# Episode 81: The Early Data on Omicron

**Chris Dall:** [00:00:00] Hi, everyone. Before we get started with this week's episode of the Osterholm update, I want to let you know that CIDRAP is commemorating its 20th anniversary this year. Since its inception in 2001, our team has created what is now a globally renowned center tackling the world's toughest challenges in infectious disease and public policy, including COVID-19, Ebola virus, Zika, antibiotic resistance, universal flu vaccines, and drug supply shortages. In celebration of this milestone anniversary and to ensure we're able to continue our important work into the future, Christy Walton has pledged a $4 million challenge to complete a $10 million fundraising campaign. A $1 match will be made for every $2 donated, helping to build a solid endowment to support CIDRAP's work. Please visit CIDRAP.umn.edu/donate and thank you. And now to this week's episode of the Osterholm update. 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. Two weeks ago, at this time, the world was getting its first information about a new coronavirus variant that appeared to be spreading rapidly in South Africa. In the short time that has since elapsed, the Omicron variant has now spread to at least 57 countries, including in the United States, and is raising concerns that the pandemic that we all want to be over will continue to be with us for the foreseeable future. Meanwhile, although Omicron is grabbing all the headlines, the Delta variant continues to cause illness and death across Europe, the United States and other countries and is showing no signs of letting up. The holiday season that we had hoped might be close to normal is turning out to be anything but. This week on the Osterholm Update podcast, we're going to fill you in on all the latest information being gathered on the Omicron variant and the picture that is starting to emerge. Then we'll provide an update on what the Delta variant is doing, both in the United States and the rest of the world. We'll also answer a COVID query on booster shots for adolescents and share the latest beautiful play submission from one of our listeners. But first, as always, we'll begin with Dr. Osterholm's opening comments and dedication.

**Michael Osterholm:** [00:02:44] Thanks, Chris. And to the podcast audience, I just have to start this week's podcast with an oh my. I will attempt in the course of the next minutes to share with you with as much clarity as I can, the fact that that crystal ball that I have sitting on my bed stand that I wake up to every morning with the five inches of crusted mud on it now it's turned out the last week has 10 inches of crusted mud and I think that somebody put it in the oven overnight and baked it at 320 for quite a while. It's a challenge. It's a real challenge. We all want more information and we all want it now and I'm in that same boat. But I will tell you right now we are in what I would consider to be one of the most confusing times in the entire pandemic. Today, I'll share with you what we know and what we don't know, and be very clear about that. I'll also share with you a sense of what might happen, what could be the various outcomes. And maybe to your surprise, I'm not sure that they're all as bad as we might have thought even a week ago. And so we'll try to cover that. I also want to share with everyone, though, that while we're going to be focused a lot over the upcoming days on the Omicron variant, we have to understand that the Delta variant is right now front and center. How long that will be, I don't know, given its battle with Omicron. But I will tell you right now that we will be fools if we neglect to respond to Delta as it's emerging in this most recent surge, not just in the United States, but throughout many parts of the world. So we'll talk also about Delta. And then finally, all of this is happening in a world that is done with the pandemic. They're done. We see that everywhere. Take, for example, in our own state of Minnesota, which really the surge started in late August and had just climbed and climbed and climbed to the point where it's at today this UK like surge that just won't go away. People are still tired. You can go around anywhere in the state of Minnesota right now and find bars and restaurants doing great. You can go to many social events and people, the last thing I want to talk about is is this pandemic. So it also comes at a time when we've overlaid a sense of dismissal of the pandemic. And again, as I've said, time and time again. We might be done with the pandemic, but the virus isn't done with us. And as a result, unfortunately, we are seeing the tragic, tragic results of this ongoing pandemic. Each week, I say that the podcast that we prepared for today was one of the most difficult ones that we've done. And I can honestly say this weeks is truly, probably the most difficult podcast that our team has had to put together. I want to thank them very much for all the work that they've put into this to make sure that you have the most current numbers. But even though we're recording this on Wednesday, December 8th, it'll be posted on our website tomorrow, December 9th. I fear it could be out of date by the time you even listen to it. So I was just add that caveat that right now, information is changing by the hour. And so I hope that the general conclusions and the overall thrust of what's happening will make sense. This week's dedication for the podcast is one that, again, I have indirectly experienced personally because I'm a grandfather, but I'm watching what's happening right now is we see the increasing number of cases and in our children around the country. This past week, the American Academy of Pediatrics reported over 132,000 new pediatric cases reported in this country. And so I'm dedicating this podcast to the parents of all of these children. They're trying to keep kids safe, dealing with school closures, remote learning, waiting for vaccines for children to be approved. And as you know, we're still waiting for children under age five to be approved. And now we're looking at a new variant that at least from the initial data in the South African experience, says that kids can be impacted by this at an increased rate. This is really a challenging time for parents. And so to you, I dedicate this podcast and I urge all the parents who are part of this podcast family today, please get your children fully vaccinated up to date where you can. Those older than five, please get two doses in them as soon as possible, and we will address the issue of even what has been called boosters in these kids throughout this podcast. So thanks, Chris. It's great to be with you again. But as I've said time and time again, never more in my life can I anticipate with a big smile the day that we don't need this podcast anymore.

