# Episode 93: What the World Needs

**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. Late last week, the Centers for Disease Control and Prevention released new COVID-19 community guidance that allows much of the country to ease indoor masking and other COVID-19 restrictions, according to new baseline measures that take into account not only cases but also hospitalization levels and hospital capacity. According to the new CDC guidance, roughly 70% of Americans are in areas with low or medium levels of COVID-19 and no longer need to wear masks unless they're immunocompromised or at high risk of severe disease. None of us know what the future may hold for us and for this virus, and we need to be prepared and we need to be ready for whatever comes next. CDC Director Rochelle Walensky said in the press briefing, "We want to give people a break from things like mask wearing when our levels are low and then have the ability to reach for them again should things get worse in the future," she added. The new CDC guidance is among the first steps into the next phase of the pandemic, a phase that President Biden discussed in his State of the Union address and the White House laid out a roadmap for in its national COVID-19 preparedness plan released yesterday. Today, on this March 3rd episode of the podcast, we're going to talk about the new CDC guidance and the Biden administration's strategy for the next phase of the pandemic and how those two documents will shape our efforts to navigate the new normal and prepare for what comes next. We'll also get an update on the trajectory of the pandemic here in the United States and around the world, discuss new data on vaccine efficacy in five to 11 year olds, examine some new research on the origins of SARS-CoV-2 and answer a COVID query. We'll also share the latest Beautiful Place submission 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:** [00:02:30] Well, thank you, Chris, and welcome back to all of you in the podcast family, if there's any people coming to visit us for the first time, welcome, I hope that you'll find the podcast useful. I will have to say that today probably is one of the most jam packed podcasts we've had in terms of information. So while we all may feel like the pandemic is slowing down and that we're coming back to some new sense of normal, I will tell you that the information right now that's coming out or the challenges that we're now facing actually remind me of drinking from two fire hoses, not just one. So we'll try to be succinct today, but we are going to be covering a fair amount of information. Over the course of the pandemic, in the dedications we've tried to illustrate or highlight both those groups or individuals from a scientific, medical or government standpoint who contribute to our response to the COVID pandemic and also those who tend to suffer the most from this pandemic. And though we all surely have been very negatively impacted by it, some have been particularly hit hard, and the dedication this week really reflects that. This past week, a modeling study was published in The Lancet Child and Adolescent Health by a group from England that, I must say really was a heartbreaking read. And what they did is they actually looked at what they call the heartbreaking hidden pandemic, which has left now more than 5.2 million children orphans grieving the loss of parents or caregivers who died of COVID-19. They actually determined that this is the equivalent of about one child every six seconds. What I think is even more telling here is this impact really is an underestimate by far because their experience ran through October of 2021 and missed all of the Omicron surge, which of course, unfortunately on a worldwide basis, left even more people in the same setting of mothers and fathers, grandfathers, grandmothers, aunts and uncles who died because of COVID. So this week's podcast is clearly dedicated to those children who have had to suffer the ultimate in terms of pain and suffering, losing their caregiver throughout this pandemic. We dedicate this to you. However, moving into the actual podcast, I'm back with good news. This week we are watching that sunlight become ever more present in Minneapolis-St. Paul. Today there will be 11 hours, 16 minutes and nine seconds of sunlight. That compares to last week at this time of 10 hours, 54 minutes and 31 seconds of sunlight, we've gained 21 minutes and 38 seconds of sunlight just in the last week. This has really been a remarkable accomplishment. Now that we're up to gaining three minutes and six seconds of sunlight every day as we get closer and closer to the spring equinox. So hold on for those of you in the northern hemisphere. For those in the southern hemisphere, we'll share with you what we have, but it's good news. It's a brighter picture, I think, in fact, both in terms of COVID and in terms of actual sunlight.

**Chris Dall:** [00:05:43] Mike, looking at the international situation, Hong Kong and South Korea still appear to be in the midst of their viral blizzard. While many European countries seem to be on the back side of their Omicron waves, Germany is still seeing high case counts. What are you seeing in terms of the international trajectory of the pandemic?

