# Episode 104: Tougher than Rocket Science

**Chris Dall:** [00:00:06] Hello and welcome to the Osterholm Update COVID-19, a podcast on the COVID-19 pandemic with Dr. Michael Osterholm. Dr. Osterholm is an internationally recognized medical detective and director of the Center for Infectious Disease Research and Policy, or CIDRAP at the University of Minnesota. In this podcast, Dr. Osterholm will draw on more than 45 years of experience investigating infectious disease outbreaks to provide straight talk on the COVID-19 pandemic. I'm Chris Dall, reporter for CIDRAP News, and I'm your host for these conversations. Welcome back, everyone, to another episode of the Osterholm Update podcast. On Monday of this week, the United States hit the grim milestone of 1 million deaths from COVID-19, according to an Associated Press analysis of death certificate data. Although we know that behind every number there is a person, that number in and of itself is hard to wrap your head around 1 million people. "1 million empty chairs around the dinner table, each an irreplaceable loss," President Joe Biden said in a statement. Each leaving behind a family, a community and a nation forever changed because of this pandemic. And that, of course, is just the number of U.S. COVID-19 deaths. Globally, there have been more than 6.2 million deaths, and that's likely an undercount. But the number of deaths in the United States is nearly twice that of the next country, India. And the nation is still losing more than 300 people a day to the virus. So on this May 19th episode of the podcast, as we assess the state of the COVID-19 pandemic in the US and around the world and discuss what the future may look like, we'll also reflect on this number, how we got here, what it means. We'll also discuss criticism of the CDC's COVID Community Levels Map, answer a COVID query about testing and isolation, and share our latest beautiful place submission. But before we get started, as always, we'll begin with Dr. Osterholm's opening comments and dedication.

**Michael Osterholm:** [00:02:03] Thank you, Chris. And welcome back to all of you who are members of our podcast family who get together with us week after week. We so appreciate having you. We particularly appreciate your feedback, your suggestions, your comments really are very, very helpful. And as I say, week after week we read each and every one of them and they mean a great deal to us. For those who might be new to the podcast, I hope that we're able to provide you with the kind of information you need. You will soon find out if you stick with us for any length of time at all, that probably the three most important words that I continue to say over and over again is I don't know. And I think we're at that stage right now in this pandemic where the uncertainty is surely challenging, but it's real. As you noted in your introduction, Chris, we've hit a milestone this past week that some of us knew that it would be coming. And in this case, recording a million deaths hardly means that only a million people have died because of COVID in this country. As we've stated over and over again, there have been at least a million deaths because of access to testing being limited at many points throughout the pandemic, state and local health departments not able to record information from medical sources as to is this, in fact, truly a COVID death or just a individual with some other medical condition who coincidentally happened to have COVID? But even those deaths that occurred among those who did not have COVID, but because of COVID, their medical care was severely compromised or their access to care. And so all of these really have contributed to the horrible, horrible impact that this virus has had. So if we just look at the confirmed deaths in our country due to COVID, they really don't represent what we now know has been the tremendous and terrible impact. So but let me just try to kind of wrap my arms around this million number because it's so abstract. That is, of course, unless someone you know and love and care about has died. One way to look at this million number is to just understand that it's about the same size of the population of San Jose, California. It's more than the entire population of Delaware. If you were to line up all of these 1 million people that died due to COVID in a single file line, it would be over 370 miles long. That's longer than driving from Chicago to Columbus, Ohio. These 1 million people were more the numbers. I know this personally. They were moms. They were dads. They were grandpa and grandmas. They were sons and daughters. They were brothers and sisters. They were friends. They were coworkers. They were neighbors. They were people who we wish we knew. All of these individuals were special to somebody. According to a study published in 2020, each of these individuals who died of COVID leave behind on average nine grieving friends or family members. That means that as we've now reached this 1 million number, there are at least 9 million Americans grieving the loss of a loved one due to COVID. To put that number into perspective, this is greater than the population of New York City or the entire state of Virginia. If we were to put all of these people in a single file line, it would be over 3,400 miles long. That is longer than the driving distance from Seattle, Washington to Miami, Florida. An article recently published New York Times by Julie Bosman titled "The Lost Americans," shares the stories of some of these 9 million people who are desperately grieving. This story was heartbreaking, and it had many impactful stories, serving as an important reminder that in any discussion we have about returning to normal after this pandemic, that for the 9 million people who have lost someone that they love due to COVID, their lives will never return to normal. Losing a loved one is always painful, but this article really highlights some of the things that make COVID deaths especially devastating for friends and family members. For example, many of the bereaved did not get a chance to say goodbye to their loved ones, since most were hospitalized on a COVID ward with strict policies regarding visitors, they were only able to see their loved ones via FaceTime or speak over the telephone before they passed. This was especially true early in the pandemic, where people sometimes had to wait weeks before they could even see their loved ones body after death. Many people interviewed in the article discuss the pain of seeing COVID misinformation on social media or in conversations with friends and having to defend the disease that killed their family member. A Chicago woman named Nichole Waltrich who lost her 23 year-old sister Emily to COVID in June of 2021, described the pain that she felt during the summer when people were outside her door partying and not wearing masks. In their eyes, the pandemic was over, or at least a lessened importance. To Nicole, this could not be further from the truth. Others interviewed in the article talked about the hurtful reaction they received when they shared that their loved ones died due to COVID. Instead of sympathy, they just got questions. Sam Beeson, who lost his 60 year-old wife Jennifer to COVID, said that the first thing people say to him when he mentions his wife's death is did she have preexisting conditions, rather than expressing sympathy. Family members are left to justify to the people around them why their loved one's life mattered, preexisting condition or not. On April 21st, about a month ago, we dedicated Episode 100 to all of those who are grieving. In light of this tragic milestone of 1 million deaths, we would like to again offer this dedication to the over 9 million of you who have lost a loved one due to COVID-19. Each week when we record this podcast, when we talk about the numbers of hospitalizations and deaths and the impact that this has had on our society, we are not just thinking about COVID patients themselves. We are also thinking about you. This podcast is dedicated to you and will be dedicated forever. Now let me close out the introduction with that ongoing, wonderful piece of news that I still have a few more weeks left to really celebrate, and that is the ever increasing light length here in the Minneapolis-Saint Paul area. Today, we will actually see 15 hours and 10 seconds of sunlight. That's almost 15 and a half minutes more than what we saw last week at this same time. In addition, just consider the fact that we're still on the march to that summer solstice, when in fact, we will be at 15 hours and 36 minutes and 50 seconds of sunlight. So this is the time to celebrate this. This is the time to understand the beauty of that sunlight. And oh, we do celebrate it. So those in the southern hemisphere, we're shipping it your way and we're expecting you to have a contingency plan, how to ship it back in a few more months to us as our days again grow darker. So welcome on board, everyone. Hold on. We've got another episode here where we're going to try to do our best to share with you what we know and don't know. Thank you for being with us.