**Chris Dall:** [00:08:10] So, Mike, we're going to start where we did last week with the Omicron variant. I said in the introduction that the picture is starting to emerge and as you noted, there's a lot of research that's been coming out over the past few days. But to be clear, it's still early and that picture is quite blurry. So what have we learned in the past week on those three crucial characteristics that we focus on with all variants transmissibility, severity and immune escape?

**Michael Osterholm:** [00:08:36] Well, as you just very nicely summarized, Chris, we know that these variants of concern in this case, specifically the Omicron variant, can be placed in at least one of the following buckets. They can be inherently more transmissible. They can cause more severe disease. And finally, they can have a heightened ability to evade the immune protection that's offered from vaccines or prior infection. Let me cover each of these separately. Topic one, what have we learned this week about transmission? We've learned a lot more about the ability of Omicron to transmit this week, and it is simply remarkable, just plain remarkable. It's still quite early to tell how much more transmissible it is compared to Delta or other variants. But the data is showing us that it is by far the most highly transmissible of all the variants we've seen to date. In South Africa, there has been a rapid increase in cases. Over the past 14 days, they've seen a 1,715% increase in daily cases, with an average of now 10,600 new cases per day. Some of this surely could be an artifact of more testing, but it is clear and compelling that the numbers are rising rapidly. This is the third highest 14 day increase in daily cases across the globe. Of note, Eswatini, a neighboring country to South Africa, is reporting actually a 14 day increase of 6,500%, and Zimbabwe is showing a 14 day increase of 1,900. So again, this compares to South Africa 1,700% increase. But this gives you a sense that in this area of Africa, Omicron is moving quickly. South Africa's average daily cases are 53% of their previous peak, which occurred on July 7th. But the numbers are still rising each day, currently by about 25% per day. This is a three to four day doubling time, and it's clear that they will, the case numbers in South Africa will surpass their highest peak in the past. There's been a steep increase in what we call the effective reproductive number with Omicron. The effective reproductive number, what some call R.T, is the average number of secondary cases per infectious disease case in a population made up of both susceptible and non susceptible hosts. In this case, if your R is one, that means for every previous case, there's one more and you have a steady state of illness in your community. If it's below one, that means that over time, the case numbers will decrease and decrease and decrease. If it's greater than one, that means that, in fact, case numbers will increase over time. Well, if we look at what's happening right now in South Africa, specifically, the reproductive number is somewhere between three and 3.5 at a minimum. This means that every three to four days and it does appear that that's the time for which from being exposed to actually becoming a case, is in fact occurring, that you could expect to see for every case today, three to four days from now, you could see three or 3.5 additional cases. Well, this is like a calculus problem, compound interest. If you keep basically getting more and more cases for more and more people who were cases, you can see how fast these numbers can grow. So I think that it's fair to say that what we're seeing right now with Omicron being nearly four times more transmissible than any previous strain such as Delta, will hold up. And remember, Delta did a pretty darn good job of transmission. So for us to think that this might be as much as four times more transmissible is really concerning. Clearly, we can see that Omicron is out competing delta in South Africa. There's been a rapid replacement of the Delta variant by the Omicron variant in South Africa in just the past two weeks alone. If you look at the previous surges in South Africa specifically looking at Delta, it took the Delta variant almost a month and a half before it became the dominant variant in South Africa, competing against all the other variants. Now we see this very same phenomena happening literally in just days. This, again, is an indication of just how transmissible this new variant is. In less than a month from where it was first identified, Omicron as you pointed out, Chris has now been detected in at least 57 countries. In 17 countries it has been detected among people who did not travel internationally. If I could wave a magic wand today and be all knowing, I suspect that this virus is probably in over 90% of the countries in the world and there is ongoing sustained transmission occurring among people who have never left the country occurring in many of those countries. In the United States as of December 7th, Omicron has been detected in at least 21 states. As I said in last week's podcast, I believe that the virus is present in most states right now and there is substantial transmission going on. So in conclusion, on topic one, what have we learned about transmission? This variant is for real. It's the real deal. It is highly transmissible. So that leads us to topic two. What have we learned about the ability of Omicron to cause serious disease? Early on, there was a suggestion of not only increased transmissibility, but that in fact, we might be seeing more severe disease. And I heard people talk about this almost as if it was doomsday. You know, I hopefully have been much more restrained than that, waiting for the data to come in to give us a better sense. I still think it's too early to tell whether Omicron cases are more or less severe, but the preliminary data from South Africa surely supports it is a less severe disease. I think also information from some of the case clusters we've seen in other countries around the world originally associated with the virus coming from travel related exposures from South Africa supports the same conclusion. So right now, I'm going to try to nuance this for you. I'm trying to thread the elephant through the needle to give you a sense of just what I think is happening. As cases have rapidly increased, South African hospitals have seen an increase in COVID-19 positive patients. On December 2nd, just one week ago, a snapshot of 42 patients hospitalized in a COVID ward in the South African Hospital showed that only 33% of the patients hospitalized with COVID were oxygen dependent. Only 21% were oxygen dependent due to COVID alone, as some of these patients were admitted to the hospital for other reasons and put on oxygen and tested positive for COVID after the fact. Only four of those patients were on high care or our concept of intensive care. Only one was in the ICU on a ventilator. The one patient in the ICU was intubated due to COPD, but was later found to have COVID, meaning the COVID was not the primary cause of