**Michael Osterholm:** [00:06:01] Well, Chris, in terms of the international trajectory as a whole, I think we can expect the current trends to continue for at least the next several weeks. As I touched on last week, most areas of the world are now past the peak of the Omicron wave, which was born out in the largest numbers from the W.H.O.. Although global case totals approached 11 million last week, they were down from 12.8 million reported the week prior. This actually represents the fourth consecutive week of declining cases after we hit that record high of 23.3 million cases in late January. So we've actually reduced our case numbers by almost 12 million people a week in terms of what we saw in January. In addition, we've now seen deaths drop for two straight weeks following a peak of nearly 75,000 in mid-February. Last week, death tolls were around 60,000, which is down from the previous week's total of almost 67,000. So on a worldwide basis, things surely appear to be improving. And yes, I know that in fact, all these case numbers I share with you surely reflect underreporting in many countries, including our own, just due to the lack of testing, the diagnostic, follow up, treatment, etc.. At the same time, as we look at this, so we have to consider where the Omicron surge has brought us. And you really get a sense for how subjective a term like improvement can be. Remember, before Omicron, our record high total for weekly cases was around five million cases per week. That's nearly half of our total just last week, which took us a month of progress to finally reach. Again we'll be talking about this in a moment, but it's all about baselines. In the same vein, there was a stretch of 17 straight weeks extending from late September to this January, where the death toll was lower than the 60,000 reported last week. In fact, for most of those 17 weeks, deaths didn't surpass even 50,000 per week. So even with most of the world seeing declines, you can see it is not an overnight process to go back to that sense of baseline. Meanwhile, as you mentioned in your question, Chris, there are a number of places still dealing with surges from this variant. Like other countries in Europe, Germany does appear to be past its Omicron peak, with cases declining there since mid-February. However, the latest levels of infection reported in the country remain more than two and a half times higher than they were at any previous point in the pandemic prior to Omicron. Notably, although deaths in the country have also increased due to the surge they're at levels essentially half of what was reported in Germany's delta surge last winter and less than one quarter of their record setting wave in January of last year. Still, when one considers that this country was reporting less than 20 deaths a day last summer, it adds even more perspective. Needless to say, I think the coming weeks and months will really be telling when it comes to determining baselines with a highly transmissible variant like Omicron. In particular, those places hit with waves early on like South Africa, Portugal and the UK might offer some insight on what Germany or even the United States could expect to see moving forward. Any identifiable patterns with Omicron baselines might also be helpful for Hong Kong, South Korea and other countries in the western Pacific, still enduring major surges. Much like I mentioned in last week's episode, this region continues to report rising cases, making it the one exception worldwide. In Hong Kong, daily cases have quadrupled in the past week, going from 7,500 last Monday to more than 34,000 this Monday. Deaths have also been on the rise, with a record high 87 also reported just on Monday. According to the city's health officials, 67 of those deaths occurred in unvaccinated individuals. An article published in The New York Times this past Sunday mentioned that each of Hong Kong's three public mortuaries are approaching full capacity. In addition, transportation delays have reportedly hampered efforts to move deceased patients from hospitals to morgues, leading to dead bodies piling up on gurneys in hospital hallways. On Monday, a story published by The Associated Press reported that officials in the city, which used a zero COVID strategy to successfully minimize and stamp out activity prior to Omicron, might be weighing the practicality of a lockdown. Some city officials have denied this claim, so we'll see what ends up happening. Of course, if Hong Kong did end up locking down, this would build upon the growing series of increasingly tightened restrictions that have been announced there in the previous weeks. Otherwise, plans are still in place to test all seven million city residents at least three times beginning in March. Regardless per capita deaths in Hong Kong, which has fully vaccinated 69% of its population and administered additional doses to 20% of residents, are now higher than the U.S. peak from Omicron. For comparison, on Monday, Hong Kong reported 8.4 deaths per million population. The U.S. peak during Omicron was only 7.85 deaths per million that occurred on February 1st. So here is a country state, Hong Kong, which we were often reminded, knew how to handle COVID. If I heard it once, I heard it a thousand times, if we just did what Hong Kong did, we'd be OK. And now I think you can see how a virus like Omicron can even challenge a place like Hong Kong in terms of case numbers and serious illnesses. Let's move to South Korea, although the per capita rates of ICU admission and deaths in South Korea remain at a fraction of what have been reported out of places like the U.S. and Hong Kong, they're anxiously awaiting any sign of relief. The surge there has driven both cases and deaths to record high levels, which have yet to reach an apparent peak. With average daily cases there surpassing 150,000, dwarfing the previous Delta record of just under 7,000. Let me repeat that they are now seeing 150,000 cases a day in Korea. Their previous record with Delta was only 7,000 cases a day. Even so, the country has opted to temporarily lift requirements for residents to show either proof of vaccination or a recent negative test result before entering certain businesses to help relieve the strain on public testing facilities. So while many parts of the world feel like they're done with COVID, we can't forget about those places that are still in the thick of things. Although things will hopefully improve in these places sooner than later, it's just another reminder that this virus is still here and impacting anywhere it goes, no matter what your previous track record was in dealing with COVID.

**Chris Dall:** [00:13:09] Here in the U.S., we are now under 65,000 new daily COVID-19 cases and hospitalizations and deaths are continuing to decline as well. But the rate of case decline appears to be slowing a bit. So Mike, do you think we're nearing our new baseline or will the case declines continue?

**Michael Osterholm:** [00:13:27] Well, that's a great question, Chris. In fact, I've been asking myself that same question day after day and have yet to come up with a good response. Honestly, I don't know what the days and weeks ahead will look like for this country when it comes to COVID. Up to this point, I think the descent we've seen since reaching the Omicron Peak has gone about as successful as we might have envisioned. Unlike South Korea and the U.K., we have managed to date to avoid an apparent plateau. Instead, over the past month and a half, we've seen average daily cases fall from a record high 806,000 per day to just over 64,000 a day as of this Tuesday. And again, I would remind everyone during that period when we were talking about more than 800,000 cases a day, we know that reporting was extremely limited relative to the actual number of cases occurring in our communities. Testing was overwhelmed. Reporting systems are overwhelmed. So if anything, this is even a more dramatic fall from over 800,000 cases to 64,000 cases a day now. Hospitalizations have dropped over this period from 158,000 a day to less than 43,000, and ICU admissions have declined from 26,500 to less than 8,000. For each of the categories I just mentioned, the current U.S. levels now sit below the levels reported just prior to the Omicron surge. At the same time, the one number that has yet to reach that pre Omicron level are average daily deaths with just over 1,800 reported a day we are undoubtedly in a better position than we were at this time last month, when the number was approaching 2,700. However, we clearly have a lot of room for improvement in this area. In fact, we've once again found ourselves on the Washington Post list of 12 countries with the highest per capita death rates over the past week. So overall, I hope we only continue to see improvement in each of these areas. But I still have a lot of questions about what exactly defines success. Is success reaching those all time lows reported this past summer? Is that even feasible with a variant like Omicron? Or will success be more of an abstract term? Regardless, I think we all agree that debates about success are preferable to the alternative. And finally, while I fully recognize that these trends almost feel like a breath of fresh air, I still find myself sleeping with one eye open. We've been on the back side of surges before. As I've said, there is no telling what the future might bring, so I'm happy that the activity is trending downward in the U.S. I'll be even happier if these trends continue. But no matter what happens, I think there's still a lot of work to be done, and we must expect that new variants will be part of our future.

**Chris Dall:** [00:16:23] The BA.2 sub-variant now accounts for 8.3% of the circulating coronavirus lineages in the U.S., up from 3.9% last week. Mike, is that something we should be keeping our eye on?

**Michael Osterholm:** [00:16:36] Well, Chris, as I pointed out earlier, I often find myself sleeping with one eye open every day just because of the fact I'm watching the variants. And in this case, it's a sub-variant that we've already talked about the issue of BA.1 and BA.2 over recent weeks and what it might mean. Could BA.2 fundamentally change the way we're looking at this pandemic? Let me just say that BA.2 cases continue to double in the U.S., and the W.H.O. continues to consider the Omicron sublineage BA.2 a variant of concern. But as you just noted in the question, it's only at 8.3% of all the circulating coronavirus lineages here in the United States. The W.H.O. reports that the initial data from population level studies are showing that BA.1 infection does provide strong protection against BA.2. British researchers have found that vaccines are also providing strong protection against severe disease, with the BA.2 variant. South Africa's CDC has reported that while BA.2 is more transmissible than the original BA.1 lineage, perhaps 1.5 times more transmissible, it fortunately is not proving to cause more severe disease. South Africa, which was one of the first countries to report BA.2 cases, is seeing a plateau in cases as of this week, but it is unclear if BA.2 is playing a role in this long tail. A preprint posted on February 15th out of New York University's Grossman School of Medicine reported that the BA.2 evades immune neutralization by monoclonal antibodies. BA.1 had previously been found to evade neutralization by some monoclonal antibody treatments as well. However, just before this preprint was posted, the FDA granted emergency use authorization for a monoclonal antibody treatment that retains activity against BA.2. The February 11th EUA was issued to Eli Lilly, which in this particular product is designed specifically for the Omicron variant.

