

## Episode 110: A COVID Marathon

**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. On July 21st, the day our last episode was released, the White House announced that President Biden had tested positive for COVID-19. While it was certainly front page news, for the most part, there was little sense of crisis around the infection. The twice boosted President, received antiviral treatment, experienced mild symptoms, and continue to work while in isolation until testing negative. While he has since then tested positive again with a rebound case, his symptoms have remained mild. In many ways, the President's infection seems to symbolize our new normal. Like many Americans, the President had in recent months largely resumed his regular activity, even though the BA.5 sub-variant is running rampant. And while he could not evade the virus, his illness was manageable. As The New York Times noted, the infection underscored how the virus remains a persistent, if muted threat in a country trying to put the pandemic in the past. Today, on this August 4th episode of the podcast, we're going to talk about our new normal amid the BA.5 surge and try to wipe some mud off of Dr. Osterholm's crystal ball to see what might come next. We'll also talk about President Biden's rebound infection, the administration's plans for future COVID-19 vaccines, COVID-19 vaccine hesitancy in parents of young children, and we'll answer a listener question on CIDRAP vaccine roadmap. We'll also give you the latest on the monkeypox outbreak and share a celebration of life 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:** [00:02:14] Well, thanks, Chris, and welcome to all of you again to another episode of the Osterholm Update, where I think the more things change, the more they stay the same. It's one of those weeks again where we're going to be talking about a lot of issues where, frankly, I don't think anyone has a good answer for you. What I'll do is my very best to, on behalf of our team, to provide you at least what we

know about some of these issues that still challenge us rebound infections, the issue of risk in the community, all the things that Chris has just mentioned in the introduction. Again, I want to welcome the podcast family back for another episode. Thank you so much for your participation, your support and most of all for your input. We really appreciate hearing from you. We learn a lot and hopefully that is demonstrated in the kinds of information we provide back to you. If you're new to the podcast, welcome. There'll be parts of it I'm sure you will appreciate. There'll be parts of it you may not appreciate. We kind of have this funky little episode going here where we choose some nonscientific aspects of the COVID to to highlight. Today, in terms of the dedication, this really is almost a dual kind of dedication in that it's not just about COVID, but it's also, in a sense about monkeypox. As many of you have been reading over the course of the past several months, there's been greater and greater criticism really thrown towards the way of public health about how the monkeypox response has been handled. And without really distinguishing between, was this really a federal issue? Was this a state or local issue? Was this a medical care issue? What was it that was unsatisfactory about the response? And what I can tell you in conversations with a number of my colleagues at state and local health departments who frankly are simply frazzled from running marathon after marathon after marathon of effort throughout COVID now to be confronted with monkeypox. This dedication today will really focus specifically on state and local public health workers the 210,000 individuals in the state and local health departments that continue to be there day and night, no matter which crisis emerges, how it emerges, trying to protect the public's health. And yet at the same time, often the recipient of criticism and in many cases, unfortunately, abuse. It's notable that there's been a 15% decline just in the past decade in the number of public health workers in state and local health departments. At the same time, the problems have only grown more complex, more difficult, whether it's dealing with the specifics of COVID, monkeypox, the very rapidly shrinking levels of immunization among our children in this country, the rising tide of a number of infectious diseases, particularly antibiotic resistant infections. The bottom line is we're asking fewer and fewer people to do more and more. And I think that what really concerns me is that currently it's estimated that 47% of public health workers in state and local health departments plan on retiring or leaving the field in the next five years. That could be a real public health tragedy. And so today, I just want to say to my colleagues at state and local health departments, thank you for what you do. We're not minimizing our federal partners, but you often are acknowledged or addressed in what you do. And it's often the frontline state and local health

department folks that don't get that recognition. So today we dedicate this podcast to you. Of course, we can't have a podcast without talking a little bit about light. Light's a very important issue for us here in this podcast family, or at least for most of you. Here today on August 4th here in Minneapolis, Saint Paul, sunrise is at 6:02, sunset at 8:35. We have 14 hours, 33 minutes and 24 seconds of sunlight, almost 6 hours more than we will have come December 21st. So there's a lot to celebrate yet about the light in our communities. Now it is true, just for the last day we've already lost 2 minutes and 29 seconds of sunlight, and that number will actually grow each day as we get closer to the first day of fall. And then the number actually begins to reduce to the point of when it gets to December 21st and again turns the corner. Today, the emphasis I want to place is not that sunlight is decreasing, but that sunlight is still here. It's beautiful and enjoy it. For those who are experiencing severe heat issues, I know sunlight can be considered at best a challenge. And we are thinking about you and all the public health issues that come up around heat related injury. For now, let's all smile on this bright sun and appreciate it. And for those in the Southern Hemisphere who are really committed listeners, thank you. Your days are getting longer. Hang in there. Your days are getting longer.

**Chris Dall:** [00:07:28] Mike, let's start with the international situation. As we've noted in recent episodes, BA.5 is the dominant variant around the world, but it seems to be having different impacts in different countries. For example, while most countries are seeing smaller BA.5 driven surges, the surge in Japan appears to be worse than what the country saw with the original Omicron variant. Do you have a sense of what's going on?

**Michael Osterholm:** [00:07:50] Well, that's a great question, Chris. Let me just start out with a reminder that this pandemic hasn't exactly offered too much in the way of straightforward cookie cutter models. You all know that if you've been listening to this podcast. So comparing activity in different locations, whether you're talking cities, states, countries or even regions, can be a real challenge. As I've said before, it's almost feels like I'm trying to solve a giant calculus equation that has countless variables. And if that's not hard enough already, there are those moments when a variable changes or a new one gets added in, and sometimes that change just doesn't make good sense, but it's happening. Of course, one of the variables that seems to change most frequently is the virus. We must never forget it is the virus that is still