**Chris Dall:** [00:09:27] Mike, let's start our international discussion with North Korea, which up until last week had been claiming that it had not had a single case of the coronavirus, a claim it should be noted that many were skeptical of. Now, according to many reports, the country is seeing a significant COVID outbreak. What do we know about what's going on in North Korea?

**Michael Osterholm:** [00:09:47] Well, Chris, clearly, North Korea is one of those countries where it's almost impossible to know exactly what's going on due to their government's tight control and oversight of news. For example, over the past several years, as we've had famines hit Korea and likely up to a million people died, they denied that it was actually happening. It was only when bodies started washing up in China that we really started to get a sense of just how desperate things were in Korea. So I'm not sure what we can take from the information we have, but when it appears to be as severe as it is, you can surely appreciate it's probably a lot worse than we're even understanding. So we're largely left interpreting whatever information the North Korean government decides to provide. Of course, as you mentioned, this is a country that claimed it previously had not had a single case of COVID detected since the start of the pandemic. Is that realistic? Well, seeing that we're almost two and a half years into this, I'm inclined to believe that they've had previous run ins or at least close calls with this virus. However, it is worth noting that this country, which shares a border with China, opted to seal off themselves in January of 2020, calling it a matter of national survival. And by all reports, this has been anything but a half hearted adventure. For example, the number of imports they have received from China, including medical supplies, has been and continues to be dramatically lower than it was pre-pandemic. In addition, they added buffer zones to their borders and issued shoot on sight orders for anyone located in those zones without permission, which has been condemned in a report by Human Rights Watch. So I don't think COVID was routinely crossing the North Korean border. Nonetheless, it's clear now that the virus has managed to sneak past whatever defenses they put up, and the situation sounds virtually desperate. Last week, North Korea's government officially confirmed the country's first cases of COVID, with at least one reportedly identified as the Omicron sub-lineage BA.2. They also acknowledged that the cases were tied to an outbreak that began in late April, which they themselves described as explosive. For them to use that word, it gives you a sense of just how significant this likely is. As of this past Tuesday, the country reported a total of almost one and one half million cases and 56 deaths. Of course, if you look at their official reports, the vast majority of these cases and deaths are being attributed to a fever. However, between the explosive growth of cases and its overlap with the confirmation of COVID, of which nearly 200 cases have now been confirmed, it's all but guaranteed that they're dealing with the flood of Omicron cases, of which we would expect many of them to be severe. Now, there's been some sense that North Korea officials are using the vague language of fever to downplay the situation, and that certainly could have some truth to it. However, this also happens to be a country that largely lacks the infrastructure resources to conduct wide scale testing for COVID. So their reliance on that somewhat catch all term fever is probably in large part a function of North Korea's inability to test its population and confirm the infection status. Even if they're actually using temperatures to determine the presence or absence of a fever, they're undoubtedly missing a sizable chunk of cases that may be asymptomatic or in the earliest stages of illness. So with nearly 270,000 cases reported by North Korea this past Tuesday alone, you can maybe imagine what the true levels of transmission are at this time. Regardless of the true toll, it's clear that they are awash with COVID. And when they add up both the country's official response to this point and the distinct set of circumstances in which this virus is spreading, the outcome is looking very, very bleak. Already, officials there have stated that the outbreak is causing great turmoil, and they've opted to thoroughly lock down cities in response throughout the entire country. Unfortunately, as we've seen with China, lockdowns aren't a cure all with Omicron and its much more highly infectious virus, and progress is always going to be very slow going. In addition, China's lockdowns have relied heavily on widespread, repeated testing. Again, that's not an option in North Korea. So how do you navigate a lockdown when you're flying blind? How do you know when to reopen? And how do you maintain the well-being of your population in the meantime? A population that already struggles severely with health challenges, including nutritional issues. If residents struggle to get food in Shanghai, one of China's wealthiest cities, then what are the prospects for residents in all of North Korea, especially in a country that's been challenged historically with food shortages? That's a real concern. On the other hand, this is a country where virtually all 26 million residents are immunologically naive. They haven't been vaccinated or previously been infected, and they lack the health care resources needed to really minimize the number of bad outcomes. In other words, North Korea doesn't have the hospital capacity, ICUs, antivirals, oxygen, staff, etc., etc., etc. that it needs to provide care to those who are infected. This should provide us with a whole new definition of what we mean by perfect storm. Again, we saw what happened in Hong Kong where two thirds of the elderly population was unvaccinated. Their ICUs were quickly overwhelmed and their per capita death rates reached the highest levels we've seen throughout the entire pandemic anywhere in the world. And North Korea is in a much worse position than Hong Kong was. Based on the number of COVID or fever deaths reported in North Korea to date, which are absolutely an undercount. We have no doubt about that. I am not sure how likely it is that we'll ever get a good sense of what they're facing in the weeks and months ahead. The WHO and countries like South Korea have offered support, including things like technical guidance, vaccines, antivirals, oxygen and medical staff. But there is no indication that North Korea will accept any of these. In fact, they already have been approached by COVAX for providing vaccine, and they've rejected it. Although the horse is out of the barn in terms of making a significant difference with vaccines in North Korea, I do hope and for the sake of the people there, that at least some options for treatments or care are made available. Otherwise, Omicron's infectivity and the country's massive vulnerabilities make this potentially the most toxic recipe for all the pandemic anywhere in the world.