even their ICU admission. The percentage of COVID patients admitted to the ICU and patients on a ventilator have remained much lower than we saw at this point in the earliest days of the Delta Surge. But they are starting to grow, and every day is an additional day that we could see lagging infections if they in fact do exist. To this point, again, I don't see the evidence that at least in that part of South Africa, we are seeing this major severe spectrum. But again, I just want to point out, I think we are still at least seven to 14 days from really feeling confident in that piece of information. But right now, I'm hopeful. Only six of the 38 adults I just mentioned in that snapshot were confirmed to be fully vaccinated, with 24 confirmed to be unvaccinated and eight having an unknown vaccination status. All nine patients with COVID pneumonia were unvaccinated, including one child. An important point. Patients had a shorter hospital stay on average just 2.8 days, compared to the 8.5 day average in that region in the last 18 months with delta infection. Another piece of information supporting a milder illness. That said, this wave appears to have a much lower age profile, which may have accounted for the reduced severity of infection in hospitalized patients. For example, 80% of the patients hospitalized with COVID whether it was their primary diagnosis, or a COVID diagnosed patient admitted for other reasons were under the age of 50. Let me repeat that 80% of the patients were under the age of 50. This is a younger age profile than this region saw at this point in the delta surge. This may, at least in part, account for the lower overall severity of symptoms we're seeing in this sample of patients. We also have to keep in mind that the population of South Africa is not representative of the populations in other parts of the world. Certain factors put their population at a higher risk for developing severe disease than other countries like the United States. Only 26% of South Africa's population is fully vaccinated, compared to 60% of the United States and 46% of the global population. Certainly putting their population at a higher risk for developing COVID infection and even likely severe infection. South Africa also has a much higher prevalence of HIV at over 20% in their general population, compared to less than 1% in the U.S., which could also put their population at higher risk. That said, there are certain risk factors that their population is lacking compared to the United States. South Africa has a much lower median age than some other parts of the world at 28 years compared to the U.S. median age of 38 years, which may also impact the percentage of their population that experienced severe disease. As everyone knows, following this pandemic in the United States, age has been a very important aspect of the risk for serious illness. While this information from this snapshot is promising, the data is from a small population that is not representative of global population as a whole. The age profile is younger than that seen in previous surges in South Africa, and the South African population as a whole has risk factors that differ from any other parts of the world. We will not know for certain if Omicron is less severe and to what extent until data on larger, more diverse populations, including people over the age of 60 and people without prior COVID infection or vaccination, is available. This latter group, of course, would be indicative of potential waning immunity. So this is going to take us a few more weeks. I would add an additional piece of information, though, that while we still have more questions to ask. I've been quite impressed by the clinical presentation of cases involved with clusters of cases reported in other countries in the world, such as large outbreaks in in Europe. And I will talk about that more in a moment, but they too have not seen an increasing number of people with severe disease following their exposures and subsequent infection. Now, many of these were breakthrough infections among people who are fully vaccinated. We will again have to wait and see what that means. So right now, my conclusion is I do believe that this is a less severe disease spectrum with Omicron and that this is really good news. The big challenge we're going to have is confirming that over the next two weeks. From there, then we can figure out what does it mean in terms of the next leg of the pandemic for the world? Finally, let me move to topic three. What have we learned about the ability of Omicron to evade immune protection, either from vaccination or prior infection? A number of outbreak investigations can give us a sense of just how transmissible the variant is, even among people who were previously vaccinated. This is the information I just alluded to in the previous topic. The biggest outbreak outside of South Africa is a report from a Christmas party in Oslo, Norway. The party occurred on November 26th, the same day the W.H.O. declared Omicron a variant of concern. More than 120 people attended an office Christmas party and every person in attendance was vaccinated. We are still trying to understand what that means to be vaccinated. Does that also include boosters or not? All individuals who attended also had to have a negative rapid antigen test before coming. One attendee had recently traveled from South Africa to this particular event. A week after the party, 60 individuals tested positive for COVID. The most recent numbers show that 25 to 35% of the positive cases were Omicron, but this number is expected to rise with more sequencing. To date, we're not aware of anyone having a variant other than Omicron in this group. According to a Norwegian news source, the case count from the party now stands at over 70, while 40 to 50 additional people who were at the same restaurant as the party that night have also now tested positive. Again what information we have indicates that they also had high levels of immunization and did not have any recognized direct contact with the Christmas party group. As of today, none of the infected individuals have been hospitalized and have only reported mild symptoms. But again, it's important to note that all of those infected are relatively young. Since this outbreak, Norway has implemented restrictions in Oslo, including mask guidelines, as well as 100 person limits to gathering, with few exceptions of places that must restrict crowds to 600. The second example involved high school students in Denmark. On November 27th, when 150 students from two different high schools in Denmark gathered for a Christmas lunch at a community center. It is not clear what percentage of attendees were vaccinated, but on this date, 77% of Danes were reported be fully vaccinated. Of the 150 attendees at this school event, 64 positive Omicron cases have been reported thus far, and more than a thousand close contacts have been identified as potentially exposed from these cases as well. Again, an amazing attack rate, when you think about the fact that 64 of 150 for sure have already been confirmed cases, while we