largely in the driver's seat. So with these new versions we're seeing, whether it's a variant or a sub-variant, I feel like I'm continually trying to recalculate. As you may recall, it was in January of 2021 where I made some very unpopular statements publicly about what I thought was going to happen with the pandemic. It was, as we saw, Alpha and Beta variants emerge, and for the first time, we had some sense that these variants could actually have a tremendous impact on potential for transmission, for ability to evade immune protection. And ever since that time, I have always had tremendous respect for what the variants and sub-variants will do in terms of how this pandemic is going to unfold. Now, in the case of BA.5, there's been a noticeable surge. Remember, just two months ago, average daily cases globally were below 500,000. Skip ahead to now and they're above 1 million and more than double the levels reported in early June. Yes, I know case numbers can be notably unreliable right now, given the challenges with testing and reporting. It's the best we've got. And right now, the best we've got doesn't look all that good. Over the same time period that I just mentioned, daily deaths have climbed from 1,300 or to the lowest level since the start of the pandemic to more than 2,400. So make no mistake, BA.5 is having a clear impact globally. We saw it early on in South Africa. We've seen it in the past couple of months in Europe, and we're seeing it right now in the Americas, the Eastern Mediterranean, Southeast Asia and the West Pacific regions. However, despite its presence in every region of the world, the BA.5 wave that some countries are dealing with has something that's looked quite different from the BA.5 that other countries have experienced. In some places like South Africa, BA.5 led to a noticeable wave of infections. However, it eventually peaked at a fraction of the levels reported during their initial Omicron surge. And although deaths in South Africa also increased from BA.5, they didn't come anywhere close to the numbers reported during BA.1. In fact, the peak number of average daily deaths in South Africa from BA.5 was 38. With BA.1, the average daily deaths reached a peak of 240. And then there's countries like Japan, which has had a record breaking BA.5 surge. For example, as of Tuesday average daily cases in Japan were more than 202,000, up from less than 20,000 a day in early July, so just one month ago. For comparisons, the country's previous all time high was 95,000 cases a day during the BA.1 surge. Remember, they're now at 202,000 cases a day. So, BA.5 has not only brought Japan's cases to new highs, but it's also more than double their previous record. Over the past week, one in five cases reported globally were from Japan. And unfortunately, it's not just cases in the country that are on the rise. We're seeing hospitalizations, ICU admissions and deaths grow as well. For example, hospitalizations in Japan have

climbed from 5,000 to 25,000 in just the past month. In that same time, the number of COVID patients in an ICU went from less than 300 to nearly 1,400, and deaths have spiked from less than 20 a day in early July to 108 as of this past Tuesday. With the continued rise in cases and built in lag time for hospitalizations and deaths, we can unfortunately assume that those numbers will only continue to grow. And at this point, it's unclear what levels will be reached there before things start to peak. But at least for the time being, hospitalizations and deaths in Japan are still well below the peak hit during BA.1, where hospitalizations surpassed 29,000, ICU admissions were at 2,100, and daily deaths hit a record high of 232. Now to get back to your question, Chris, why is BA.5 having such a significant impact in a country like Japan? Why are Australia and New Zealand reporting record high numbers of deaths from the BA.5 wave while places like South Africa, parts of Europe, and the US have seen lower levels? Well, I don't think there's any one simple explanation. However, there are a couple of things I want to point out that might help add some perspective. First, when you're looking at a country and comparing it where it's at now with previous points in the pandemic, it's always important to remember the bigger picture. In many ways, the pandemic has felt like a marathon, and while each leg of the race or a mile in the marathon is significant, it's still part of a much larger event. So with BA.5, there have been some countries that have had a more difficult experience than they had at any previous point in the pandemic. These are the places like Japan, Australia and New Zealand, and it's been a challenge for them. But when you zoom out and look at where these countries stand in terms of the entire pandemic marathon, you can see that they've also done quite well. For example, if you look at the number of cumulative COVID deaths per million, in other words, the total number of deaths since the start of the pandemic, after adjusting for population, there are more than 130 countries with higher rates than Japan. For example, the top of the list is Peru, which has documented 6,358 deaths per million population so far. The US ranks 21st with 3,058 deaths per million. And if you keep going down the list, you'll eventually make your way to Japan, which is reported a total of 262 deaths per million population as of Monday. Again, that's in contrast to Peru with 6,358 deaths per million and the United States at 3,058 deaths per million. Again, the number of deaths reported in Japan is 11 times lower than what we've reported here in the US. So I think it's important to keep the bigger picture in mind. And this gets to my second point, which is somewhat related. A factor that could be contributing to the larger BA.5 wave in countries like Japan, Australia and New Zealand is their ability to limit transmission throughout most of the pandemic, or at least until Omicron arrived. In

other countries, including South Africa and the US, there have been multiple waves with a number of different variants, which has each resulted in significant portions of the population becoming infected. In other words, the lack of containment and ongoing widespread transmission of the virus could have resulted in more population level immunity, which helped blunt the BA.5 surge in these places. So needless to say, there are a number of theories and I'm not sure what the exact answer is. Again, when I look at my crystal ball with five inches of caked mud, that helps explain why I know what I know and what I don't know. But regardless, I don't think the mantra you're only as good as your last race is all that applicable in a pandemic. Yes, some countries are being hit harder than others with BA.5. But ultimately, BA.5 isn't the first leg of the COVID marathon, and I don't think we can expect it to be the last one either.

**Chris Dall:** [00:16:01] Here in the US where a BA.5 now accounts for 85.5% of all new COVID-19 cases, the seven day average has hovered around 120,000 to 130,000 new daily cases for the last few weeks. Again, we have to note that this is likely an undercount and we are seeing increases in hospitalizations and deaths. But it is not anywhere near what we saw with the initial Omicron wave. Mike, what's your assessment of the current situation in the US?

**Michael Osterholm:** [00:16:27] Well, it is important to acknowledge, I think, one very important point, that we are in an unprecedented time in the pandemic in the United States. And what I mean by that is we have gone from the surge and peak, big increase in cases, to this trough of low number of cases, or at least lower. And then another peak, almost like moguls on a ski slope. Now we've almost hit the Great Plains and it's high, but it's just level. So let me just start by saying that things don't seem to be moving or changing significantly here in the US, but the virus is certainly not going away. Let me just come back and for the eighth consecutive week and I can't wait until I can change this conclusion. I know of more people with COVID this week friends, colleagues, neighbors than I have at any time in the pandemic for a one week period. This past week was the first time in the entire pandemic, dating back to 2019, where I knew of four different people who died from COVID. Now, while the case numbers are not going off the roof, the number of deaths are not anywhere near what they once were. This virus is simply not done with us. So in short, the numbers have plateaued at a relatively high level and remain constant over these multiple weeks. Unlike any time in the pandemic in the United States. Activity seems to be distributed relatively equally across