**Chris Dall:** [00:16:37] Mike, are there any other areas of the world that you're keeping an eye on?

**Michael Osterholm:** [00:16:41] Well, again, Chris, I'm doing what I can to keep tabs on as much as possible, especially right now. But I will tell you, none of us have enough eyes or ears to really keep track of what's happening globally. But let me just share with what we do know. For the first time in two months, weekly global cases increased, although slightly surpassing 3.8 million last week, which is up from 3.7 million the week prior. Again, I come back and I emphasize over and over again the fact that reporting has likely dropped substantially relative to the inability to be tested by PCR and the infrastructure of many countries to actually count cases has been eliminated. So take these numbers for what they may be worth. From a regional perspective, the uptick appears to be driven by increases in the Americas, the Western Pacific region and in Africa. Although Africa's overall activity has been largely driven by what is happening in South Africa alone. Now that being said, I'd be remiss not to provide an update on weekly deaths, which slowly but surely continues to descend. As of last week, a total of 10,200 deaths were reported, which was down from 12,400 the previous week. So over the past three months, we've seen the weekly death toll go from 77,000 to nearly 10,000, the lowest since the start of the pandemic. Let me repeat this. This is an important point. Over the last three months, we've seen the weekly death toll go down from 77,000 to nearly 10,000, the lowest since the start of the pandemic. This is not just an artifact of poor reporting. Yes, it may contribute to this, but it also clearly, I think, reflects the current status of the pandemic. Now, of course, as you may recall, there was actually a span of 48 consecutive weeks, extending from early November 2020 to late September 2021, where the death toll was above 50,000 every week. So think about where we're at right now. This is a very important piece of information that really does deserve emphasis. So from that perspective, we're in a much different position right now. But in the past two years, we've been reminded over and over again things can change very quickly. And as we all know so well, this virus happens to be one of those things that is constantly changing. It will continue to throw at us 210 mile an hour curveballs day in and day out. So given that dilemma, we're ultimately left trying to figure out what those changes might mean for us moving forward. In other words, are these new versions of the virus driving up activity but not driving up serious illness? In some ways, it becomes a familiar process. While the principles have largely remained the same, the virus is totally a wild card. So that being said, let me just briefly touch on a few places I've been paying a fair amount of attention to recently. First, there's China. You've heard me talk about this week after week. Again, they're battling Omicron with the weapons and tactics that are most familiar to them, courtesy of their commitment to zero-COVID. As of Tuesday, the country reported just over 1,000 locally transmitted cases among three municipalities, two of them which are Beijing and Shanghai, and ten additional provinces. Although more than 800 of those cases were identified in Shanghai, the city has reportedly gone three consecutive days with zero-COVID cases located outside of the quarantine zones, which they view as an important step in elimination. Still, the news appears to have meant little, at least so far, for most of the city's residents who are in their seventh week of lockdown are still in lockdown. Otherwise, officials there claim that the city will plan on moving forward with a gradual, phased reopening throughout June. In the meantime, it appears that city residents, many of whom have had to navigate sudden unanticipated changes, are clearly skeptical. At the same time, that uncertainty continues to permeate the economic and supply chain side of things, and delays are still a reality. For example, in the port of Shanghai, which is the largest in the world and handles 20% of all of China's trade, imported shipping containers are stuck waiting an average of almost 14 days before being collected for transport. That's 2 to 3 times longer than the average wait times earlier this year, when that, too, was still affected by the pandemic. Meanwhile, companies from Apple to Amazon are anticipating major disruptions in supply chain integrity. According to the latest estimates, which are from last week, a total 290 million Chinese residents in 41 cities are under partial or full lockdown. Of course, one of those cities is Beijing, which has seemed to report around 40 to 50 cases a day for the past several weeks, despite a gradual tightening of restrictions and widespread testing happening there. In fact, according to a Financial Times article, all three and a half million residents of Beijing's larger city district have undergone 17 rounds of testing since April 25th, 17 rounds of testing. So as I've said many times in the past months, we'll see what happens in China, where the threat of Omicron isn't going to go away. Otherwise, let me provide a quick update on South Africa, which has faced a recent wave of cases driven by BA.4 and BA.5. Starting in mid-April, average daily cases there started climbing, going from 1,200 a day to almost 7,700 a day in the span of just a month. However, for the past week, cases have reportedly been dropping, falling below 7,200 as of Tuesday. So the country might have already seen a peak, although the gaps and variability with testing are surely making it difficult to discern that as of right now. If that is the peak, it would seem to be good news for the levels of severe disease and deaths that the country might anticipate. Although hospitalizations have risen slightly the past few weeks, the number of admissions is several times lower than it was during the country's initial Omicron Wave, 2,800 weekly admissions last week versus 9,000 weekly admissions at the height of the country's first Omicron surge. Otherwise, daily deaths have grown from the single digits to just over 30. Of course, it's still early, and that's a lagging indicator. So we can expect it to increase a bit. But if cases have peaked and hospitalizations remain at around one third of the levels they reached during the first Omicron wave, then I don't anticipate a situation where they'd close in on the 240 deaths a day that the initial wave also brought with it. The hope is that the BA.4 and BA.5 case surge in South Africa remains as shortlived as it appears. And the country where more than 90% of the residents are estimated to have been infected during previous waves, retains a notable amount of defense against severe disease and death. Otherwise, another country that could offer some insight on BA.4 and BA.5 is Portugal. Cases there have more than doubled since late April, going from 8,400 to almost 18,700 in just a few weeks time. However, hospitalizations and deaths in the country where 92% of the entire population is fully vaccinated and 62% have received at least one additional dose have remained virtually unchanged throughout the same time period. So we now have a total of two countries, both with quite different circumstances, seeing case upticks from BA.4 and BA.5. And as a matter of fact, the European Center for Disease Prevention and Control opted to officially label BA.4 and BA.5 as variants of concern, warning of potential case surges throughout the region over the course of the next couple of months. Based on some early sequencing data, BA.4 and BA.5 do appear to have a growth advantage over BA.2 in several European countries. So we certainly could see a situation where it could prompt an increase in overall case numbers. But with the sample size of just two, I think our best approach is to wait and see and in the meantime, keep our eyes open for a new sub-lineage or even another variant altogether. This will be good news if BA.4 and BA.5, while it may infect us, doesn't cause an increase in severe illness, hospitalizations and of course, deaths. But at the same time, having said that, as much as that will be something I think we'll all welcome, we must keep our eyes wide open for whatever will be that next variant, wherever it'll show up.