believe many of these people had previously been vaccinated. The third example with regard to the ability of Omicron to evade immune protection from vaccination or prior infection, took place in Somerset, the United Kingdom, where 18 guests attended a 60th birthday party. All 18 were fully vaccinated, with some having also received booster doses. All guests also had to test negative within 24 hours of the start of the party. Despite these precautions, 14 of the 18 guests tested positive for Omicron, but fortunately to date they still report only mild symptoms. This is a remarkable transmission rate among a group that did everything they could to reduce their risk for transmission. The only good news out of this entire situation with all three of these events is the preponderance of mild symptoms and the fact that we don't have any individuals that have required intensive care treatment. A final example of how transmissible Omicron is comes from the transmission event in a Hong Kong quarantine hotel. In this case,Omicron cases were detected in a Hong Kong quarantine hotel in two fully vaccinated travelers who had negative PCR tests upon their arrival. These two individuals were in hotel rooms across the hall from each other. The first case, case Patient A, was in an individual who traveled to Hong Kong from South Africa via Qatar, arriving on November 11th. He tested positive on the 13th two days after arrival. He was hospitalized with an asymptomatic infection on the 14th of November. This person had received two doses of the Pfizer vaccine, with the second dose being given on June 4th, 2021. The second case for I'll call Case Patient B, was an individual who arrived from Canada on November 10th. The individual received two negative PCR tests on the 12th and the 14th. On the 17th, he started experiencing mild symptoms and had a positive PCR test on November 18, eight days after his arrival. The person received two doses of Pfizer, with the second dose being given on May 25th, 2021. Viral sequencing determined the virus was nearly identical. There was no interaction between these two people and none of the other 12 people in the same hotel floor, nor the hotel staff tested positive. After reviewing security footage, it is confirmed that the two remained in their respective rooms, and the most probable explanation for the case is airborne transmission across the hallway. It appeared that at one point, each of them had opened their doors within a minute of each other in terms of in taking food from hotel staff. At the very least, the exposure between these two individuals was not direct and any airborne transmission from a door being opened or some aspect of the ventilation system has yet to be determined. But it just points out how infectious this virus actually is. We see it from these examples that Omicron seems to be spreading easily among large groups of previously vaccinated individuals, raising concerns about immune evasion. Just in the last 24 hours, we've had a series of studies which are based on laboratory evaluation of how well sera or blood samples from people with antibody in it, from people who are vaccinated and are previously infected neutralize the Omicron variant. Preliminary data from one small study shows that there was a very large drop in the neutralization of the Omicron variant relative to the earlier strain of COVID-19. The lab tested blood from 12 people who had been vaccinated with the Pfizer vaccine, and they had observed a 41 one fold decline in levels of neutralizing antibodies against the Omicron variant. There are still a good news here. This report also emphasized that in fact, the ACE2 receptor was still the primary site of attachment for this variant, which is what our vaccines are really aimed at trying to address. And number two, even with the 41 fold decline in antibody, someone who is likely boosted or had previous infection and were vaccinated would still have enough antibody to likely reduce someone's chances of having serious illness. So it's a concern, but it's also good news. So to conclude all of this, let me just say that the information I just provided reinforces several things. Number one, the Omicron variant is highly transmissible. We have to expect it to be around the world and showing a major presence here within a short period of time. It's been suggested that in some countries, such as even the United Kingdom, that by Christmas time it could become the dominant variant just based on how fast we see it moving. The second thing is the good news is the fact that it's still causing less severe illness based on all the data we have. But let me just again remind you that that while it may be great news has to also be put in context of this increased transmissibility. For example, let me just give you a hypothetical situation to see what I'm talking about. If we just assume that with Delta, one out of every 10 infections would be a severe illness requiring hospitalization and you had 1,000 cases. That would be 100 individuals needing some type of hospitalization care, including for severe illness. On the other hand, if you look at the Omicron variant where instead of one out of 10, let's just say one out of 40 has severe disease. So it's a four fold lower risk. But now, because of the increased transmission fourfold instead of 1,000 cases, it's 4,000 cases, and guess what, that comes out to the same 100 severe cases needing hospitalization. So we haven't figured out yet how these numbers work out. What's the math on these? If we're lucky, Omicron will have even a much lower rate of severe illness than we've had with Delta to offset its increased transmissibility. But we still don't know. The one conclusion I can clearly take away from all of this is the fact that now, if ever, there was a time where we understand the criticality of the booster dose as it's been called, it's now. As you know, if you've been listening to this podcast, I have been a major advocate for that additional dose of vaccine dating back to early August. And I have all along felt that this was never really a two prime mRNA vaccine or a one dose adenovirus platform vaccine. This should have been three to begin with for the mRNA, as it should have been two doses for the adenovirus platforms. Now with Omicron It's become very clear you must have that third dose on board. Whether you want to call it a booster, you want to call it the last dose of the prime series, I don't care, but please, let's not have any more arguments about it. Let's not try to cast people as if somehow they are evil or not in keeping with the world needs for a vaccine to get three doses. I wish everybody in the world could get three doses of an mRNA vaccine right now. But the bottom line is it is really important, and I hope that the FDA and the CDC even seriously reconsider what is now recognized as fully vaccinated. I don't believe that you can conclude that somebody is fully vaccinated with only two doses of mRNA vaccine on board or one dose of an adenoviruses platform vaccine. We need to redefine as soon as possible what it means to be fully vaccinated.