the entire country, with no specific regional trends. We're not seeing specific states lighting up with COVID while other areas of the country are relatively quiet like we have in previous surges. Remember all of the experts who announced this past spring that we could expect to see another big burst of cases in the Sun Belt states of the United States as we had seen in the previous two years. My comments at that time were that a broken clock is right twice a day. I don't know why we should expect that we would see another summer surge, we haven't. So what we're really seeing right now is an unprecedented leveling of cases in a way that makes it uneasy for all of us. In some ways, I think we adjust our risk at the time when a big peak of cases occurs easier than we do if we have this steady plateau. As you mentioned, Chris, the seven day average reported cases have been fluctuating between 120 and 130,000 cases for the past several weeks. At the risk of sounding like a broken record, we know that in reality, true case numbers are much, much higher than what is being reported. I just indicated my own personal experience, anecdotal information, which some people call data I don't, but still nonetheless important. But there are other signs of cases plateauing, including wastewater data, which is showing a small decline in the presence of COVID-19 across the country over the past week. But let me emphasize a very small decline. In our last episode, we discussed the test positivity rate and how it has fluctuated with previous surges, meaning that as reported cases went up, the test positivity rate also went up. We discussed the rate in the context of how reported case counts are not a true representation of the actual numbers and that while cases are only slightly increasing, the test positivity rate was increasing rapidly. We have now seen this rate plateau. It now sits between 18% over the past few weeks, right between where it was during the January 2021 peak and the Omicron Peak. Let me remind you that during the Omicron peak, test positivity was about 29% and the average reported daily cases were 805,000, quite different than 110 to 120,000. The 29% positivity and the 805,000 cases were the highest for both at any point during the pandemic. During the surge in January of 2021, the test positivity rate was 15% and the average daily cases were about 250 a day. Again, we've seen the test positivity rate sit around 18% for a couple of weeks now, which gets back to my point that things don't seem to be changing significantly here in the US. While daily deaths and hospitalizations are increasing, the increases are relatively minimal. Over the past two weeks, the average hospitalized in a given day has increased 5%, now at 43,500, and the average daily deaths have increased 4%, now almost 450 lives lost each day. Let me just come back and focus on that. I think that in this time of a steady state plateau like activity, people are kind of saying it's done with.

But let's just add perspective. At 450 deaths a day, extrapolate that number to the number of deaths that might be expected annually, which takes it well over 160,000 deaths a year, which now places this illness as the number four cause of death in this country. Think of that. If three years ago I had said to you a virus would emerge that would get into some kind of almost steady state picture with us, and it would become the number four cause of death in this country. Most people would have said, Oh, what a crisis. Today we hardly hear anybody talk about this anymore. I would also like to point out that the ICU numbers have increased 9% over the past two weeks, with an average of 5,000 people in ICUs for COVID on any one given day. We are yet stretching in many locations our health care resources. This means that 12% of the hospitalized COVID-19 patients are currently in an ICU. A number that has remained at about 11% since May 3rd, until Friday, July 24th. So let's not forget that everything I just talked about are not just numbers, something that is the heart and soul of this podcast. They're absolutely not numbers that we should somehow feel comfortable with. As I just said, at the current rate, COVID is the fourth leading cause of death in this country, only behind heart disease, cancer and accidents. So while 450 daily deaths may seem like a fraction of what we've seen in the past, we cannot let ourselves become acclimated to this. All of this is to say that the current situation in the US is that things are just not moving. COVID-19 is everywhere and it's not going anywhere. We need to continue to have humility and remain vigilant, always remembering how we can reduce our own risk. And finally, let me just say that these times provide a real challenge personally for each and every one of us as to what does this mean for my own protection? What do I do to reduce my risk? Or do I just assume I'm going to get it? I have heard more people over the course of the past several weeks just say, Oh, I'm just going to get this. I'm sure I am. And unfortunately, we continue to see long COVID cases. We continue to see these people being hospitalized, severely ill. And as I pointed out, unfortunately, even people dying. So at this point, I'm not comfortable saying I'm just going to give in. At the same time, I know we all have to move on with our lives. And as I pointed out in previous podcasts, I'm doing that. We now get together with friends, private in our own homes, where we ask that everyone make certain that they have not had contact with any known case in the three previous days before getting together. We all test at least once and sometimes twice before we get together on the day and the day before our evening dinner. And we recognize that this is not foolproof. We're not wearing respiratory protection, but it's our way of coming to grips with the risk of this virus. And



so far, knock on wood, I'm doing okay. At this point. I hope all of you are able to enjoy life and yet have some semblance of protection against this virus.

**Chris Dall:** [00:24:40] As I mentioned in the introduction, about three days after he tested negative and left isolation, President Biden again tested positive for COVID-19, and his doctors said he was experiencing a rebound case after treatment with the antiviral Paxlovid. Now, there have been a lot of anecdotal reports of rebound cases after Paxlovid. And this is the most high profile rebound case we've seen to date. But Mike, do we have any data on how many people are experiencing rebound cases after taking Paxlovid?

**Michael Osterholm:** [00:25:08] Well, the simple answer to this question is, no, we don't. Now, I could leave it there, but that would be terribly unsatisfactory. I know that. Well, Chris, as you have said, there have been some real high profile rebound cases in the news recently, including President Biden and Dr. Tony Fauci, bringing up a lot of questions about how common these rebounds are, what they mean for patients and whether or not taking Paxlovid is worth it. First, I want to define what a Paxlovid rebound case is as we at best know it. The CDC states that a Paxlovid rebound case is, quote, "characterized by a reoccurrence of COVID-19 symptoms or a new positive viral test after having tested negative." Unquote. Now, let me be clear that the issue of a new positive viral test in and of itself does not necessarily mean that someone is infected or, for that matter, infectious. Particularly if that test is a lateral flow test, which may have a relative lack of sensitivity and in some cases, real questions about specificity. In other words, determining that someone really is infected when they are or not, saying someone is infected when they're not. There are a few theories as to what might be causing these rebound cases. And I will tell you right now, I don't know of anybody that has clear cut data that supports one specific conclusion. One theory is that the virus mutates during treatment to resist the drugs that make up the Paxlovid treatment. While it is too soon to rule out this theory completely, a recent preprint suggests that that may not be the case, as viral sequencing data from a rebound patient showed that no mutations had occurred. Another theory, which is supported by the findings in this preprint, is that Paxlovid successfully blocked viral replication during treatment, but still leaves some virus behind in the body. When the patient stops taking Paxlovid, the virus begins to replicate again, resulting in a new positive test or a reemergence of symptoms or both. If this is the case, a longer treatment may be beneficial to patients. Some health

