose of vaccine I can get that's coming down the pike. But I don't see that as a long term solution, whether it's going to be the kind of work that we're doing right now to look at the landscape for game changing coronavirus vaccines, that we're going to need to really do everything we can to make that a reality. But that's not going to come soon. That's going to be at best years off. So in the meantime, what do we do? How do we handle this? How does the world that is now discarding vaccine because it's out dating, not because they can't get it. How are we going to handle that? What are we going to do to change the vaccines going forward if in fact, we need to because of a change in the virus? Again, we don't know. Finally, we're all searching for how to live with this virus. We all are. I gave some examples today. Some of you will probably look at me and say, Oh, that's not right. That's wrong. Well, you can't do this or do that. And you may be right. I'm doing the best I can for myself and my family, my loved ones, to understand how to protect myself while still living my life. We all have to come to grips with that. But I do feel empowered. I don't want people to leave this podcast today saying you can't. I went to the James Taylor 4th of July concert in Tanglewood, Massachusetts, and it was a hell of a time. I probably had tears throughout that concert more than anyone I've ever had. That's how much I appreciated that. You can do that yet. I'm still negative. I'm now four days out. You know, I'm testing. And I think by being vaccinated and wisely using respiratory protection, I was able to do that. And yes, it was a compromised experience, but it was one of the best experiences of my life and I can't say enough about that. So we all are learning to live with our lives in a world of COVID. And I hope that what I've shared with you today is helpful to you.

**Chris Dall:** [01:11:11] And do you have any closing songs for us this week?

**Michael Osterholm:** [01:11:15] I do have a closing song and it's one that's very familiar to you. But let me take a step back and give you the backdrop. COVID has clearly challenged us with relationships. But in some instances it's also opened up relationships, people taking new looks at friends, colleagues, people we didn't even know before, but now have a connection. And Fern and I have had had that very experience. We met a couple and their young son in the earliest days of the pandemic through an email exchange that happened, and it just built from there into Zooms. And we had the opportunity for the first time to actually physically meet them and be with them on this trip that we took out East, it was one of our stops on the way and it was a gift. It was such a gift. The friendships that we have established with them will be friendships will keep forever. We'll celebrate and we'll love and cherish. And so for me, I also want to make it clear we can still do better during this pandemic. And one of the things we can do better at is making sure that we take care of those relationships we have in our life and not use the COVID experience as an excuse not to deal with others in the kind of way that we would want them to deal with us. And so I share this on two of these dear, dear friends, lifetime friends now. And it's the song "Friends" by Elton John. And interestingly enough, it is the number one most used song in the podcast. This is the fifth time I've used it. I used it in Episode 54 back in May of 2021, when the title was "Vaccines and Taking Care of Friends." Then I used it in Episode 65 in August of 2021, "The Ongoing Tug of War." I used it in Episode 81, "The Early Data on Omicron." This was in December of 2021. And then I even used it this year in Episode 97 entitled "The Virus Isn't Done With Us." This was in March of this year. So today I'm going to use it one more time. And it is about friends. It is a song written by the English musician Elton John and songwriter Bernie Taupin. And it's performed, as, you know, by Elton John. It was his third US hit and his second to reach the top 40 after a breakthrough success of "Your Song." The song rose to number 34 on the US Billboard's Hot 100 and number 17 on the Cashbox Top 100. This is a very special song and one that today means more to me than any time it ever has. And so I share it with you. And I hope that all of you take this to heart and think about it yourself. So here it is, "Friends." "I hope the day will be a lighter highway for friends that are found in every road. Can you ever think of any better way for the lost and wary traveler to go? Making friends for the world to see that the people know. You got what you need with a friend at hand. You will see the light. If your friends are there, then everything's all right. It seems to me a crime that we should age. These fragile times should never slip us by a time you never can or shall erase. As friends together watch their childhood fly. Making friends for the world to see. Let the people know you got what you need. With a friend at hand, you will see the light. If your friends are there, then everything's all right. Making friends for the world to see. But the people know you got what you need. With a friend at hand. You will see the light. If your friends are there, then everything's all right." Elton John and Bernie Taupin. To all of my dear, dear friends, thank you for being there. For my new friends and for the friends that have become the gifts of my life, thank you. And at this time, when we are challenged by so many issues in our communities, not just COVID, but all the other challenges that we are obviously aware of. If there was ever a time to define who and what you are, it's with your friends. And I'm reaching out to my friends and I'm finding ways to, I believe, safely interact with them. That's what we all need to be doing right now. This is not about whether you can or can't have friends in a world of COVID you can. And now's the time that we need those friends so badly. So thank you dear, dear, dear friends. So as I close this episode, I just want to thank all of you again as listeners who have shared with us at CIDRAP your thoughts, your feelings, your concerns, your criticisms, your words of support. It means everything to us. We read them all. We read them all. And as a member of what I call that podcast family, I just want to thank you on the behalf of our team and me. And also just remind you, now is the time if there ever was a time to be kind. We need kindness so badly right now with everything happening in our world, we need kindness. I hope that you can find that kindness and I hope you can share that kindness. As a scientist, I sometimes find it hard to understand abstract concepts that aren't somehow able to be shared in an equation or some kind of scientific description. And yet, at the same time, it's those very kinds of abstract things that sometimes give me the very most wonderful feelings in my life. I still never figured out what's that one thing that you can give away, and the more you give away, the more you have? It's love. And that doesn't make sense, does it? I give more and more away and I have more of it at the end. Well, I think right now we're all looking for that. We're looking for that. And so today, thank you for being with us. Be kind. Be kind and be safe. But also enjoy and love life. Thank you very much. We look forward to seeing you in two weeks. And in the meantime, be safe and be kind. Thank you.

**Chris Dall:** [01:17:43] Thanks for listening to this week's episode of the Osterholm update. If you're enjoying the podcast, please subscribe, rate, and review, and be sure to keep up with the latest COVID-19 news by visiting our website CIDRAP.umn.edu. This podcast is supported in part by you, our listeners. If you would like to donate, please go to CIDRAP.umn.edu/donate. The Osterholm Update is produced by Cory Anderson, Meredith Arpey, Elise Holmes, Sydney Redepenning, and Angela Ulrich.