**Chris Dall:** [00:31:55] So now back to Delta, which, as has been the case for the last several months, remains the variant that is driving the COVID-19 pandemic globally, particularly in Europe, but also now in other countries. So Mike, our listeners have been inundated with information about Omicron. But can you just give us an update on where things stand with the Delta variant?

**Michael Osterholm:** [00:32:16] Well, thanks, Chris, and I think this is a very important update that is being lost somewhat in the mix in terms of the discussions that we're all hearing about Omicron. As I've said, there's no doubt that Delta is currently king of the variant hill in most countries of the world, which places many of us in a precarious situation. Clearly, I think the safest and most effective approach we can take today to deal with both Delta and Omicron is to just do what we were doing with Delta. It shouldn't shock any of you when I say that the real cornerstone to this approach comes in the forms of the vaccines, given that there is going to be real uncertainty as to what will happen globally over the course of the next weeks. Let me just give a brief summary of what's happening. As it stands now, we're still experiencing this wave of heightened activity that is being driven by Delta. Last week's case totals fell just shy of four million cases around the world and nearly 51,000 deaths. Now, if there's one bit of good news that comes from these numbers, which remains far, far too high, it arrives in the form of decreasing weekly cases for the first time since early October. Recent trends in places like the U.S., Western Europe and Africa could have us heading back up again and quickly. On a regional basis, it's evident that Europe is still the biggest contributor to the overall global numbers, as they once again accounted for more than half of the world's cases and deaths reported last week. At the same time, cases in Europe actually declined for the first time since September, which breaks their streak of nine consecutive weeks, with rising cases. Still with nearly 2.7 million cases reported out of the region last week, they remain at record high levels. Finally, as far as deaths go, Europe reported another 29,000 deaths last week, placing them at levels that are around four times higher than what they were reporting in the weeks leading up to the surge. However, it's now the second week in a row that they've seen declining deaths, which can again be attributed to slow improvements in parts of Western Europe. In many other regions of the world, activity has essential remain steady and sits at levels that are below have been reported in the past. There are signs of some increasing activity in the Americas and the western Pacific region, but for most parts of the world, activity has been relatively limited outside of Europe and North America. As I've said in numerous other podcasts, the world is still a sitting powder keg waiting for explosions of COVID-19 to occur in their country. Remember, India has only vaccinated 30% of its population, Pakistan 22%, Thailand 53%, Vietnam 37%, the Philippines 36%, Indonesia 31% and even in the Americas, Columbia at 45% and Paraguay at 36%. All of these represent countries where explosive growth in cases could occur in very short order. Again, we've got to get the vaccines there. So is the South African experience with Omicron a harbinger of things to come globally? And can we expect it to outcompete Delta and become the dominant variant? Time will tell. If that does end up happening and South Africa provides a window into our future, I certainly hope that Omicron doesn't come with the bite that accompanies Delta, but as you all know, hope is not a strategy. So in the meantime, as we await the arrival of more data on Omicron the best advice I have for the world and you specifically, is we've got to get people fully vaccinated, that means both the initial series and that booster dose. As I've said, time and time again, the vaccines offer our best defense against this virus. Even in the event of a breakthrough infection, if you're fully vaccinated, it dramatically reduces the risk of severe disease and death. So we will be following carefully what happens around the globe, and I am certain I am certain the countries around the world that have seen only limited activity with the Delta variant in the past months will either see major upsurges in Delta or Omicron in the months ahead.

**Chris Dall:** [00:36:43] Here in the United States, we appear to be well into the second wave of delta activity, with the seven day average of daily cases now around 118,000 and several of the highly vaccinated northeastern states now seeing significant surges. In fact, the most highly vaccinated state in the nation, Vermont, with 74% of its population fully vaccinated, is now seeing its highest case numbers of the pandemic. Mike, for lack of a better question, what is going on?