care providers are now prescribing longer courses of Paxlovid, but as of right now, no official recommendation has been made to lengthen the course of treatment. These rebound cases are almost always reported as being mild or moderate worst in terms of symptoms. In clinical trials, rebounds occurred in just 1% of patients, but currently rebounds are estimated in large data sets of patient follow up to occur in about 5 to 6% of patients. But honestly, the real number of rebound cases is likely even larger. In short, we don't really yet understand what positive and negative tests mean in light of a rebound. Again, let me come back to the point that if you are found to be positive by either lateral flow or PCR testing after you have had a series of negative tests and likely some recovery, doesn't necessarily mean that you are or not infectious. But I do want to add, we have now a growing number of instances where individuals had exposure to someone who was in a rebound stage and for which this is their only exposure they had and they did get infected. So it is clear that rebound related infections can still result in transmission of the virus. So this is surely a really substantial challenge to understanding what does this all mean in our everyday practice of trying to isolate and to protect people who may be at high risk? We currently have every reason to believe that Paxlovid patients are able to transmit the virus during their rebound. On May 24, states that patients should restart their isolation if they have a positive test after testing negative or if their symptoms reappear. Though they do not state this in the isolation guidelines on their website. While having to isolate again is surely a challenge for many individuals. For most people at risk for severe disease and death, the benefit of preventing these outcomes outweighs the risk of having to isolate again. I would urge anyone who is currently taking Paxlovid over or may take Paxlovid in the future to be aware of the risk of a rebound case and test accordingly. But I hope this does not discourage people at high risk of severe disease from seeking treatment. Again, I also want to point out that all the data we have to date still holds up supporting that using Paxlovid, particularly among those at high risk for serious illness, hospitalizations or deaths is still of great benefit. So for those that say, well, I'm not going to take Paxlovid because I don't want to get a rebound and actually be in isolation longer or prolong my infection at the same time if you are at increased risk for serious illness, I remind you that all of the rebound cases that I'm aware of have been mild, and at worst moderate illnesses, and that surely still is a wonderful outcome to have relative to what the other options are with serious illness.

**Chris Dall:** [00:30:24] Mike, that leads me to my follow up question, which is what does the President's rebound case tell us about the CDC's isolation guidelines?

**Michael Osterholm:** [00:30:34] Well, any routine listener to this podcast knows I've had major challenges with a number of the CDC's routine recommendations and the fact that they have not updated them to reflect the modern science of COVID infection. As I stated before, CDC recommends that those who have a Paxlovid rebound case restart their isolation. Unfortunately, many of these rebound cases are going undetected, or at least not confirmed, even though someone may know that they likely have a rebound illness. So if people are only isolating for five days and not testing again, they may transmit the virus during the rebound period. This is absolutely a concern and emphasizes the need for providers to educate their patients on Paxlovid rebounds and the importance of testing. My concerns about the current CDC guidelines extend far beyond these rebound cases. We discussed this in detail in our last episode, but I'll briefly highlight this point again. The five day isolation recommendation was a response to the massive shortage of essential workers that we were seeing during the Omicron surge. Health care facilities like hospitals and long term care could not have continued to operate without this change in guidelines. I was very involved with these discussions about this recommendation and supported it for the five days with the idea that individuals would wear an N95 through all of their work hours. And that it was a matter of just having someone there at the bedside to care for these patients. I never dreamed that this particular recommendation would be made permanent and across the board for everyone. So the current CDC recommendations state, individuals who have had COVID symptoms should end isolation after five full days if they're fever free for 24 hours without the use of fever reducing medication and their symptoms are improving. Those without symptoms should end isolation after at least five full days after their positive test. On days 6 to 10 individuals should wear a well-fitted mask, not an N95, which I wish they said, and to avoid traveling, but they are not required or even encouraged to isolate. Only those who are very sick from COVID-19 or have a weakened immune system are advised to isolate for ten days. This is very concerning, considering the recent data suggests that 50% of people are still infectious after day five and 25% of people are still infectious after day nine. And they may be infectious even longer with BA.5. But the CDC says nothing about this in their isolation guidelines. These guidelines need to be updated to reflect the fact that those who can isolate for more than five days should absolutely do so. These aren't the only outdated CDC

guidelines I'm concerned about. The CDC also needs to revisit their current definition of a close contact. The CDC states that you are considered exposed to COVID-19 or having had close contact if you have been less than six feet from someone with COVID during or two days before the start of their infection for a total of 15 minutes over a 24 hour period. This recommendation is incredibly outdated, incredibly outdated. This virus has evolved to be increasingly transmissible with each variant, so it makes absolutely no sense for the definition of a close contact to remain the same. Imagine if I was seven feet away from you for 15 minutes and I was smoking and the smoke was blowing right into your face. You could imagine how, in fact, I was sharing my virus with you as I breathed out air. The six foot recommendation would make sense if the virus were spread only by large respiratory droplets. But now we know and have known for some time that airborne transmission of the virus can and does occur, meaning people can be infected at a much further distance. In fact, a study, published in the CDC's Morbidity Mortality Weekly Report that I was involved with, looked at over 11,000 NFL players and staff who were tested by PCR 6 to 7 days per week from August to November 2021. This study found that 21 of the 329 identified infections occurred as a likely result of contact that was either less than 15 minutes long or at a distance greater than six feet or both. That's over 6% of the cases, and this was before Omicron. We have every reason to believe that the percentage of cases that are a result of contact lasting less than 15 minutes or at a distance greater than six feet is even higher now. In fact, I am convinced that all you need now is a relatively moderately long elevator ride with someone who is infected to become infected yourself. The bottom line is the changes in the CDC's isolation guidance and close contact definition are long overdue. It makes little sense that the CDC can acknowledge that these new variants are more transmissible and at the same time not consider this in the context of these recommendations. This change is needed so that people have an accurate understanding of whether or not they need to test after an exposure and how long they need to isolate to keep their loved ones safe. This virus is changing, and these recommendations need to change with it.