**Chris Dall:** [00:18:38] So now let's talk about this next phase of the pandemic, and we're going to start with the new CDC guidance, which I briefly described in the introduction. Mike, as with all things COVID, there are a lot of opinions on this guidance. What do you make of it? Did the CDC get this right?

**Michael Osterholm:** [00:18:56] Well, let me set the table for this discussion. As anyone who has been listening to this podcast over recent weeks has heard me say, time and time again, public health had more or less taken itself out of a position to provide criteria based on public health measures, scientific approaches to determining what our public health interventions should be. We did little to inform the public what we thought might be trigger points for taking actions or in fact, relaxing particular recommendations. The governors in this country ended up making those decisions by reading the tea leaves in the public. What did the public want? What do they need? How do they feel about this? And I think in that sense, we just have to understand that this guidance is now coming along in that regard. Now that doesn't mean that it can't be important and helpful. I think all along, we needed this kind of guidance so that at least we would have the same compass to understand what are we measuring? It's like a thermometer, we might argue is it cold at zero degrees or a 50 degrees or 100 degrees? Or is it warm at any of those? You know, but the bottom line is least we have something that we can measure against. Well, the CDC guidance is actually based on a combination of three metrics new COVID admissions per 100,000 population in the past seven days, the percent of staffed inpatient beds occupied by COVID-19 patients, and the total new COVID-19 cases per hundred thousand population in the past seven days. This will, in fact then lead to determining the COVID-19 community level. These metrics are then used to determine which mitigation strategies should be implemented. In communities with high levels for example, the guidance recommends wearing a well-fitting mask indoors in public regardless of vaccination status, including in K through 12 schools and other indoor community settings. At all levels it is recommended that people stay up to date with COVID-19 vaccines and boosters, maintain improved ventilation for whatever that means throughout indoor spaces, follow CDC recommendations for isolation and quarantine, including getting tested if you're exposed to COVID-19 or have symptoms of COVID-19. For people who are immunocompromised or high risk for severe disease, they recommend having a plan for rapid testing and talking to your health care provider about whether you are a candidate for treatments like oral antivirals, pre-exposure prophylaxis and monoclonal antibodies. In a JAMA prospective piece I wrote in January with Ezekiel Emanuel and Celine Gounder, we recommended that policymakers need to specify the goals and strategies for the new normal of life with COVID-19 and communicate them clearly to the public. We called for national guidance with the ability for local jurisdictions to adopt to their local needs. We recommended that a threshold be put in place of how many weekly deaths we as a society will accept from a respiratory infectious agent and scale interventions accordingly. As a benchmark, we suggested a risk threshold that would correlate to the worst week of a bad seasonal influenza and respiratory syncytial virus year, approximately 35,000 hospitalizations and 3,000 deaths. This amounts to less than one death per 100,000 population. So let's talk about the model. Alyssa Bilinski from Brown University and Joshua Salomon from Stanford dug into it and detailed their thoughts in tweets on Tuesday. They estimate that the benchmarks that correlate to CDC's metrics correspond to a death rate of a thousand deaths per day before mitigation measures are triggered. This is about two to three times higher than the 3,000 deaths per week we recommend. The first challenge is that the metrics related to hospitalizations and staffed beds correlate with transmission events that happened two to three weeks earlier and do not reflect the state of transmission in real time. Whenever mitigation measures are put in place, deaths will continue to increase before leveling off. To really control transmission, we need to catch it before hospitalizations are too high because we know they will continue to increase after mitigation measures are put into place. The second challenge is that if we're going to recommend masking as a coronavirus mitigation strategy, we need to focus on messaging the need for high quality masks that offer respiratory protection. I cannot say this enough times. It seems to still fall largely on deaf ears, both among my colleagues and the public is masking is not a single concept, and we continue to see so many people who wear a face cloth coverings and surgical masks, which likely have very little protection for that individual from either transmitting the virus or becoming infected. And if there was anything I wish that the CDC could do is finally get it together on that issue. Their point of using whatever feels most comfortable for you that you'll use is like saying the swim goggles you should use are those that are most comfortable for you, even though they leak water the entire time you're using them. That just doesn't make sense. So as part of this recommendation, the whole mask mandate issue to me is a useless argument about how many angels can dance in the head of a pin. If you're not using high quality respiratory protection like an N95 or a KN95. Why mandate something that does very little to protect you? The third challenge with this model is to remove a test positivity rates from these metrics. Now I don't have an answer for this because I understand the problems with that. This metric can be very challenging and unfortunately lead to erroneous conclusions about what the data are telling you. It all depends upon the availability of testing. What kind of testing? Do test results get reported? Do people even get tested when they're clinically ill? And so I don't advocate that this be part of any kind of assessment program, but in fact, we do know that hospitalizations and deaths will always be lagging indicators. So I don't have a perfect answer for this one, but this is one that ultimately, as we work on our availability of testing in our communities, it has to become as simple as going to an ATM machine like environment where basically we all can know how to get money if we need it in the next 20 to 30 minutes. We need to have a similar picture for testing and encourage people to get tested if we're ever going to use this information and these metrics. Again, it is not now included. Finally, I just want to point out the issue on masking again that I found interesting. The American Medical Association president this past week responded to the CDC announcement, explaining that he will personally continue wearing a mask and urges others to do the same out of respect for the immunocompromised or those too young to get a vaccine. Well, I have to tell you that, in fact, I agree wholeheartedly with the fact that we need to do everything we can to protect the immunocompromised patients and those too young to get vaccinated. But if you go through the materials that the American Medical Association have accumulated on their website with regard to COVID, there are so many pictures and so many statements about using any kind of a cloth face covering, surgical mask without emphasis on N95 respirators. And so to me, this is part of that mixed message. You know, they're going to keep using masks, but they don't really tell you how important it is to use the right kind of quote unquote mask.

**Chris Dall:** [00:26:49] In his State of the Union address on Tuesday night, President Biden said that we've reached a new moment in the pandemic, and he laid out some elements of the strategy for that new moment. Those elements appear in more detail in the White House's National COVID-19 Preparedness Plan, which was released yesterday. Mike, you were among the experts consulted for this plan. What can you tell our listeners about it?