**Chris Dall:** [00:25:35] Here in the U.S., the nationwide surge in cases continues as BA.2 and BA.2.12.1 take over. The seven day average of new daily cases is hovering around 100,000 right now, but as we've discussed over the last several weeks, that is likely an undercount due to unreported home testing. Over the weekend, Dr. Eric Topol posted an essay in which he said the number of cases is likely at least 500,000 per day, if not higher. Mike, what is your assessment of what's going on in the U.S. right now?

**Michael Osterholm:** [00:26:06] Well, Chris, let me be really clear. I'm answering this question both as a professional and as a person, as a grandfather, a father, a friend, a colleague. This is a tough question. So let me share with you what I do know and what I think I know. I do agree the case numbers are much higher than are being reported. Let me just be really clear. I know more people today who have been diagnosed with COVID in the last seven days than any time period in the entire pandemic. This virus is virtually everywhere. Over the last few weeks, I've been emphasizing how little the case numbers being reported actually mean due to a lack of available and affordable PCR testing in the U.S. and the number of at home tests. We just can't rely on these numbers. Eric Topol's essay touches on several issues that are at play here and it also discusses changing metrics that are misleading to the public and we will address later. So as I've talked about in previous episodes, let me in a sense, try to tease apart the difference between the number of cases which I've just emphasized to you is at an all time high, from my perspective, versus what are serious illnesses, hospitalizations and deaths. On top of the unknown number of positive unreported at home tests and people who are just not testing because they're asymptomatic, unwilling to test, or mistake their COVID symptoms for something like allergies or a common cold. Many states and local health departments have changed how they're reporting their case numbers. Some state and local health departments are now only reporting the case numbers once or twice a week. Meaning that the cases reported in a given day may be very much out of date. We could look at trends over time to get an idea of how the case trends are looking. But ultimately, the absolute numbers themselves mean very little. We need to look at hospitalizations and the death data if we're to want a quantitative state of this pandemic. The U.S. is now reporting 2.1 new daily hospitalizations per 100,000 and an average of 22,600 people hospitalized for COVID on a given day, or about seven per 100,000. Well, let me just share with you some perspective I think that's really, really important here. If you look at that rate of hospitalizations per 100,000, as I just noted, we're at about 2.1 new daily hospitalizations per 100,000. If you go back to July of 2020, which just before the Delta surge emerged, we hit a low for the pandemic at 1.8 new hospitalizations per 100,000. We're almost there now, even with this increase. But when you look at what happened with Omicron and Delta. Omicron, we were at 8.3 hospitalizations per 100,000, literally almost four times higher than it is now. Delta was at 5.3 hospitalizations per 100,000 over two times what it is now. So hospitalizations, even with these major increases in numbers are still down. But let's go one step further, ICU use. ICU numbers remain relatively low, with 2,400 patients in ICUs daily for COVID. Again, let's go back to our previous experience. If you look at July 2021, that period just before Delta hit, we were at 4,115 people hospitalized in ICUs, whereas with Omicron, we were at 26,500 when we hit its peak. And for Delta at its peak, we were 26,088. These are much larger numbers than we're seeing right now with the 2,400 patients in ICUs. This is great news. This is a very different kind of pandemic in that sense. Now, let's just go one more to deaths. If we look at what's happening here. Right now, we're averaging about 318 deaths a day. That is still tragic. We're still talking over 2,000 deaths a week in this country. But compare that to what we saw before. During the Omicron peak, we were at 2,603 deaths a day, quite different than the 318 we're seeing. If you look at Delta, we're at 2,074 deaths a day when it hits peak. Again, we're far short of that. So I think the important message here is that we really have a different kind of pandemic phenomena right now, much more transmission, more cases, even though they're not being reported. What this really means is that we are seeing basically a substantial reduced severity of illness, which again, in the end, some of us have said all along, we can't go for zero COVID, but wouldn't it be great if we could go for zero COVID deaths? And I think that's what we really need to consider right now. Among those 318 that are dying per day, how many of those would have died had they been fully vaccinated or had access to an antiviral drug? And so this is where I think we need to concentrate on. So let me just conclude where we're at by saying we still don't want to get COVID. I remain very concerned about the issue of long COVID. What would that mean to get that? There are a number of you listening to this podcast who I know are experiencing long COVID. You know what kind of hell it can be. So I'm not even satisfied just getting a mild illness because I don't know if that's going to result in long COVID. I do know my vaccine status is going to help protect me against long COVID even if I do develop COVID itself. But I don't know. But let me leave you with one last point, and this is the unsatisfactory answer to this question. I don't know what's going to happen next. Will we see a new variant that will fundamentally change all of this and take us to a new place? I don't know that. And that's the unknown that leaves this answer so unsatisfactory.

**Chris Dall:** [00:32:13] The current wave of cases in the U.S. and the uncertainty about the real numbers has a lot of people criticizing the CDC's COVID Community Levels Map, which currently indicates, based on hospital admissions and hospital capacity, that more than 81% of U.S. counties have low COVID community levels. So Mike, the CDC switched to this metric in late February, saying that the rationale was at this point, hospital capacity can serve as a better signal for how bad a local outbreak is than can cases. But is that metric now giving us a false sense of what's going on?