**Chris Dall:** [00:36:03] Let's turn our attention now to vaccines. COVID-19 vaccines for children five and under were authorized back in June. And while that news was celebrated by many to date, fewer than 3% of the 19 million US children in that age group have received a single dose. And a recent survey by the Kaiser Family Foundation had some concerning findings about vaccine hesitancy among parents of

children under five. So, Mike, how concerned are you about the low uptake in children under five to date?

**Michael Osterholm:** [00:36:32] Well, let me just hearken back to a previous podcast. Actually, in late 2020, I actually had a podcast entitled "The Last Mile, the Last Inch," in which at that time vaccine was just beginning to flow. And we were all concerned and challenged by how would we get this vaccine into those who may be disenfranchized, who don't have access to health care, etc.? The idea of making sure that it was distributed and available to those populations, often most in need and at the same time with little access. But the last inch was all about everybody. And how many people would actually really take the vaccine once it was available? I said back then, turning a vaccine into a vaccination could be a significant challenge. So let's look at what's happening with children under five. As you may recall, prior to the vaccine's approval by the FDA and the CDC for use in kids under five, there were a very loud clamoring for the vaccine for this age group of children. Now, what we've failed to, I think, fully appreciate it. This was actually a very loud voice by a very small number of parents who wanted the vaccine. I congratulate them. I think it was exactly right on. But this was not a loud orchestra full of people wanting the vaccine. So I'm very concerned. And as you know, we've continued to discuss this issue time and time again. And unfortunately, I don't really have much positive news at this point. The long story short for COVID-19 vaccines is that we aren't getting enough shots in arms, and that is definitely the case for children under age five. The Kaiser Family Foundation publishes a COVID-19 vaccine monitor on a bimonthly basis that helps to tease out how the American public views vaccines and who is being vaccinated. We previously cited a poll from them in April when they reported that 18% of parents would get their child vaccinated right away and 27% reported that they would definitely not get their child under five vaccinated. Other polling options included families stating that they would wait and see or that they would only vaccinate their child if required. Polling updated for the month of July shows an even worse outlook. Similar to April, about 18% of parents plan to vaccinate their child right away or already have. But now 43% state that they will definitely not vaccinate their child under five. In April, that number was 27%. From Kaiser's reporting, we can see that a number of the families seem to have moved from the wait and see stance to making the decision not to vaccinate. This is really disheartening considering how much damage Omicron has done and continues to do. I think most people are surprised to know just what impact the COVID has had in kids under age five. For

example, if you just look at reported cases, the Omicron Wave had much more impact on kids under age five than all of the other variants before it. In 2020, about 328,000 cases were reported in kids under age five. That number of group with 2021 to 994,000. But as of just the first week of June in 2022, there have been almost 1.3 million cases in kids. But what I think what's even more concerning is that for children under age five, there have been 531 deaths in children under age five throughout the pandemic, with the majority of these occurring during the Omicron wave. Look at even hospitalizations. If you look at the actual number of hospitalizations for children under age five in 2020, it was 7,223. In 2021, it was 17,177. But just as of the middle of July of this year, just part of the year, that number is already at 20,443. This is the number of children hospitalized. So for me, I look at this and say this is almost the equivalent in terms of deaths of what we would expect to see children dying each year in this country and automobile accidents. Well, but we would never conclude that, therefore, it's not that high. So we don't really need to have car seat legislation. We don't need to have requirements that kids be buckled up when in fact, that's exactly what we're asking people to do to prevent COVID, get their child vaccinated. So at this point, we need to protect these kids the best way we can. And clearly, the best way is to decrease the hesitancy for their parents to get them vaccinated. If you have friends, family, coworkers or even they are your own patients, please be open to having these discussions about why to get vaccinated. It could take just one more conversation for someone to make the decision to protect their family. Yes, we understand the potential adverse event issues around these vaccines and the very rare cases of myocarditis in this age group. But when you compare it to the actual number of kids hospitalized and how many have died, the risk comparison becomes, I think, quite easy to say. Getting vaccinated will be a very, very important step you can take to protect your child.

**Chris Dall:** [00:42:09] The White House held a vaccine summit last week to discuss the need for more broadly protective COVID-19 vaccines in the future. Mike, what did you make of that meeting?

**Michael Osterholm:** [00:42:18] First of all, I do think it was a very positive development, but I also know that it is a very small first step towards where we need to go with vaccines and COVID. We have a lot of challenges to overcome. As you state, the White House convened the summit on the future coronavirus vaccines, they brought together public health and private scientists, as well as vaccine developers on promising

strategies and critical needs. The meeting covered a wide range of topics. As you can imagine, vaccine development requires numerous different skill sets. The group started by going over the biology of the virus and any stable targets we can use to make vaccines more durable. There was also some discussion of biology related to how research approaches protective immunity, our antibodies and our T-cells. Next, the group discussed different technologies we could use from nasal sprays to microneedle patches. Finally, they talked about the challenges related to global availability of vaccines, equity, and effective efforts in community engagement. I was really pleased to see this as a major area of discussion. Inequities are a consistent challenge not just in this pandemic, but all the public health work we do. If we don't take steps to facilitate access for everyone, we're really, truly not doing our job. My takeaway from the summit was very cautiously optimistic. First of all, I heard a lot of discussion about the possibilities with nasal vaccines. Yet I heard no really good discussion about the challenges we've had with nasal vaccines in the past. As some of you know, our group has been very involved assessing the effectiveness of influenza vaccines. So our group has clearly demonstrated that the nasal vaccines can be very successful in preventing influenza when administered to young kids who have not previously been vaccinated or who have not previously had influenza. When either of those events occur, there is some immune action that occurs in the nasal area that can actually reduce the effectiveness of a live virus vaccine growing in that area of the body. And that is the very reason why this vaccine is not used in adults, because adults have done really very poorly with the vaccine because the kind of immune response you'd hope to get is aborted by your own initial immune response to the vaccine. We can be optimistic about the use of vaccines for SARS-CoV-2 or COVID, but we have not looked at all at what the interference might be with previous infection or previous vaccination. And I worry about that. And in fact, one of the company executives there completely misstated the state of the art around the nasal influenza vaccines and how well they work in adults. So I think that's a challenge. We've got to understand, just to the extent we can, what is actually doable relative to things like nasal vaccines. The second thing is I just don't see the resources forthcoming. We're not going to have another Operation Warp Speed 2 where there is unlimited resources available to explore these vaccines. And so they're going to have to be commercially successful right from the start for companies to invest. Surely there will be federal government investment in these, but will it be sufficient to move these along? So I worry right now that we're in this almost, you might say, black hole of COVID vaccines, meaning that what work that was done on the mRNA vaccines,

the adenovirus vector vaccines, etc., surely was a major, major effort that did save millions of lives. But as we've discussed multiple times, that's not enough. These vaccines are not going to get us out of this pandemic and for the foreseeable future really reduce the likelihood of COVID in our communities. And the challenge we have is how long will it take us to get to better vaccines, if we can, at all? And we're not seeing any of that discussion. There is no real plan right now beyond what we have. And you can see with what we have right now has surely challenged us in terms of addressing COVID in our communities.