**Michael Osterholm:** [00:27:12] Well, first of all, let me begin by just congratulating the administration on addressing the future of COVID in our country and, for that matter, around the world. There are a lot of organizations and governments right now that just want to forget about COVID and move on. And I think that this administration recognizes that we're not done with this virus yet. I was very pleased to see the President address the issue, as he did in the State of the Union. And as you pointed out yesterday, the White House released actually a document called the National COVID-19 Preparedness Plan March 2022. And in this plan, they laid out four different goals that are really at the foundational level of what they're attempting to do and how they're attempting to do it. Let me just go through and address these goals very briefly, lay out where I think they're very strong, where I think they need additional efforts, and then briefly lay out for you a report that'll be coming up next week, which is from a group that I have participated in. One of the issues that I think is very important and the point made in the State of the Union was that President Biden will not accept just living with COVID any more than we accept living with cancer, Alzheimer's or AIDS. And he stated, we will continue to work to stop the spread of the virus, blunt its impact on those who get infected and deploy new treatments to dramatically reduce the occurrence of severe COVID-19 disease and deaths. We are not going to just live with COVID. Because of our work, we are no longer going to let COVID-19 dictate how we live. Well, I think this is a very lofty goal and one that I surely support. I do think, however, we have to be careful when we say we're no longer going to let COVID-19 dictate how we live. We have to again come back to the variants. Several weeks ago on the podcast, I actually shared a paper that had been published by a dear friend and colleague, Dr. Don Burke, former dean of the school Public Health at the University of Pittsburgh, who laid out the different kinds of scenarios that we might expect to see with a coronavirus like SARS-CoV-2, and that some of those scenarios could depart dramatically from what we've seen so far in terms of the kind of illness that we see, the risk of transmission, what cells that it might affect in a body, so therefore causing different kinds of disease. And so while I think it's very important that we surely pursue that concept that we're no longer going to let COVID-19 dictate how we live, we also have to be humble enough to say we don't know the unknowns yet that could change that very piece. Well, let me move to the different goals and share with you what's in the plan and a general sense of how I think they are addressing the challenges we have. Goal one was to protect against and treat COVID-19. Clearly, the administration has expedited the development, manufacturing and procurement of COVID-19 treatments, and as they said, they've built a diverse medicine cabinet filled with more treatments now than at any point in the pandemic. Today, there are about four million treatment courses available to Americans, with one million additional courses of the Pfizer antiviral drug available in March, and another 2.5 million additional courses of the Pfizer antiviral drug available in April. In total, we have now secured 20 million courses of this drug, which has been shown to reduce hospitalization or deaths by 89%. I think these are very helpful numbers. Unfortunately, I think the plan does create a bit of a stretch here in some of their statements in this area. For example, it stated that America has weathered the current Omicron wave with minimal disruption. Schools or businesses largely remained open. Well, that's a stretch. Come on. We know school closures were at their highest point this year, businesses shortened hours or closed due to employee illnesses. There were plenty of other examples of disruption in health care settings and other essential areas, such as first responders. I only point this out because again, the public just wants the truth. Don't sugarcoat it. So I will continue to advise this administration. Don't make statements like this. They're not true. Also under this goal, they stated, the vast majority of Americans have the protection of a vaccine, with 215 million Americans fully vaccinated and an estimated two thirds of eligible adults having received their booster shot. Well, in fact, if you look at that, it's really not true. Only in the age population 65 years of age and older do we have 66% of those individuals who have been fully vaccinated with that additional booster. If you look at the overall total, it's only 43%, a number that we've talked about many times on this podcast. So again, a bit of a stretch on that point. Also under this goal, the report states that the U.S. government has successfully put equity at the heart of a nationwide public health response. They have stated Hispanic, black and Asian adults are now vaccinated at the same rates as white adults. Well, this might be true if you only look at first and second doses, but there are huge issues yet with the booster doses. If you look at the Kaiser's February 2022 Vaccine Monitor report, they state, and I quote "black adults 41%, and Hispanic adults 39%, continue to lag behind white adults 52% in the share who have gotten a booster dose of COVID-19 vaccine, as do younger adults and those earning lower levels of income." White adults continue to outpace black adults and, to a lesser degree, Hispanic adults in receiving a booster dose, even among those likely eligible for a shot. So again, we have work to do here. The racial inequality of vaccine availability and use is real. So it doesn't help for the report to state that, in fact, they're all the same. The report does note under this goal that we need to continue to push for expanded vaccine manufacturing capacity. We need to accelerate research and development for a universal COVID vaccine. We need to expand and expedite additional treatments, and we do need to in fact, define masking. I'm so happy that we have that in there. We need to emphasize the importance of high quality masking, and the bottom line is the President will direct the U.S. government to accelerate efforts to detect, prevent and treat long COVID. Really a very clear statement of how important that is. So I think on a whole, I may have nitpicked with some of the facts stated. I think this goal was a very laudable and a very positive one, and I give the administration credit. Goal two, prepare for new variants. Here they had a number of noteworthy points. They explicitly acknowledge the potential game changing role of new variants, something we didn't see before, and I really give them credit for this. They emphasize sequencing and surveillance and how important this is. They talk about playbooks to plan and prepare for new variants. How do we assess the characteristic of the variant? How do we adapt, update and scale vaccines, tests and treatments around the variant issue? And finally adding to and maintaining the strategic national stockpile of at home tests, antivirals, masks, ventilators, gloves, gowns, hospital equipment, everything. I think this was really a very, very important point. And now let's move to goal three, prevent economic and educational shutdowns. The noteworthy points is an acknowledgment of how critical ventilation can be in reducing risk. They mention tools to improve ventilation, including the clean air and buildings checklist, encouraged uptake of ventilation improvements, technical assistance, encouraging schools and governments to make improvements using the American Rescue Plan funds. So this, too was a very important point. They clearly push for paid sick leave for people who have COVID related infections or their family members who do. Finally, they update guidance for employers to ensure safer workplaces, and one of the things that they address is how to support workers, such as people who are immunocompromised who choose to wear high quality masks. A very important point. The last goal is to continue to lead the effort to vaccinate the world and save lives. In this goal, it is clear that the United States now stands alone in procuring one billion vaccine doses for the sole purpose of donating to the world. And overall, the administration is committed to donating 1.2 billion doses to other countries for free, with zero strings attached, which represents the largest commitment of any single country or group of countries in the world. As of today, the U.S. government has delivered over 475 million free doses to 112 countries around the world, four times the number of free doses shared with the world than any other country. So I think this has been a very important point. They have done a similar effort with things like oxygen treatments, personal protective equipment and other essential supplies that are worth more than one billion dollars to countries experiencing outbreaks. So with this goal, we really have been a leader and will continue to lead. If I had any challenges to this particular document in what was said that I think really deserve much more attention is number one, we have to stop defining fully vaccinated is having two doses of vaccine when we know three doses are critical throughout all ages. Until that definition has changed, we will continue to see such confusion about how many doses of vaccine do I need. I worry about the efforts that they put out to do, test and treat. Not because I don't think it's a very laudable goal, it is. This is the program of having rapid testing available at pharmacies around the country. And the intent here is to actually have individuals present to the pharmacy who may be infected and ill and have them get tested with one of the rapid antigen tests and if positive, then immediately dispense drugs to them, with a standing order to do so so they don't have to get lost in the health care system. They would also be provided free of charge. The problem I have with this is a problem that no one seems to want to address. These lateral flow tests are only 40 to 60% sensitive in a single test, meaning that if I really had it and I had a lateral flow test, I only have a 40 to 60% chance of finding a positive. Well, that means 40 to 60% of people who are infected would go home without a drug because they'd have a negative test. So again, like masks in that large definition of anything you put in front of your face, testing has kind of taken on the same thing. We need to have highly sensitive tests. And so we're going to continue to encourage that. And then finally, I won't beat this into the ground masking. We have got to redefine what we mean by masking. It's really, really a critical issue and one that we just have not addressed. But on a whole, I give the administration great credit. Thank you for taking this on. Early next week, a group that I'm involved with that included a number of experts but was led by members of the Biden-Harris Advisory Board on COVID, of which I was a member, will be issuing a report ourselves, and it'll be very complimentary to what you'll see in the White House information here, but even more extensive than you're getting with this plan.