**Michael Osterholm:** [00:32:46] Well, first of all, let me defend the CDC in the sense that they were trying to find a way to measure what I was just talking about. One, that actually addresses how many infections are occurring in the community. And number two, what is the impact of those infections in terms of severe illness, hospitalizations and deaths? And I think we would all agree we could have widespread transmission of community of disease X like the common cold and it's a little public health consequence because virtually no one dies from it. On the other hand, we can have a virus that, as we saw earlier in the pandemic, only infects a small percentage of us at any one point. But the severity of the illness is really very, very real. And it causes us to actually have challenges with providing health care. Well, in those two scenarios really are what this is all about is try to find a way to describe how much transmission and what's its impact. And so I have to, I think, cut CDC some slack here. But it also means, as you pointed out, many people misunderstand these various measures and have come to the conclusions we're done. So if you look at CDC's Community Level Map and compare it to the Community COVID Transmission Map, these are two different ones, you'll see very, very stark differences. The two maps are based on the different metrics I just mentioned, and it's obvious these metrics impact the picture that is painted when you look at them side by side. Interestingly, on the website, the CDC has a statement that reads, and I quote, "The CDC recommends the use of COVID-19 Community Levels to determine the impact of COVID-19 on communities and take action. Community transmission levels are provided for health care facility use only" unquote. So their new Community Levels Map characterizes the COVID levels in communities as either low, medium or high, which appears as green, yellow or orange respectively. The high, medium, low gradient is first based on whether the number of new cases per 100,000 population over the past seven days is 200 or more. And then either the seven day total of new hospital admissions per 100,000 population or the seven day average percentage of inpatient beds being used by COVID-19 positive patients, depending on which of these two is higher. So if a county had fewer than 200 reported cases per 100,000 and fewer than ten new hospitalizations per 100,000 or less than 10% of their patient beds being used by COVID patients, they're considered at low risk. If they have more than 200 cases per 100,000, they're either medium or high level, depending on if there are ten or more new hospital admissions per 100,000 or if more than 10% staffed beds are being used by COVID patients. As we've discussed, the case numbers that are being reported, cannot be trusted today. So basing community COVID levels on the case numbers that are being reported means that the map also cannot be trusted. I don't have any faith in this map, but it's not a function that the CDC is trying to misrepresent the data. It's just that things have changed dramatically over the course of the last 4 to 6 months with regard to testing, availability of testing, people's willingness to be tested and those results getting reported. So as far as I'm concerned, I think this is a huge challenge. So for example, the CDC's Community Levels Map for last week showed that 82% of counties in the U.S. have low levels of COVID-19, 14% had medium and only four had high levels of COVID-19. Eric Topol mentioned this overwhelmingly green map in his essay, writing that the CDC propagates delusional thinking that community levels are very low. Or, as my friend Peter Hotez called the Field of Greens, while the real and important data convey that transmission is very high throughout most of the country. I fully agree with Eric and Peter. We are seeing major transmission. This map is no longer relevant. It's providing a false sense that the pandemic is over. This is so far from the truth, and the CDC's own transmission map illustrates this. The Community Transmission Map shows a completely different picture. In this map, transmission risk is characterized as low, moderate, substantial, or high and appears on color gradients low being blue, moderate is yellow, substantial is orange, and high is red. Transmission risk is determined by two metrics, the number of new cases per 100,000 in the past seven days and the percentage of positive tests that are being done in the past seven days. If these two do not match, the higher level is the one selected. While the community transmission map shows that 52% of the counties, which is the majority of counties in the US, have high levels of community transmission based largely on the testing data. 16% are substantial, 22 moderate and just nine are low. The map is largely red and orange, a vastly different picture than the nice pretty green one that the CDC recommends that the public look at to determine the impact of COVID on their community. This second map is far more realistic in terms of depicting the current state of the pandemic in the U.S. So yes, these metrics do provide a false sense of hope that could ultimately be very dangerous in terms of the public's perception of what they need to do to protect themselves. We need to be careful with our messaging and basing risk assessment off unreliable metrics is certainly not the way we want to go about it. I wish CDC would address this as soon as possible and help us all understand what we're all experiencing right now. COVID seems to be everywhere.

**Chris Dall:** [00:38:40] The FDA this week authorized booster doses of the Pfizer-Biontech COVID-19 vaccine for children ages 5 to 11. For parents who've been waiting for this authorization, this is clearly good news. But Mike, is it going to have much impact?

**Michael Osterholm:** [00:38:55] Well, as you pointed out, Chris, this is good news for families who have been eager to get their children boosted. And I surely don't want to minimize that. But on a population level, it's a different story. So few children in this age group are vaccinated with even one dose, which is a far bigger issue, and that this authorization does absolutely nothing to change that. As of Tuesday, 35% of children in the US between the ages of 5 to 11 have received one dose of a COVID vaccine, and only 29% have received two doses, which we would consider to be fully vaccinated at this point. This is a very low rate considering that vaccines have been approved for this age group since early November. And it's unlikely that this announcement regarding boosters will cause a major change in the initial vaccination rate. According to a survey done by the Kaiser Family Foundation, 32% of parents of children in this age group say that they will definitely not vaccinate their children, 12% say they will only vaccinate their child if it is required for school, and 13% have said that they are waiting to see more data becoming available before deciding but as of right now, they are not planning on vaccinating. Even among the 29% of children in this age group that have received two doses, we cannot guarantee that at all they will get a booster dose. Currently, only about one fourth of those eligible 12 to 17 years of age have gotten a booster, and we don't have much of a reason to believe that the rate would be drastically higher in the 5 to 11 year old age group. With so few children in this age group fully vaccinated and many of them unlikely to receive a booster dose, I don't think that the authorization for boosters will have a significant impact on the population level, at least yet. That is not to say that vaccinations has not been effective in preventing severe outcomes in this age group. It has. According to a report published in the CDC Morbidity Mortality Weekly Report in April, the hospitalization rate in unvaccinated 5 to 11 year olds was two times higher than the rate in vaccinated 5 to 11 year olds. This all occurred during the Omicron surge. Additionally, of the 400 children age 5 to 11 that were hospitalized with COVID from late December through the end of February, nine of ten were unvaccinated. Now, to reconcile these numbers, what I just mentioned about the rate only two times higher for hospitalization among the unvaccinated. The reason that this is such an impact is so many of the kids are in the unvaccinated group. That's why nine of ten who are hospitalized are unvaccinated. Vaccines have made a significant impact on the individual level in the age group in preventing serious outcomes. And it is likely that booster doses will provide some additional protection for these children, at least for the short term. But since such a small percentage of 5 to 11 year olds will actually receive three doses, we should not expect to see major changes in the overall number of cases, hospitalizations and deaths in this age group. This is just another example of how we cannot boost our way out of this pandemic. It does not mean that parents should choose not to get their 5 to 11 year olds vaccinated with a third dose. These are still safe, effective and remarkable vaccines. But until we see a higher rate of 5 to 11 year olds fully vaccinated with two doses, we cannot expect to have a major impact at a population level.