**Chris Dall:** [00:46:48] This brings us to our COVID query segment, which continues on the vaccine theme. Today's question comes from Mitch, who wrote to us after our last episode. Mitch wrote, "This past week, Dr. O mentioned that the team is working hard on better vaccines. Can you give us some information?" So, Mike, what can you tell our audience about CIDRAP's COVID-19 Vaccine Roadmap Project?

**Michael Osterholm:** [00:47:09] Well, I'm glad you're interested in this work, Mitch. And I'm happy to share more about what our magnificent team here at CIDRAP is doing. Before I go into the specifics, I want to provide some context around the issue as well and why we've entered into this work. When we discuss coronavirus vaccines, as I've already shared, we are really facing a series of major challenges, two in particular. The first is mitigating this current COVID-19 pandemic. The virus continues to mutate and evade protective benefits of the vaccine, reducing its effectiveness. The second major challenge is the future risk of yet another coronavirus emerging, potentially of even greater risk to humans than COVID-19. The scientific community is aware of these threats and is forging its way forward. The vaccines for COVID-19 were developed with amazing speed and efficiency to control a global public health emergency. But as the virus mutates and we experience potential waning immunity based on currently circulating variants isn't going to solve the long term problem. The proposed new approach is to develop pan coronavirus vaccines or vaccines to protect against many different coronaviruses. We need vaccines that provide longer and broader protection from the current pandemic, offer effective protection against future variants, and even new coronaviruses. It's really promising that leading researchers, industry, and political will are aligned in moving this forward. However, as I noted in the previous question and answer, I still reserve judgment as to just how much we can accomplish without a new major funding commitment to this effort. We do, however, have some recent examples



of groups coming together to work on this issue. One example is the NIH, specifically the National Institutes of Allergy and Infectious Diseases and the Coalition for Epidemic Preparedness Innovations, also known as CEPI. They are launching an initiative to develop pan coronavirus vaccines. They recently convened an expert panel to outline the science, challenges, and possible solutions to make these new vaccines a reality. Another example is the White House Summit we just discussed. Finally, let me share with you what we are doing here at CIDRAP. We have had a long history of developing vaccine roadmaps, really bringing together all the information we have about what are the barriers, what are the opportunities, how do we actually make these vaccines a reality? CIDRAP with support from the Wellcome Trust, developed extensive roadmaps for Ebola, Lassa, NIPA and influenza. In addition, with the World Health Organization support, we led the way to develop a roadmap for the Zika virus. And now we're addressing the issue of coronavirus vaccines, an incredibly complex task. Our team, with support of the Rockefeller Foundation and the Bill and Melinda Gates Foundation, is leading the development of a roadmap for research and development of pan coronavirus vaccines. The purpose of the roadmap is to outline multiple, specific areas that must be addressed for development of these new vaccines. The roadmap includes clear targets for an agenda that are specific, measurable and time bound. We have over 50 scientific experts from around the globe currently reviewing the strategy in building a comprehensive framework to make these new vaccines a reality. You can imagine that this isn't an easy feat, especially trying to schedule virtual meetings with really busy people across so many time zones. But it's really encouraging that people across the Americas, Europe, Australia, Africa and Asia are willing to meet sometimes in the middle of the night because they know this is a global priority. I recognize it can be harder to see the value in big meetings of people talking about COVID-19 in comparison to a scientist in a lab creating the next compound. But I think everyone in our podcast family knows by now public health is a team sport. If we're going to come up with innovative and effective solutions, we can't rely on just one or two people in leadership to make a decision. It has to be multidisciplinary. We need to start working at the most basic research and development levels of vaccine development all the way up to manufacturing and regulatory science. Even if we develop a fantastic vaccine, how do we ensure we can distribute it in an equitable manner globally? What community engagement will be necessary to effectively get shots in arms? A single epidemiologist, infectious disease doctor, microbiologist or supply chain analyst can't answer all these questions. From start to finish, we need everyone in the room working together. And

that is what CIDRAP is doing right now to support the development of pan coronavirus vaccines for the future.

**Chris Dall:** [00:52:09] And now for an update on the monkeypox outbreak, which continues to grow in the US and elsewhere, leading the World Health Organization to declare it a public health emergency of international concern. Mike, I know you have a lot of concerns about this outbreak, about the availability of vaccines, and about public health messaging. Where would you like to start?

**Michael Osterholm:** [00:52:29] Well, Chris, I think the most important thing we have to do is start with what do we really know and not know? And unfortunately, I see a lot of discussion going on in the public health community, even in the medical community, that really is not based on what I would consider to be state of the art science and most importantly, the facts. First of all, Chris, I am very concerned about this outbreak, which has now reached over 24,000 reported cases globally, over 6,000 of which have been identified in the United States. Just for some perspective on these numbers, one month ago on our July 7th episode, there were only 7,000 global cases and only 560 cases in the US. Eight weeks ago there were just 780 confirmed cases around the world and unfortunately I have no reason to expect this rapid increase in cases to slow down any time soon. Let me also point out that the dynamics of the virus transmission around the world is simply remarkable. Now, when you think about over the course of the last 3 to 4 months, this virus has gone from not being recognized as a major problem outside of Central Africa to now being a challenge in more than 90 countries, your first reaction as an epidemiologist, if nothing else, you had said, oh, this has to be a respiratory transmitted infection. Well, it's not, although that is surely a remote possibility that you can transmit the virus via breathing in air from someone who is infected. The primary mechanism of transmission for this virus has been and continues to be sexually transmitted. This is a term that, unfortunately for some, has been seen as stigmatizing gay men. And what we have to do in public health is basically just call balls and strikes. And you'll see in a minute why this becomes so important. Let me be really clear. Sexually transmitted infections can also be transmitted by non-sexual means. That's true for virtually every one of them. Syphilis. We know that we can transmit syphilis from an infected mom to an unborn child. We know with HIV you surely can contract the infection from sexual contact, but also from blood products. Another example is hepatitis B, where about 40% of infections are estimated to be transmitted sexually and about