**Chris Dall:** [00:39:11] So now to a question about vaccines, there were some new data published earlier this week in a preprint and came out of New York state that showed the efficacy of the Pfizer vaccine against infection dropped to 12% for children ages five to 11 during the Omicron surge. Then, on Tuesday of this week, the CDC released data from 10 states that showed the vaccine efficacy in five to 11 year olds during the Delta and Omicron periods was 46%. So Mike, what are we to make of these studies? Does the lower dosage of vaccine for children under 12 need to be rethought?

**Michael Osterholm:** [00:39:45] Chris, this is a case of evolving science. I mean, to get a clear picture of what is happening, we do need real time data from numerous sources to help disentangle what is happening in terms of protection provided by vaccine among kids. To reiterate what I've said in previous episodes, these vaccines are still remarkably safe, even among children. The question is how are these vaccines performing when used in a dynamic situation of emerging variants? And how is or isn't the immunity against infection and severe illness sustained over time? And of course, the overlay in all of this is the dose, as you just mentioned. If we look at what we see for five to 11 year olds with two doses, the Pfizer vaccine was administered at 10 milligrams per shot. And if you look at kids 12 to 17, they received a 30 mg dose three times higher than those in the five to 11 year old age group and similar to what we see in adults. And if you look at the less than five years of age individuals, the ones that are currently in the studies, it's only a three microgram dose. So we need to look carefully at the issue of timing and dose. So let's take a step back. And as you noted, there are two studies that came out this week, and they really do help shed some light on the issue. Both studies looked at the effectiveness of the Pfizer vaccine among children five to 11 years of age. The Pfizer vaccine is the only vaccine currently available to this age group, and this age group receives, as I pointed out, one third the dose given to older children and adults. The first study is a study conducted by the New York State Department of Health, whose results were published by a preprint server on Monday looking at the effectiveness of the Pfizer vaccine among children five to 17 years of age from December 13th, 2021 to January 30th, 2022 when the Omicron variant was the predominant variant. The authors found that over the six week study period, effectiveness of the vaccine against infection declined in both younger kids five to 11 years and older children 12 to 17 years. Among children five to 11 years, effectiveness declined dramatically, from 68% to only 12%. This compares for 12 to 17 year olds, who saw a decline in effectiveness from 66% to 51. So again, they both started out initially with roughly the same protection from 66 to 68%. But the five to 11 year olds with the lower dose went down to 12%, whereas the 12 to 17 year olds only dropped to 51%. The vaccine did retain protection against hospitalization, but let me describe that a bit further. Among the younger children five to 11 years, it declined from 100% initially to 48% over the course of this time period. And among older 12 to 17 year olds, it declined from 85% to 73%. It is important to note that these estimates all have wide confidence intervals since COVID-19 hospitalization among children is relatively rare. So these numbers may not be statistically different between the two groups and thus therefore some determination made that the dose did have a big difference in hospitalization. The study also showed some evidence of rapidly waning immunity. Among children fully vaccinated between December 13, 2021 to January 2nd, 2022, effectiveness against cases within two weeks of full vaccination for children 12 to 17 years was 76% and by 28 to 34 days it had dropped to 56%. For children five to 11, effectiveness against cases declined from 65% to 12% by 28 to 34 days. We would have expected that the protection would increase over time as the immune response takes up to 14 days to develop. Needless to say, these results are concerning. Again recall that the dose given to the five to 11 year olds is three times lower than that given to the older children, raising questions about whether dosing is too low in this younger age group. The authors looked at vaccine effectiveness against infection for 11 year olds compared to 12 year olds during the January 24th to 30th week and found it was much higher among the 12 year olds. Vaccine effectiveness for children 11 years was 11%, compared to 67% among 12 year olds. Because we wouldn't expect a huge biologic difference between the immune response in an 11 versus a 12 year old, this raises the serious question of the dosing schedule being a major potential component in the decreased effectiveness in younger age kids. Let me move to the second study. It was published in the Morbidity Mortality Weekly Report of the CDC on Tuesday, and it looked at data from 10 states to evaluate vaccine effectiveness in preventing emergency department and urgent care visits in three different age groups five to 11 year olds, 12 to 15 year olds and 16 to 17 year olds. Ultimately, vaccine effectiveness against emergency department or I'll call ED and Urgent Care or UC visits related to COVID-19 infection decreased with time from the second dose as well, with Omicron becoming dominant over Delta. One thing to keep in mind is that given the date that the study was conducted and when the vaccines were approved for the age groups, the vaccine effectiveness for the five to 11 year olds was assessed only 14 to 67 days following their second dose. For the older age groups, vaccine effectiveness was evaluated any time after two weeks following their second dose. As you may recall, the vaccine approval for the younger age group came after we saw it for the older age group. Overall, for kids aged five to 11 effectiveness against urgent care and ED visits within 67 days of their second dose was 46%. For kids aged 12 to 15, with 149 days of the second dose effectiveness was 83%. Five months after that second dose, it dropped to 38%. For older teens, 16 to 17 years old effectiveness was 76% less than five months of their second dose, but dropped to 46% after five months. A week after receiving a third or booster doses, it's been called, effectiveness in this age group increase back to 81%. So this MMWR study also showed that vaccines were effective in preventing hospitalization. For five to 11 year olds, two doses were 74% effective in preventing hospitalization. For 12 to 15 year olds, two doses was 92% effective within five months and dropped to 73% beyond five months after the second dose. Effectiveness against hospitalization for 16 to 17 year olds was high at 94% within five months, but then dropping to 88% after. Vaccine effectiveness in preventing emergency room department and urgent care visits was lower during the Omicron surge for all age groups compared to any other time, including when the Delta variant was dominant. For children aged five to 11, effectiveness was 51%. For 12 to 15 year olds within five months of the second dose, effectiveness was 45%, but dropped to zero beyond five months. A similar trend was seen for 16 to 17 year olds, with effectiveness of 34% within five months, but dropping to zero in the group assessed five months or more after their second dose. In 16 to 17 year old it appears that a booster dose at least seven days earlier restored protection to effectiveness of 81% during the Omicron surge. This study, similar to the New York study, also showed that vaccine efficacy for children aged five to 11 who received a pediatric dose was much lower than the vaccine efficacy for older children who received an adult dose. However, we must consider that the data collected for this analysis occurred primarily during Omicron surge, which was also when we saw dramatic declines in vaccine effectiveness in older kids as well. This begs the question of whether the low VE number in five to 11 year olds is due to Omicron variant or the dosage or both. It is also clear that such large confidence intervals around the study estimates is such that the data still remains quite limited. The takeaway point from these two studies is that the Pfizer vaccines look to provide protection against severe disease and hospitalizations among kids. But doses and perhaps the timing of vaccine doses really needs to be further investigated to determine the optimal approach for children. We also have to be very clear with parents, what have we found and not found? I worry that in fact, this will become a reason why children will not get vaccinated because people look at these results and say, Well, they don't look good. Why would I get my kid vaccinated? And what we need to do is a very, very careful analysis to understand why did we see these results as we did? Are we undervaccinating these kids by dose? Is that third dose really critical in kids as we often think it is in the immune compromised, where there we even go to a fourth dose? And so we have a lot of work to do here, but do not for a moment take these results to state that these vaccines are not helpful in kids. You know, reducing hospitalization, serious illness is still a very laudable, noble goal, even if it doesn't prevent infection. And by better calibrating and understanding what the dose needs to be so that it's both yet a safe vaccine but a more effective vaccine could surely give us very different results going forward, and I expect that to be the case.