**Michael Osterholm:** [00:37:11] Well, to be completely honest, Chris, when I talked about our current reality with Delta during the international update mentioning the precarious position that has put us in, I couldn't help but think of our own experience here in the U.S.. Here we were just this past spring claiming victory over the virus, only to have it come roaring back in the summer, primarily in the southern Sunbelt states and to some degree in the southeastern Atlantic states. Come fall, the surges in those states were cooling off and the national numbers conveyed those declines. However, around that same time, we had evidence of budding activity in other parts of the country. Lo and behold, after just over a month of declines, we were headed back up. And finally, as if this roller coaster ride we've been on with Delta wasn't suspenseful enough already, we made it to Thanksgiving, which basically took us into a long, dark tunnel with no clear indication what we'd see on the other side. Well, we're now finally emerging from that tunnel, and it's apparent that this roller coaster ride is far from over. As you mentioned in your question, average daily cases have once again topped the 100,000 mark, routinely coming in at just over 120,000 cases today. In other words, that's nearly 25,000 more cases a day than we were seeing heading into Thanksgiving. Hospitalizations have also been on the rise. On Thanksgiving, there was just under 52,000 Americans admitted to the hospital of COVID. Now, today, hospitalizations have surpassed 61,000 patients, placing them above the peak levels reached during the country's first spring and summer surges. And finally, deaths are also trending upwards, with an average of nearly 1,300 Americans dying from COVID each day. Think about that. That's 9,100 a week. That's 38,000 deaths a month now occurring in this country from COVID. So what's fueling this uptick? Well, if you look at a map of cases in the U.S., you'll see what almost looks like a red sash of activity that cuts diagonally from the Four Corners region in the Southwest, up through the Midwest and into the Northeast. I know I've mentioned the Four Corners region during these updates for quite some time now. But Arizona, Colorado, New Mexico and Utah remain above the national average when it comes to cases per capita. In fact, each of these states have experienced elevated activity for the better part of four months now. We've seen similar patterns emerge in some Midwestern states, including Michigan, our own Minnesota, Nebraska and Wisconsin. In Michigan and Minnesota, both of which rank among the top five states with the highest per capita cases nationally this most recent surge has been extremely challenging. For example, Michigan is reporting its highest number of cases and hospitalizations since the start of the pandemic. This includes the activity we saw there last spring with the Alpha variant. And although Minnesota hasn't quite reached record high levels of cases and hospitalizations during this surge, we're now reporting our highest ever occupancy rates of adult ICU beds with 98% of these beds filled statewide. If one looks at what we call the epi curve, the case was plotted over time for Minnesota, our surge literally began in mid-August and has generally been just an upward ride ever since. Our health care system is tired. In many cases, it is bending to the point of breaking. That's what Delta is doing. Some other states in the Midwest like Illinois, Indiana, Iowa, Kansas and Ohio are also experiencing growing activity. In each of these states, delta is now showing up as two fairly distinct waves as opposed to that slow burn we've experienced in places like Minnesota. Why the difference? Again, as I've said time and time again, I'm not sure, but they're contributing to the rise in national numbers, with states like Iowa now reporting their highest number of hospitalizations this past year. And finally, there's the northeastern region of the country, which is home to several states that lead the U.S. when it comes to vaccination rates. Even with those higher rates, we're seeing that they're not immune to surges. New Hampshire, which has fully vaccinated 65% of its population, had the highest case rates in the country this past Tuesday. Cases and hospitalizations in the state are at record highs. Rhode Island, which has fully vaccinated 74% of its population, ranked third on the list of states with the highest number of cases per capita. Although they haven't hit record high levels during this surge, they're clearly seeing a lot of transmission and hospitalizations are continuing to creep up. Then there's Vermont, which has fully vaccinated 74% of its population. They ranked fifth on the list of states with the highest case rates. In addition, cases and hospitalizations there have reached an all time high and continue to grow. In each of these areas that I've just talked about, the one overriding finding is that the ICUs and most of the hospital beds are occupied by unvaccinated individuals. So even with this very high level of vaccinations in many of these states, as I have said time and time again, if you are not vaccinated, this virus will find you, it will find you, and this experience keeps being repeated over and over again. If we look at other areas of the country, such as other northeastern states undergoing surges, this includes Massachusetts, Pennsylvania, Delaware and New York. In fact, New York's recent growth, coupled with their shortage of health care workers, has already resulted in overburdened health care systems, despite their current rates remaining below levels reached during previous waves. As you know, I have been saying for some time on this podcast, it would be just a matter of time until the New York City metropolitan area lit up. Given the fact that they still had large pockets of under vaccinated individuals, they would not be spared the delta surge as we know it. I can say the same thing about Southern California. Well, in this case, the early evidence from the past two weeks supports that New York City is now about to emerge as a potential major location of delta transmission. So Delta's not done with us here in this country yet. Now, I can't tell you exactly where, when and why it surges or descends. I don't know that. And anyone who tells you they know that, be careful. As I've said to you before, they likely have a bridge to sell you. Anybody that provides you with modeling data more than 30 days out, don't listen to it. It's pixie dust. I do know that with these pockets of susceptible people remain in this country, it will provide ample opportunity for this virus to spread. Our job now is to get as many people vaccinated as possible, both in terms of first doses and the booster doses, so that regardless of what happens with Delta or Omicron, we're in the best position to minimize the horrible impact of these viruses.