60% from blood contact or being born to an infected mother. So this distinction that it can be transmitted by other routes beyond sex does not at all disqualify it from being a sexually transmitted infection, particularly when the majority of transmission is in that category. When I just noted that it had spread to over 90 countries in just a few months, that also is a very important observation because typically when you think of sexually transmitted infections, you don't think of wide dynamic transmission throughout the community or for that matter, throughout large geographic areas. It might lead you to believe that a lot of people are at risk. No, that's not the case here. What we have to be mindful of is we have networks of individuals who have frequent sexual contact with anonymous partners and move around the world relatively quickly. As an epidemiologist, when I look at the issue of potential for transmission, I look at how might in a given community, this virus be transmitted from one person to another. I worry that when we talk about stigmatization of gay men, as we discuss the pandemic, people say, well, you can't you can't talk about this, or look what will happen. In fact, it's just the opposite. I would tell you right now, there are many, many more gay men who have very little risk at all of contracting this virus. What do I mean by that? Well, in a survey that was done by the University of Chicago called the General Social Survey data collected from 2008 to 2018 and remains really the definitive data that we use to understand human sexuality across all populations. And in the survey for individuals here in the United States, it found that among gay men, 52% reported 0 to 10 partners in their entire lifetime. 10% reported 101 or more partners in their lifetime. And for 1.9% reported more than 400 sexual contacts in their lifetime. Now it is in this group of much more highly sexually active individuals that we're seeing a tremendous amount of transmission. For example, if you look at just the data that has come out of studies in Europe, it found, for example, that 44% of the cases there occurred in individuals who had had group sex during the incubation period of the virus. Just that time period. And when we look at this issue, why is that important? Again, as an epidemiologist, we're all about prevention. And right now we will continue to see a major shortfall of vaccine for the world, because there is virtually only one company now manufacturing this vaccine and every country wants it. Fortunately, the United States will likely have greater access because it was our government that over the course of the last ten years led and funded the research that has now given us what we call the MVA vaccines or JYNNEOS vaccine, known here in this country. But make no mistake, it is going to be far, far short of what we need. So our job is to identify who's at greatest risk. Who is it that we want to get this vaccine to? Don't put 8,000 doses out to a large metropolitan area and say, sign

up first, come first, serve on the website and watch after three and a half minutes it crash. We need to be working closely with local community experts, those from the gay community, those from the black and brown communities, those in the medical community, public health to come up with a plan for how will we distribute what limited vaccine we have in our communities and help avoid at least some of the anger and lack of understanding of what's happening. There's not some effort here by public health not to get vaccine out. This is a vaccine that is somewhat fragile. If you know about The New York Times story this week, you saw that more than 20 million doses of this vaccine had to be thrown out not long ago because it lost its potency. When the United States actually drove this research and bought the vaccines they did in stockpile. They did that with the understanding that over time these vaccines would lose their potency and that they would need to be basically thrown away. Imagine if we had spent hundreds of millions of dollars on a monkey pox vaccine that no one was ever going to use, at least in the minds of many, we would have been highly criticized. So you can say all you want about how public failed with vaccine. I thank the US government for leading this way. Every other country in the world should thank them, but know that the entire world wants this vaccine. So it is going to take quite some time before we will have enough vaccine for everyone. So why do I emphasize that? Because, again, I'm coming back to who do we vaccinate? We've got to understand the risk factors. And right now are these individuals who are having increased number of partners, often anonymous, traveling around the world to spread this virus so quickly. Now, can there be additional cases? Absolutely. As I laid out earlier, it was sexually transmitted infections. Not the only way it's transmitted. In this case, someone with a vesicle, a lesion on their arm, anywhere else on their body could by touching someone else, such as a parent picking up a child, could transmit the virus to them. In addition, you could have towels, clothing, bedding that could transmit the virus. But you're going to see the vast majority of that transmission stay as a sexually transmitted infection issue. I worry based on what we know about HIV/AIDS and how we've learned so much about transmission there, that in fact, we're likely to see spillover, particularly in the black and brown communities where bisexuality often is not acknowledged as having same sex. And we saw countless examples of transmission from a black or brown male to their female sexual partner. And so we need to be mindful of that and try to target vaccines where we must. And right now, we're doing a very poor job of that in communities around the country. It's white gay men that are getting the majority of vaccine. And again, we need to come back and figure out who is at the greatest risk of getting an

infection and how do we deliver that vaccine. So suffice to say, my comments are not well received by many because they think I'm adding to the stigmatization of of gay men. First of all, I hope my comments give a lot of gay men the reason to know they're not at risk. You're a gay male in a committed relationship. You're married. You have no more risk than I do in my committed relationship with my partner. I'm not concerned about that. So we want to make certain that these individuals realize that they are not at high risk. But we also need to work closely with those who are at high risk to do what they can to reduce their risk in the absence of vaccine and then to prioritize vaccination to them. Again, it's about calling balls and strikes. It's not about trying to stigmatize any one population. So we'll see where this goes. But I can promise you in the months ahead, we are going to see widespread transmission throughout the world. The good news, of course, is, is that it is still a disease with a relatively very low mortality rate. Any death is a tragedy. But to date, we only have four deaths around the world with this virus, considering the many, many thousands of people have been infected. The other good news is, unlike any other sexually transmitted infection I'm aware of, one recovers from this one and recovers in a way that they develop long term immunity. And so unlike any of the ones I mentioned syphilis, hepatitis, HIV, herpes, chancroid, any of those diseases have ongoing infection status until treated or in some cases like HIV, it's difficult to treat, but in fact, you can take drugs to reduce the likelihood of developing severe illness. With this monkeypox situation, we will see recovery, we will see immunity. But it's a terrible process to get there in the sense of a painful illness. So I hope this overview is helpful. As I said, I don't think it will be popular because most people don't want to talk about it. I've seen outlets such as The Washington Post that have continued to publish or make statements about the fact that this is not a sexually transmitted infection. They really don't understand what they're talking about among the columnists or the reporters at the Post. This is and we've got to deal with it like it is.