**Chris Dall:** [00:49:48] It's been a while since we've covered the issue of the origins of SARS-CoV-2, but there were some new research published last weekend, also in preprint studies that points to the Wuhan market in China and the animals sold in that market as the origin of the coronavirus pandemic. Mike, do these studies put the origins issue to rest?

**Michael Osterholm:** [00:50:10] Well, Chris, as I have stated many times on this podcast, I have been largely agnostic on what the source of the original virus was that has caused this horrible pandemic. I have laid out the fact that the data that I've seen so far surely tends to lean towards this being a spillover event, not a leak from a laboratory. As you know, I was grilled on this by Joe Rogan on his podcast two weeks ago over and over again and you know, I still have the same answer. Well, what these two new studies that were released over this past weekend point to, I think, is more evidence supporting that the food and live animal market in Wuhan, China, was the origin of the coronavirus pandemic. Now I want to be very clear here because I don't think these are the definitive data by far. I think some people have made them to be A-ha, we now have proof. But there's nothing in these data that would support, it's anything other than the actual spillover from animals. What the authors did and there's two separate studies I'll mention in a moment, they looked at a wide range of data, including virus genes, maps of market stalls and the social media activity of early COVID-19 patients across Wuhan. And by putting this all together and looking specifically at the Huanan Seafood Wholesale market in late 2019 and how did that serve geographically as the likely source of many of these early cases? Well, what we found, first of all, was that the papers did not, for example, identify an animal at the market that spread the virus to humans. And so we don't have that smoking gun, but the investigators from around the world and a group of Chinese Center for Disease Control and Prevention scientists actually in releasing these studies came to the conclusion that, one the epidemiology supports that the clustering of cases and where the cases first showed up really did focus on the market. And the Huanan market was the source. And we can get into an elaborate display graphically of how this all came together. Epidemiologically, I think it actually makes great sense. In addition, the new Chinese research study conducted over the past two years and I don't know why it wasn't reported before now actually took market samples after the market had been closed and had been largely disinfected, and they actually did find evidence of the virus there in the market. It included two different lineages A and B, both which were circulated in early COVID cases in China. And they also found it in the environment in basically looking at the market samples, they found it on a glove that had been there. And really again pointing out that the virus had been in the market. Now, some will argue, wait, which came first, was that the fact that the virus is in the community then got into the market? Or did the market serve as the source? But when they also looked at the area, they had clear examples of 10 stalls in the southwest corner of the market, sold live animals, and they actually had pictures of this from prior to the 2019 pandemic, when some of the researchers had actually been in this market. This is also where among the 69 environmental samples collected from the market turned up, the positive SARS-CoV-2 was just in this area, which would potentially spell out the fact that it was from an animal species. The researchers did also determine that the Huanan market did sell animals that were of high concern with being a reservoir for the coronaviruses like SARS-CoV-2, including raccoon dogs. And so I think when you put this all together, it really points to the fact that this is more data supporting a natural spillover event. There was no evidence here that somehow the laboratory was involved, which was eight miles away, and it actually just gives us more ammunition as we really need to understand the animal species that are in the market at that time when the spillover occurred in late 2019. And where did those animals come from to go look to see other residents hundreds of miles away that provided these animals to the market that would still have antibody if they had been infected? We need to look at that. That would be very, very helpful. And so I think at this point, let me just say that the study does support, from my perspective, evidence, not strong not compelling evidence that the SARS-CoV-2 virus originated in animals in the Huanan wholesale seafood market. And that we need to understand that, particularly as we talk about animal species today and spillovers. I will cover this in a future podcast as we get more information on it. But just this week we had more information come forward about a unique new variant that's been found in white tailed deer in Ontario. You know, this is really a challenge. What's going to happen with these animal species? And so suffice to say, I don't think these studies give us definitive information to say yes, it's a slam dunk. We found the smoking gun, but it does provide, I think, more cumulative information that says, you know what? It's very likely that the Huanan market was the source.