**Chris Dall:** [00:42:28] That brings us to this week's COVID query, which is from Jen, who has a question about when an infected person can leave isolation. She wrote, "Three out of five members of my immediate family have come down with COVID recently, our first time after months and years of doing everything to avoid it. My question is about returning to society. According to the CDC website, there's a formula to figure out when you can leave isolation and then masking all based on symptoms and fever. Our local health department advises based on the date of your positive COVID test. In my case, I had symptoms way before a positive PCR test. Another friend is still testing positive via antigen test ten days after positive PCR results. Is he still positive?" So Mike, I will note we're getting a lot of similar questions from many listeners. And anecdotally, I'm hearing about a lot of people who continue to test positive on rapid antigen tests well after their symptoms are gone. That was my own personal experience. So what can you tell Jen?

**Michael Osterholm:** [00:43:22] Well, first of all, thank you, Jen, for this very, very important question. It's one that we get often. But let me just preface it by saying this is not rocket science. That's a lot easier. This is tougher than rocket science. So for me, I will try to give you the best shot I can at trying to understand this. There's a lot going on in this question. And let me try to break it into parts. The two primary issues which I think I need to address seem to be one, how long am I infectious to others and therefore should isolate? And two, what are rapid tests telling us about our ability to transmit to others? I'll start by discussing what we know about how long someone may remain contagious or infectious after contracting COVID-19. This is critical in public health recommendations and individual decision making, but it's also something that has been really difficult for researchers to pin down. PCR testing, which accounts for most of the reported COVID testing, is meant to detect pieces of genetic material from the virus. A positive test indicates that it found fragments, but it does not necessarily mean that those fragments are actually part of a live virus. You need that to before you can infect others. Think of it like weeding a garden. You can go through and pull up the weeds by the roots and put them in a landscaping waste bag in your backyard. You technically still have the plant on your property, but now that it's pulled out of the ground and collected, it won't continue to grow in your garden beds or spread to your neighbor's yard. PCR tests can tell us, yes, there are fragments of COVID-19 virus in your body, but we can't distinguish whether it is a dead piece that your immune system is still getting rid of or a live virus continuing to spread within your body. In contrast, a virus culture, a type of specialized test to look at whether there is whole virus that is still active is far less common in clinical and research settings, virtually impossible to get. Because of this, most studies are only telling us about how long a PCR is finding fragments, not whether they're active. The studies looking at viral cultures often have very small sample sizes. Despite these limitations, we have learned some things about the length of time someone with COVID may infect others. Studies on sub samples of the population show that most people are infectious for a little over a week after the onset of their symptoms, usually between 8 to 10 days at most. For those without symptoms, the best benchmark we have is someone's initial positive test. Now, there have been many factors that can influence how infectious someone is and for how long. We have evidence that people who are vaccinated are somewhat less likely to transmit the virus to others. People that are asymptomatic also seem to be less likely to transmit the virus compared to someone experiencing symptoms. But there's still enough evidence to know with certainty that they can and still do transmit SARS-CoV-2. This is less relevant for pre-symptomatic people. The period of time from a few days between when someone who actually gets infected with the virus and when they start to experience symptoms can be a prime time to transmit the virus, considering the person is likely unaware they've been infected. The takeaway is that while vaccinations and lack of symptoms may decrease the likelihood of infecting others, they do not eliminate that possibility. Finally, we know that some people who are immune compromised may be infected with a live virus for a longer period of time and can last at least 20 days or more. Each new variant throws a wrench in our understanding of how easily people can transmit the virus to others. Average duration of the virus and how easily it can transmit to others look different a year ago than it does today. Delta was more transmissible than Alpha, and now Omicron is more transmissible than Delta. Differences in immune escape for each variant play a role as well. I want to stress that there's not a universal magic number in how long a person is contagious. To truly pin down whether someone has active virus that they can infect others, we need to take viral cultures. As I noted, this is a specialized test that can only be done in very few laboratories and takes multiple days. Therefore, it's not a great option for individuals, let alone an entire population. PCR tests can remain positive for months after an infection when we know an individual is no longer infectious. So that it is not an option for determining whether someone is contagious either. This leaves the rapid antigen testing, which is far from perfect, but may actually have some utility in this area. This difficulty is in part because antigen tests are not nearly as sensitive when viral load is low. According to a study published in scientific reports, though antigen testing sensitivity was near 100% for patients with a high viral load, it was less than 40% for patients with low viral load. This study, as well as other studies I will reference in a moment, measures relative viral load using a cycle threshold or CT value. A CT value is the number of PCR cycles needed in order to get a positive test. The more cycles you need, the less virus that was there to begin with. A relatively low CT value means fewer PCR cycles were needed for a positive test, much more virus present. In general, this indicates the viral load is relatively high. A higher CT value means that the more PCR cycles were needed, so the patient's viral load is estimated to be lower. As I mentioned, antigen tests don't perform as well when there is low viral load. It is important to note that the low viral load at which antigen test sensitivity begins to decline rapidly is still high enough that individuals who are at least somewhat likely to be infectious. This is where things get complicated. There is no specific CT value that provides an exact cutoff for optimal sensitivity. It is a spectrum where sensitivity gradually declines. Similarly, there is no cycle threshold value that definitely tells us whether a person is or not infectious. We know that high viral load or low CT value is associated with an increased ability to transmit the virus. But researchers have not yet been able to quantify this with an exact CT value. Omicron also seems to be able to infect and transmit at lower doses of viral load than variants like Delta. Especially in the age of variants, we cannot look at a CT value alone and definitively say how infectious that person is. Still, we have gained some insight from studies that have been done so far. For example, a preprint study that we referenced in Episode 99 found that the sensitivity of antigen tests within 24 hours of a positive PCR test was nearly 100% for CT values below 25, 67% for CT values between 25 and 30 and only 18% for CT values above 31. Estimates for the maximum viral load required for a person to be infectious vary from study to study, but most agree that someone with a CT value below 30 is likely infectious. After that point, the probability of someone being infectious begins to decrease, but may still be substantial. Some suggest that the probability of being infectious does not decline significantly until a CT value of 32. And others suggest it could be even higher than that at 35. So what does all this mean? It seems like a lot of mumbo jumbo, in a way. Well, as I said, it's complicated. And the one thing that I can be certain of is that the result from a rapid test does not guarantee anything. However, we can make some generalizations about what is probably true. We know that most likely, if you test positive on rapid test, your CT value is probably below 30 because beyond that point, the sensitivity of these tests is fairly low. We also know that when a CT values are below 30, the general consensus is that your viral load is high enough you're probably still infectious. Though again, it is difficult to guarantee anything with 100% certainty. This indicates that a positive rapid test means you are likely still infectious, but it is not definitive proof of infectiousness. That said, since these tests are only approximately 67% sensitive for moderate viral load levels, when someone is very likely still infectious and less than 20% sensitive for low levels for virus loads, where we estimate some people still may be infectious, we certainly cannot use these tests as proof that someone is not infectious. Again, even though a positive test means it's likely that someone is infectious, these tests are not sensitive enough so that we can say is like someone with a negative test is probably not infectious. We have said time and time again on this podcast that these rapid tests are not perfect. And I want to stress that we still have a lot to learn about viral load, antigen test sensitivity, and the ability of someone to transmit this virus. But using the data we have now, we can conclude that is probable, although not 100% guaranteed, that an individual who is still testing positive on a rapid antigen test may be able to transmit the virus. The question you were asking about in the very beginning. Just to note, the federal government is now offering a third round of free rapid antigen test to all Americans through the U.S. Postal Service. For those in rural areas or those who otherwise lack access to affordable PCR testing, these tests are likely better than nothing. They may even be helpful for those unsure of whether or not they are still infectious after their five day isolation period. We simply cannot view them as definitive proof as to whether someone is or is not infectious. In addition to the uncertainty surrounding the relationship between viral load, infectiousness, and the sensitivity of rapid antigen tests, there are even more aspects of this issue that remain unclear. We don't know why certain individuals are superspreaders. It is likely viral load and or longer duration of infectiousness that could be playing a role here, but we don't know the extent of this nor do we know why some individuals have higher virus loads or longer durations of infections than do others. We also have no idea what any of this means in the context of a future variant. Will our rapid tests be more sensitive for a Pi or Sigma or variant of the future? Or will they fail to detect cases with more moderate levels of viral load? Will we see a short duration of infectiousness, or will individuals continue to shed live virus for a longer period of time than they do now? We don't know. It is becoming increasingly difficult to learn about this topic. Contact tracing programs for COVID-19 are rapidly disappearing, making it harder to identify who are superspreaders. Further, with increasing reliance on rapid antigen tests, we are missing out on significant public health data, more sensitive results, reliable reporting, and CT values that point to viral load. Even if we can identify superspreaders, we may not have much useful data to help us solve the many unanswered questions I have raised. So this is a lot of information. So I want to close with some very practical points. If unfortunately you are a close friend or family member contract COVID-19, it may be best to isolate for more than five days from your symptom onset or if asymptomatic, your first positive test. As we discussed, there's no magic number of days that each person is infectious that I can give. One measure that is reliable is the continued significant symptoms. If you're on day six or seven, since you've come down with COVID, you still have a high fever or cough, it's best to stay home and rest. Rapid antigen tests may also be a helpful tool here, but they cannot provide definitive proof as to whether or not you're infectious and should continue to isolate. I also want to acknowledge that isolation is an equity issue where you factor in access to sick leave, caretaking responsibilities, and lost wages. So I don't want to lose that nuance. But best infection control practice for our infectious diseases say stay home if you're sick. I wish I could have provided a more clear cut answer to this query, Jen, but I hope this at least gives you a sense of what we do and don't know about this issue and how to use this information to guide your decisions about isolation.