**Chris Dall:** [01:04:01] Mike, what can you tell us about this week's celebration of life?

**Michael Osterholm:** [01:04:05] This one is a very, very special one, and it's one that is really all about remembering and celebrating. We received an email from Kira and I'm going to read it to you and we will post the link that she provided to us too, and you'll see why this link is so important. Kira wrote, "I was hoping to share information regarding the annual COVID march, which will occur on August 6th of 2022. You can walk anywhere in the world to honor lives lost to COVID. My sister lost her battle to

COVID on July 8th, 2021, and I will be participating in an independent walk with my family at beautiful Mira Lake in Utah. The main event is held in Brooklyn. I do not know if your listeners are aware of Hannah, a young lady who lost her grandfather to COVID. She is honored more than 2,500 lives lost to COVID through painting faces of COVID victims. Her family is the host of the event. Please consider sharing this information in your next podcast to reach listeners who are grieving lives lost to this. It might be helpful for those to feel not so alone as we continue to live with this terrible virus. Thank you, Kira." And the link is here and what a wonderful way to celebrate those we have lost. I can't imagine a more fitting and appropriate thing to be doing coming up in just a couple of days. So I hope you will all take a look at the link. Anyone can participate around the world and all feeling unified in the fact that we so miss those we love, we care for, we think about. And now is a fitting time to remember them. Thank you, Kira.

**Chris Dall:** [01:05:53] And just a reminder to our listeners that if you want to share a celebration of life for a loved one friend, neighbor, or coworker who died during the pandemic, or if you want to tell us about the beautiful place that helped get you through the pandemic, please email us at osterholmupdate@umn.edu. So Mike, we've covered a lot. What are your take home messages for today?

**Michael Osterholm:** [01:06:15] Well, my first take home message is I hope you're not growing tired of all this discussion. It seems as if somehow it just doesn't get easier. But let me summarize three major points. First of all, we are in the long days of the 2022 summer and BA.5. Imagine throughout the course of this pandemic, we've seen these big peaks and valleys occur over and over again. And now here we sit in what appears to be the high plains, increased numbers that just don't change. How long will that last? We don't know. But one is we have to understand what this means. And it means that there is still substantial infection in our communities. And we are seeing what I believe is still an unfolding tragedy in terms of the number of deaths associated with COVID. Number two is, as I pointed out, in looking at what we know and don't know, there is so much in the way of recommendations that we've put forward as a public health community that frankly are based on little or real information. And it's time for us to go back in and do a housecleaning. We need to clean this up. We need to decide what does full vaccination mean? What are the kinds of appropriate actions we should take to reduce transmission in terms of what is a contact time? I can go through the laundry list. Now is the time. We're calling on CDC and other public health authorities to come

together, clean up a lot of these very confusing and many times incorrect definitions that we're using. Finally, the third thing is monkeypox is going to get a lot worse before it gets better. Expect that. It's going to. And we will not have enough vaccine. And you can yell and scream at the world about not having enough vaccine, but that's not going to help you get the vaccine that we do have to the people that most need it. And we must do that. So we also have to have an international response to monkeypox. If we take care of it only in one country, we really don't take care of it because the virus will continue to spill back into that country over and over again. So one of the points that is going to be a very important measure over the course of the upcoming months, how well do we coordinate all the international activities and how do we get vaccine to Central Africa, where we will continue to see the virus spin out of the animal population into humans if we don't protect that population?

**Chris Dall:** [01:08:48] And do you have any closing songs or poems for us today, Mike?

**Michael Osterholm:** [01:08:52] Well, Chris, I do. And it's one that's actually a special one for me, but it's one that we had used before. But I hadn't realized we hadn't used it since Episode 27 back in October of 2020, sometime ago. This is a song that is familiar, I'm sure, to almost all of you. It was written by Burt Bacharach and Carole Bayer Sager. It is one that was initially part of a soundtrack for the movie "Night Shift," but in 1985, it became the cover version of a very, very special effort a charity for AIDS research and prevention. And of course, by now, many of you realize I'm talking about the song "That's What Friends Are For." Dionne Warwick, Elton John, Gladys Knight and Stevie Wonder recorded this song. It went on to raise over \$3 million for AIDS research. And it's a song whose words are about hope and about coming together and what friends mean to each of us. And from that perspective, I think today we can all feel the need for that. And now's the time for us as friends to reach out to so many and to take the spirit of this song, hold it tight and live it for the days ahead. So here we are. "That's What Friends are For." Dionne Warwick, Elton John, Stevie Wonder and Gladys Knight. "And I never thought I'd feel this way. And as far as I'm concerned, I'm glad I get the chance to say that I do believe I love you. And if I should ever go away, well, then close your eyes and try to feel the way we do today. Keep smiling, keep smiling. Knowing you can always count on me for sure. That's what friends are for. For good times and bad times. I'll be your side forever. That's what friends are for. Well, you came and opened me. And now there's so much more. I see. And so, by the way, I thank you. Oh, and then for

the times when we're apart. Well, then close your eyes and know these words are coming from my heart. And then, if you can remember. Oh, keep smiling. Keep smiling. Knowing you can always count on me for sure. That's what friends are for. In good times, in bad times. I'll be on your side forever. That's what friends are for. I'll keep smiling and keep shining. Knowing you can always count on me for sure. That's what friends are for. For good times and bad times. I'll be on your side forevermore. That's what friends are for. Keep smiling, keep shining. Knowing you can always count on me. For sure cause I tell you that's what friends are for." Thanks again for being with us for this episode. We very much appreciate you being with us and what this all means to us and to you. We welcome your feedback and anything that you think that we can do to improve these podcasts. And we also welcome the opportunity for all of us to take a moment and just think about all the people we know that have been so harmfully impacted by COVID. And as we talked about in terms of our remembrance today. Go take a look at that link on our website. And remember, August 6th is just a couple of days away. Do something. Respond to that. So thank you very much. All we can say is be safe as you can. I'm continuing to take my approach of I'm not going to get infected with this virus and still enjoy life at the same time. And also be kind. It's a tough world right now. It's very hard to be kind in many ways, but be kind, know that we'll get through this. So thank you very much. Have a great week. Be safe. Be kind. Thank you.

**Chris Dall:** [01:13:00] 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](https://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](https://cidrap.umn.edu/donate). The Osterholm Update is produced by Cory Anderson, Meredith Arpey, Elise Holmes, Sydney Redepenning, and Angela Ulrich.