**Chris Dall:** [00:44:31] Now to this week's COVID query, and this one is from Julia, who asks, do our 12 to 17 year olds need a booster and when might that be available to them? Mike, this is a timely question since the FDA authorized COVID-19 vaccines for adolescents in early May, which would mean that there are many that are now six months out from being fully vaccinated. So should this group be getting boosters?

**Michael Osterholm:** [00:44:55] Well, Chris, this is a challenging question, and I must acknowledge both the reasons why I believe that the boosters are really important and necessary and why we need to be cautious in terms of making these recommendations. First, as I have stated in this podcast and have stated in numerous podcasts in the past, I do believe that the three dose mRNA approach is the right one, as well as the two dose adenovirus platform approach. But I must acknowledge also that there have been concerns raised about, well, what will happen with additional dosing in this age population and the potential for adverse events. I've seen no data that supports at this point significant adverse events in any of the kids five years of age and older who are getting first and second doses. I have no reason to believe that the third doses would be any different. So I, for one, very strongly support the fact that everyone have access to that third prime dose or that second prime dose and that that be something that should be a standard of vaccination. We'll wait and see. I know this is being considered right now. Surely the FDA is well aware of the need would be good to get more data on kids as they get further out from their second dose to see what happens with waning immunity. But I will make a prediction right now that within several months it's very likely that kids, even down at the youngest ages, will be in a three dose or a two dose approach, depending on which vaccines they get.

**Chris Dall:** [00:46:32] And now to a lighter moment, Mike, where is our latest beautiful place submission from?

**Michael Osterholm:** [00:46:39] Well, Chris, this is a very unique submission of a beautiful place, and it comes from Ellen. Ellen, thank you so much for what you've done here, not just your submission, but as you'll hear in a moment, what is so unique about that. Ellen wrote, "Dear Dr. Osterholm. I would like to nominate not one place, but many. She was referring here to the beautiful place. For the last two years, I've been working on a project called The Disappointed Tourist. I've been painting places submitted by members of the public in response to the question, Is there any place that you would like to visit or revisit that no longer exists? I've painted happy childhood memories of visits to lost amusement parks and swimming pools, places where people love to gather like bars, restaurants and theaters, places lost to urban renewal, gentrification and technological change, and commemorated the scars left by conflict, racism, anti-Semitism, inequality and climate change. Some losses are recent. Others have been mourned for millennia. During the pandemic, the project has been a personal lifeline, allowing me to travel through time and space from my Brooklyn studio, and I have felt honored to be entrusted with people's stories about the places they wish they could have saved. To date, I painted over 250 places in over 40 countries. The project is currently installed at the Salzburg Museum der Moderne, where I was hoping to take my family to visit this Christmas. Although Austria's current lockdown makes that seem increasingly unlikely, I fear the title may have been prophetic. I'm still adding to the project, so if any listener would like to suggest a site to be painted, they can do so at www.disappointedtourist.org, where they can also see the paintings and read the stories submitted by other participants. Let's look at what we have loved and lost as we think about what we want to save and build going forward. Let's use our love for place to create a world that is better for all of us. Best wishes, Ellen." Well, let me just say that some of the most special time in the past week has been on the disappointed tourist website. Ellen, what you have done has been nothing short of incredible. I urge all of you to use the link here to go and look at these beautiful paintings and understand what they represent. Ellen, you are a gift to all of us. And it brought back such wonderful memories to me thinking about the places that I wish were still around that played such important roles in my life. So this is truly a beautiful place. And while the title, the disappointed tourists may seem somehow a negative sense of what you've done, it's just the opposite. What you've done is given us an incredible gift, a powerful gift. So thank you very much, Ellen.

**Chris Dall:** [00:49:40] And for all our listeners, if you found a special place of comfort or solace during this pandemic and want to share it with us, please email us at osterholmupdate@umn.edu. We love hearing about and seeing the places that have helped you get through this difficult time. So, Mike, what are your take home messages and closing thoughts for today?