**Chris Dall:** [00:56:17] Mike, on a lighter note, where is our latest beautiful place submission from?

**Michael Osterholm:** [00:56:22] Well, I'm very happy to share with you a beautiful place that actually came from Nancy. This is one that was sent to us several weeks ago, but is now just being able to get it to the podcast. And Nancy sent a very long, thoughtful note. So I've just abstracted a small part of it to share with you what is, in fact, her wonderful, beautiful place. So, Nancy, thank you. She wrote, "You've included so many beautiful places, so I'll offer up one. My dad passed away after a long illness, and many drives to see him led me to a halfway point in the Oregon Cascades. He died in February 2020, and like so many families, his funeral was not held until July 2021. Some of my darkest Zoom cave times. I'd stay a week in this area to recharge. I wish you all time and place to heal in peace. Growing up in Minnesota, so yes, -20 to 25 degree temperatures makes a lot of sense to me, gave me a love of snow. Here are some of my hike views, mountain chickadees singing overhead from the Oregon Cascades near the Pacific Coast Trail December 2020 and February 2022. Nancy." Simply beautiful pictures. And Nancy, we're so sorry about the loss of your father. And thank you so much for sending not only just this beautiful place, but the rest of your note. And I urge everyone to go take a look at the pictures that Nancy has shared with us. They're simply beautiful. Thank you, Nancy.

**Chris Dall:** [00:57:56] And just a reminder to our listeners that if you have a beautiful place you want to share with us, a place that has provided solace and comfort for you during the pandemic, and it does not have to be a physical place. Please email us at osterholmupdate@umn.edu. Also with the nation now surpassing 1 million deaths from COVID-19. We'd love for you to tell us something about a special person, a loved one or friend, a neighbor or coworker who you've lost during the pandemic. We're calling these messages, celebrations of life. Again, you can share those with us at osterholmupdate@umn.edu. Mike, what are your take home messages for today?