**Chris Dall:** [00:55:56] This brings us to our COVID query segment. This week, we have a question from a listener who asked to remain anonymous. It regards the Russian invasion of Ukraine, they wrote. "Will military interactions with soldiers and Ukrainian civilians crowding in bomb shelters cause a new COVID-19 surge?" Mike, obviously the Ukrainian people are dealing with more urgent life and death issues right now, but I've wondered the same thing. When you also factor in the stress that their health system is going to be under as it deals with wounded civilians and soldiers, is a surge of COVID-19 cases in Ukraine also a concern?

**Michael Osterholm:** [00:56:33] Chris, this may be the most difficult question I've ever answered on this podcast series, and it's not about confused scientific data. It's not about the facts. It's about the heart tugging, gut wrenching experience that we're all watching happen. And just to talk about this is very, very difficult. Let me just say at the outset that our ability to determine what's going on with COVID right now in Ukraine is in fact severely challenged. Just give you some background, on February 5th, the country experienced its highest surge number of cases due to Omicron at 42,533 reported. That's 106 cases per 100,000 population. On February 24th, the day of the invasion, they were at 25,789, so it had come down some, but it was still at 64 cases per 100,000. To give you an idea what that 64 per 100,000 number is like. Today, the incidence in the United States and I've already covered with you how we still are challenged in our health care systems is only 18 per 100,000 cases in the United States, so they are at 64. All case reporting stopped on the 24th. We have no idea what's going on there right now. It's likely that they are seeing a very high burden of severe disease. Only 34% of the country is fully vaccinated and less than 2% have received a third dose. Their current case fatality rate, which was last recorded again prior to the invasion, is higher than what countries with high vaccination rates are seen at 2.2%. This is almost double what we're currently seeing in the U.S.. Ukraine's daily death rate remains relatively low at 0.29 per 100,000 population, but this may also be truly an underestimate given the lack of available testing. The World Health Organization now is reporting that the medical oxygen supplies in Ukraine are reaching critical low and some hospitals have already run out. We're also hearing about major shortages of other medical supplies. This puts not only the 1,700 reported hospitalized COVID patients at risk prior to the invasion, but also many other patients require supplemental oxygen for other medical conditions or even war related injuries. It also poses a risk for future hospitalized COVID patients. Given the high daily incidence of cases, the low vaccination rate and the fact that many Ukrainians are being forced into crowded bomb shelters, it is safe to assume that widespread transmission is still occurring in Ukraine, even though it's not being reported. If the oxygen shortage continues, it is likely many of these COVID patients who develop severe disease will not have access to the treatment, meaning Ukraine could see a higher COVID case fatality rate in the coming weeks. Of course, low oxygen supply is, I just pointed out, only one of the many challenges Ukraine's health care infrastructure is facing. It is likely the country will struggle to receive shipments of their lifesaving drugs and their hospitals are struggling with power outages and influx of trauma patients and the fear of ambulances getting caught in the crossfire. And of course, there then, is the challenge of enough health care workers to even take care of this massive influx. On top of that, COVID is just one disease of concern in Ukraine. The country has also been battling a polio outbreak since October, with 21 cases reported so far. Two of them resulted in children developing paralysis. Only 87% of the country has received their first dose of polio vaccine, and in some oblast areas of the country, that number is as low as 60%. With so many people crowded in bomb shelters again without access to proper sanitation and much of the population still unvaccinated, it is very possible the country could see an increase in polio transmission as well over the next few weeks. I must add, however, though, and I think this is also another sobering moment Ukraine is not the only country experiencing something like this. Yes, it's what's on our TV screens, and it's tragic. Other countries and groups are also facing violence and political instability and have seen similar trends in underreporting and widespread transmission of COVID. For example, Yemen, which is in the midst of a war that has killed 100,000 people since 2015 and displaced four million people, has reported a total of only 40 cases of COVID-19 per 100,000 population throughout the entire pandemic. This country has not released any information about the number of tests they're administering or a test positivity rate. But the high case fatality rate in the country, which at one point was over 29%, suggests that only the most serious cases are being tested and reported, meaning there's a lot of transmission in Yemen that has not been documented. Just as Ukraine is battling a polio outbreak along with COVID-19, Yemen was in the midst of a deadly cholera epidemic when the pandemic began. Their cholera outbreak began in October of 2016, about two years after the Civil War started. The conflict resulted in the collapse of water, sanitation and health infrastructure, creating an environment where cholera bacteria could thrive. If treated, cholera has a fairly low case fatality rate, but military blockades are sometimes preventing medical supplies and aid workers from entering the country similar to the challenges we are seeing with medical oxygen in Ukraine. Over 2.5 million cases of cholera reported in the epidemic and over 4,000 people died, leaving their already overwhelmed health care system few resources to fight COVID. The Rohingya, an ethnic group that is fleeing genocide and other violence in Myanmar, have also struggled with COVID transmission in refugee camps in Bangladesh. There are over 900,000 Rohingya in refugee camps in southeastern Bangladesh, many of whom had little access to health care. Though there have not been large numbers of COVID cases reported from these camps, their lack of testing access, low vaccination rates and crowded living conditions all suggest that there was likely widespread COVID transmission. COVID restrictions and fear of infection have reduced the amount of international aid provided to Rohingya refugees, worsening both COVID-19 and other health outcomes. The bottom line is that what is happening with COVID and other infectious diseases in Ukraine is not unlike what other countries experiencing violence and unrest have just seen. Just like with other countries facing this challenge, we may never know the extent to which COVID cases and deaths resulted as a result of the Russian invasion due to the lack of reporting capabilities and testing resources in Ukraine at this time.

**Chris Dall:** [01:03:49] Mike, amidst all this darkness, we are still getting beautiful place submissions from our listeners, which bring a little bit of light. So where is our latest beautiful place submission from?