**Michael Osterholm:** [00:50:00] Well, first of all, this has again been another tough podcast, I'm sure many of you are finding your head swimming with the information wondering would you just tell me what's going to happen? Would you just tell me what I need to do? I can't tell you what's going to happen. I can tell you what you need to do is get everyone in your family, every one of your friends, every one of your colleagues fully vaccinated, and that will without question provide the most protection against the ravages of this ongoing pandemic. I know that's tough. I know that's hard. In some cases, it is painful in terms of trying to deal with others who are not in the same place with vaccination. Well, let me just summarize where I think we are today. As I've already shared with you, Omicron is a game changer. What we don't understand yet is how is going to change the game. Will it be a positive or a negative? Imagine two weeks ago thinking that something with this many mutations, this variant, that there could be something positive out of it? Well, stay tuned. Wouldn't it be something if we have a virus that outcompete some more deadly virus and it wins and causes much less severe illness? We can hold out hope for that. But as I've said multiple times, hope is not a strategy, but I will consider that on the list of possibilities. And that's one that gives me hope. If in fact, Omicron replaces Delta and while being much more infectious but less severe disease, we're going to have a whole new look at this pandemic. If we do see moderate to some severe illness with Omicron, it won't be clear necessarily what the tradeoff has been with Delta because we know with the more transmissible virus, we're going to see more cases. But that's something we'll have to look at very carefully over time, but again, it shouldn't change what we're doing. Get vaccinated. Delta is still here. That's point two. Please do not ignore it. We're seeing the emergence of this new wave of cases around the country. This past week, at least 28 states in this country had a 20% or more rise in cases over the previous 14 days. We know that we're in for a rough time ahead, even if it were just delta alone. The holidays are going to present even more challenge for exposures. Get vaccinated. Global cases are going to start increasing again. The numbers that we've had to date with this kind of up and down, up and down ride, I think will fundamentally change with Omicron. What we don't know yet what that means, but expect that the global picture is going to light up and it will change. Probably the most important message I can share with you today is hold on, just hold on. I know this is tough. I know there are so many people who are done with this pandemic, even though it's not done with us. Hold on. There is hope. The vaccines are still remarkable tools. Not perfect, but remarkable. I will take any day in my life if I can exchange a potential moderate to mild illness versus one of severe illness and possible death. These vaccines largely give that to many people, to those that still are challenged because underlying immune deficiencies or other comorbidities, I'm still with you. My heart and soul is there. I know how challenging this must be. I can't imagine actually, to the extent that you worry, every day is today the day you might get infected because you don't know how well your vaccine will protect you against serious illness. I think about you a lot. So my message is we're not done. Don't be done. Do what you continue to do. Hold on. We are going to get through this. Now in terms of my final message today, you probably can tell by now if you've been following my concluding comments that I have a habit of liking something and I stick with it. In this case, I'm going to leave us with the lyrics to another one of my very favorite songs in terms of what it means. And I think today it so applies to our podcast family. I shared these song lyrics with you before on Episode 54 from May 6th of this year entitled, "Vaccines and Taking Care of Friends" and then again in Episode 65 on August 19th, "Ongoing Tug of War." This is the lyrics to the word "Friends." "Friends" is an international hit, composed and performed by Elton John with lyrics by longtime collaborator Bernie Taupin. It was John's third U.S. hit and the second to reach the top 40 after the breakthrough success of your song. Ironically, Friends was not the follow up single to "Your Song," but was rather the title track and theme song from the movie "Friends" starring Sean Berry and was included on the soundtrack. It was the only hit single from that LP. The song rose to number 34 on the US Billboard Hot 100 and number 17 on the Cashbox Top one hundred. This song was recorded in September of 1970 and released on March 10th of 1971. It's all about the importance of friends. "I hope the day will be a lighter highway for friends are found in every road. Can you ever think of any better way for the lost and weary travelers to go? Making friends for the world to see, but the people know you've got what you need. With a friend at hand, you will see the light. If your friends are there, then everything's all right. It seems to me a crime that we should age. These fragile times should never slip us by a time you never can or shall erase as friends together watch their childhood fly. Making friends for the world to see, but the people know you got what you need with a friend in hand, you will see the light. If your friends are there, then everything's all right. Making friends for the world to see that the people know you got what you need with a friend at hand, you will see the light. If your friends are there, then everything's all right." Well, I want to thank you again for being with us on this episode of the podcast. I want to thank you for being our friends. We continue to appreciate so much the feedback you share with us, the letters, the emails, all the communications. You are our friends and we cherish that. I want to thank the podcast crew for helping pull together all this different information that's right now coming at us like drinking from a fire hose. And I also just want to remind everyone again I talked about a lot of numbers, a lot of numbers. They're grandfathers, grandmothers, mothers and fathers, brothers and sisters, they're cousins, they're neighbors, they're colleagues, they're people we don't know, but we wish we knew. I want you also to know as we get into the holiday season, I know it's going to get tougher and tougher trying to make decisions about what to do travel, family events, public get togethers. The world has moved on. Unfortunately, as you've heard over and over again, this virus has not moved on from us. It's still there after us. So just hold on. We're going to get through this. You know, I have this dream. Wouldn't it be something if Omicron becomes, in fact one of the blessings of this pandemic? Not one of the curses that it does beat out Delta, and it causes much less severe illness? We'll see. I got my fingers crossed. I know that's not necessarily a good scientific approach, but it's right now my best way of hoping for tomorrow. So have a good week. Stay tuned. We'll be back next week realizing that we'll be probably drinking out of four fire hydrants at one time by next week, but we'll do our best to give you the information that we hope can impact on your life and just thank you for everything you're doing out there. Thank you. Be kind. Right now, man is it tough? It is tough. Be kind. Be patient. Be safe and be kind. Thank you very much.

**Chris Dall:** [00:58:44] 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.