**Michael Osterholm:** [00:58:34] Thanks, Chris. Again, I have three take home messages I think have been illustrated in this podcast. Number one, the transmission of SARS-CoV-2 in North America is simply remarkable. Right now, I know more people infected than I have at any time in the entire pandemic. This has been demonstrated time and time again by friends and colleagues who will tell you the same thing. And this is not just in one region of the country. This is throughout the United States. But as I pointed out and point two is that if you look at hospitalizations, ICU bed use, and deaths, we are seeing a very different kind of pandemic, one with less severe illness, which is really great news. Now, we haven't addressed, however, even among these milder illnesses and for people who have been previously vaccinated, what is the rate of long COVID? So yes, I may have a mild illness, only be out with flu like symptoms for several days before I start feeling better. But I will be very interested to know what does your health picture look like 3 to 6 weeks from now, or for that matter of 3 to 6 months? So I think the issue is much better clinical outcomes right now. I still don't understand the issue of long COVID. And then finally, what is our strategy? We've talked about the CDC maps that they've put up. We've talked about the fact that we really have a different kind of pandemic on our hands right now. And I think for the short term, as I said before, I think we aren't here for a zero-COVID policy, but I surely could support a zero COVID death policy where we make every effort to continue to get people vaccinated, fully vaccinated, using the definition with the boosters, not just two doses. And that we make every effort to get people access to health care quickly who are at high risk for serious illness. And that includes the availability of the antivirals. Wouldn't that be something if we could see here and then be able to export that to the rest of the world? A zero COVID death policy. So I think this is a huge point. Now, I'm going to leave this, though, because all three of these points will be influenced by what are the variants going to do? Will we see a new variant? Will it have a big change in terms of its infectiousness and its ability to evade immune protection? We don't know. Just remember, for everyone who tells you they know what's going to happen six months from now. It was six months ago that Omicron was first emerged, and at that time no one had any idea what the next six months would be like. Well, then think going forward, what the next six months could be like. And anyone that tells you they know, be careful, they probably have a bridge to sell you too. And unfortunately, we are seeing a lot of bridge sales in recent days.

**Chris Dall:** [01:01:28] Mike and I believe our closing song this week is recommendation from a listener.

**Michael Osterholm:** [01:01:33] Chris, this is a really very special one for me, and I'll explain more in a moment. This actually came from Sue, who is a routine listener of the podcast wrote us a very, very kind and thoughtful email and with a song suggestion. And let me just share with you what Sue shared with us about why this song is so special. And then I'll relate a more personal note to this issue. Sue wrote, "Loss is hard to deal with, whether it's the loss at the end of a long and well-lived life, but especially if it's an untimely and senseless loss. As for me, I find that a balm for loss can be gratitude. And there's a song that's been going through my head for a few weeks that I want to share with you all, because it's about gratitude for the special people in our lives. The song is from the musical "Wicked," and it's a duet sung by the characters Glinda and Elphaba. In the original Broadway production, they were played by the wonderful musical actors Kristin Chenoweth and Idina Menzel. Death at any time can be so difficult to accept, especially the senseless death from an illness like COVID. The loved ones we have lost are always on our minds and in our hearts. And during this melancholy time in human history, I find the words of this song to be particularly comforting. I would think that others might feel the same." Thank you very, very much, Sue, for this very thoughtful suggestion. Now, let me just share a bit with you about "Wicked." I think most of you have probably have either seen it or at least definitely have heard about it. But "Wicked" is a musical and the music and lyrics by Stephen Schwartz and based on a book by Winnie Holzman, is based on the 1995 novel "Wicked: The Life and Times of the Wicked Witch of the West," based on the characters and setting of the classic 1900 novel "The Wonderful Wizard of Oz" by L. Frank Baum and the 1939 Metro-Goldwyn-Mayer film "The Wizard of Oz." The musical is told from the perspective of and focuses on the witches of the Land of Oz. "Wicked" opened to the production stage in San Francisco in May of 2003 at the Curran Theatre. Shortly thereafter was brought to Broadway and in 2006 opened in the West End of London. On October 28th, 2019, with its 6,681st performance, it surpassed Les Miserables to become Broadway's fifth longest running show. In short, this particular musical also means a great deal to me, as I had the opportunity in 2008 through a series of crazy events which I'll not get into to actually perform in all three acts of "Wicked" on Broadway. And I've attached the pictures from my performance on Broadway in 2008 in "Wicked" here you can take a look at it. So this particular moment means a great deal to me as having a very close connection with "Wicked" on Broadway, with the production team and the actors and actresses. So let me now share with you the song that Sue suggested is called "For Good." Again music and lyrics by Stephen Schwartz. "I heard it said that people come into our lives for a reason, bringing something we must learn, and we are led to those who help us most to grow. If we let them. And we help them in return. Well, I don't know if I believe that's true, but I know I am who I am today because I knew you. Like a comet pulled from orbit as it passes a sun, like a stream that meets a boulder halfway through the wood. Who can say if I've been changed for the better? But because I knew you, I have been changed for good. It may well be we will never meet again in this lifetime. So let me say before we part, so much of me is made of what I learned from you. You'll be with me like a handprint on my heart. And now, whatever way our stories end, I know you have rewritten mine by being my friend. Like a ship blown from its mooring by a wind off the sea. Like a seed dropped by a sky bird in a distant wood. Who can say if I've been changed for the better. But because I knew you. Because I knew you, I have been changed for good." Stephen Schwartz. This song to me is all about this podcast in many ways, the friends that we've made, the friends that we share. You all have had such an impact on changing us as members of the CIDRAP podcast team. We've learned so much from you. I hope that we've been able to be your friend and in turn we all helped each other get through this pandemic. And just as I started with this podcast today, remembering all those who have died and all those left behind who continue to suffer. This song reminds us all of how important it is by who we've been touched by, what they've done for us, and how we must appreciate them to really understand the beauty of friendship. So thank you so much for being with us again today. It means the world to have you with us as part of the podcast family. As I say, weekly and wish you the best. But be kind. Be kind. It's getting harder and harder. In days of frustration, days of uncertainty, be kind. Be thoughtful. And thank you so much for being with us. Thank you.

**Chris Dall:** [01:09:13] 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 Sydney Redepenning, Cory Anderson, Angela Ulrich, and Meredith Arpey.