**Michael Osterholm:** [01:04:01] Chris, I just got done talking about the heart tugging situation in Ukraine, what's happening in Myanmar, what's happening in Yemen. And if there was ever a more wonderful, beautiful place to talk about what a beautiful place means, it's this particular one. This comes to us from Sheree, and we have permission from Sheree to tell you this story and to share pictures with you of what I'm about to talk about. Sheree wrote, "My mother Shirley was an extraordinarily active person, violinist, sculptor and painter, athlete, professional clown and puppeteer, photographer, world traveler and much more, all of which she continued after being widowed 23 years ago. An intrepid adventurer, her first paragliding adventure was in the Swiss Alps on her 80th birthday. At 90, six months after choosing to move to an independent living apartment, COVID-19 hit and for months at a stretch we were unable to visit her. Our daily phone calls weren't enough social contact to slow her descent into dementia. She was eventually reduced to living in a tiny room, unable to get out of bed or understand how to use the TV remote. In spite of her best efforts to adjust, she was miserable. Then I had the opportunity to move mom into my home and serve as her full time caregiver. The morning she was wheeled into my living room and was lifted into the hospital bed overlooking a lovely, natural pond, the look on her face of exquisite joy initiated a six week experience I consider to be my beautiful place. With help from my brother and boyfriend and loving support from hospice, we are able to keep mom comfortable and happy. Her favorite puppet companion stayed by her side at the ready to entertain visitors. We watched her favorite old movies, episodes of The Golden Girls, the best of videos of Johnny Carson. We pored through family photos and her many travel albums. For the final time she read to her box of treasured love letters from my dad sent during his service as a Navy fighter pilot during World War II. The four of us would gather and recount our favorite family tales, so much laughter. And after being separated for a year and a half due to COVID restrictions, it was a wonderful time for us to deeply reconnect. We savored every moment. My gratitude for that time is boundless. Sheree." You must see the pictures on the website. Of Shirley, Sheree's mom and who this incredible woman was and in fact, who her daughter is. Thank you for sharing this. What a beautiful place. What a beautiful place. Not without adversity, not all a bed of roses, but you made a beautiful place. And we all look for these moments because we all have the same challenges. Our lives are largely filled with challenges. Just so wonderful to hear from someone like you, Sheree, about how you made this into a beautiful place. Thank you.

**Chris Dall:** [01:07:17] Mike, what are your take home messages and closing thoughts for today?

**Michael Osterholm:** [01:07:23] Chris, I have really three points that summarize, I think all the information we covered today. Number one, we're not sure what to feel, how to act or what to think. We're all confused. Wait, is this over or not? It seems like it's over for me. But then you keep reminding us about this left guardrail and right guardrail with the left guard rail being something of akin to a seasonal flu pattern from here on out. The right guardrail, this new horrible new variant that comes back and surprises us and creates a great deal of pain, suffering and death. What are we to feel? And I wish I could give you a better information on that. I hope, I hope knowing hope is not a strategy that we are on that left guard rail, a seasonal flu like picture from here on out. But we could be on the right guard rail. And we could be where we were a year ago where in fact, despite vaccines flowing, case numbers dropping from that January peak and everybody believing that we were done with this pandemic and we weren't. I commend the President and the White House for clearly stating that we have to be absolutely mindful of the variants and what they could do yet and that we're not marching on anymore. So this is really an important point. How do we feel? I want so badly to get back to that old normal, knowing that'll never happen, so then I just want the new normal. But asking myself what that means? I don't know yet. Number two, I think the administration plan is a real start. They do appreciate the recognition of what the variants can do. Now they just have to deal with what does it mean to be fully vaccinated? What can these rapid tests really do and what do we mean by masking? If they can add clarity to those three things that'll surely make it even better. And finally, last but not least, is that war is hell. War is hell. And what we're seeing happen with the experience right now in Ukraine just reminds us that COVID, when overlaid on a situation like that, can just add that much more pain and suffering. And so again, my heart goes out to all those who are suffering right now. For those who have family there who are unable to determine their outcome, who worry about their very safety. This is a time that we all come together and we all care about for those people in country and for all their loved ones around the world. In terms of closing today, I picked a song that I actually had considered quite some time ago and just never felt like it was the right time. Today is the right time. What I've picked is a song that was written in 1965 by the incredible dual, the late Hal David and Burt Bacharach. This was a song first recorded and made popular by Jackie DeShannon, was released on April 15, 1965, on the Imperial Label after a release on the sister label Liberty Records the previous month was canceled. It ultimately peaked number seven in the U.S. hot 100 in July of that year. In Canada, the song reached number one. Of course, I'm talking about the song "What the World Needs Now." Here it is with the lyrics by Hal David, the music composed by Burt Bacharach. "What the world needs now is love sweet love. It's the only thing that there's just too little of. What the world needs now is love, sweet love, no, not just for some, but for everyone. Lord, we don't need another mountain. There are mountains and hillsides enough to climb. There are oceans and rivers enough to cross enough to last till the end of time. What the world needs now is love sweet love. It's the only thing that there's just too little of. What the world needs now is love sweet love. No, not just for some, but for everyone. Lord, we don't need another meadow. There are cornfields and wheat fields enough to grow. There are sun beams and moonbeams enough to shine. Oh listen, lord, if you want to know. What the world needs now is love sweet love. It's the only thing that there's too little of. What the world needs now is love sweet love. No, not just for some, but just for every everyone. What the world needs now is love sweet love. What the world needs now is love sweet love. What the world needs now is love sweet love." Hal David and Burt Bacharach. Thank you again for spending your time with us. A lot of information today, a lot. If I've over done it, we're sorry, but there's a lot happening. Thank you for being with us again. I just want to remind everyone, and for so many of you, you need no reminding whatsoever as you yourself have experienced this. But you know the people who become severely ill, the people who die. Often our moms and dads are grandpa or grandmas or brothers and our sisters, our friends, our colleagues. Even people you didn't like that much, we didn't want anything bad to happen to them. This is really a time to remember all of these people. We will continue to keep you posted and all the things happening right now. I can only hope that as time goes on, day after day, we see less COVID in our communities. We begin to appreciate a type of experience that we haven't had in two years, and we come to love every minute of those that we missed over the past two years and now we are living out with our new found safety. And we always will obviously have to keep one eye open for new variants. So thank you again for being with us. Be safe. Please be safe. Be kind. Be kind right now. Love sweet love. And thank you very much for being with us.

**Chris Dall:** [01:14:00] 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. This podcast is supported in part by you, our listeners. If you would like to donate, please go to CIDRAP.umn.edu/donate-now. The Osterholm update is produced by Maya Peters, Cory Anderson, Angela Ulrich, Meredith Arpey, and Sydney Redepenning.