# Episode 105: COVID-19, Monkeypox, and Pediatric Hepatitis

**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. With a third COVID summer rapidly approaching, the US is experiencing a rather bumpy ride on the path to the new normal. Reported COVID-19 cases are rising across the country, and most experts agree that the true number of cases is likely much, much higher. Anecdotally, it seems hard to find people who haven't had COVID recently. It's not shaping up to be the COVID free summer many of us were hoping for. We may very well be in another viral blizzard just like we were in December and January. And that means more severe illness and deaths are coming. At the same time, neither hospitalizations, ICU admissions, nor deaths appear to be rising in a rate anywhere near where they were in the winter. And when you look around, no matter where you are in the country, it seems like many people have moved on, that the threat of COVID-19 has become an acceptable risk for many for the return to normal life. Is this what the new normal looks like? And what's the next chapter in this story? That's what we'll be discussing on this May 26th episode of the podcast as we assess the state of the COVID-19 pandemic in the US and around the world. We'll also provide an update on COVID-19 vaccines for the youngest children, answer a non-COVID query about the monkeypox outbreak, 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:** [00:02:05] Thank you, Chris. And welcome back to all of you to another episode of the podcast. As we say every week, for those who are members of the podcast family, we so appreciate you being with us. For those who may be new, I hope that what we can share with you here today is helpful and puts into perspective that introduction that Chris just shared with you. Where are we going? What's happening? But before I address anything here it is with such a heavy heart that I feel I must say something about what has happened in this past week in Texas, what happened last week in Buffalo, what happens every day on the streets of this country, and that is firearm related deaths. For everyone who is listening to this, who is a parent, a grandparent, an aunt and uncle, a neighbor, a friend of young children your hearts are surely heavy and filled with tears. And anyone who has listened to this podcast over the last several years knows that from time to time I've shared insights into my personal life. And one of those insights was I was the oldest of six children, born to an alcoholic father who was extremely violent. I can tell you the pain that never goes away of being afraid with seeing the kind of violence that one human can inflict upon another. And for all of those families today who have lost loved ones, who have lost their future, their hope, their dreams, this podcast never could begin to even address a scratch on the surface of what you're feeling. But today we actually dedicate this podcast to you the grievers, the people left behind, the people who have survived but have done a great cost emotionally and physically. It's senseless. You know, we're fighting a virus that is on the other side. But this violence is us. We're fighting us. And I just have to take a step back, catch my breath, wipe my tears, and just say to all these families, we're so sorry. We are so sorry. Now, it's hard to make a transition from that, and I won't make a very good transition. But I think at the end of every dark tunnel has to come some hope, has to come some light. Maybe the horrible events of Texas and all that have preceded it will be enough for this country to make a move to deal with gun violence. I don't know what else it needs to understand the critical, critical actions needed to reduce gun violence. But so for that light at the end of the tunnel, maybe it's fitting that this week we talk about the light and the ever increasing amount that we see. Here today on May 26 in the Minneapolis-Saint Paul metropolitan area, we will have 15 hours, 15 minutes and 17 seconds of sunlight. A substantial increase of 15 plus minutes, even just from last week. And we're now within 20 minutes of our summer solstice and the longest day of the year here in Minneapolis-Saint Paul. May this be a sign of something that is yet good going to come out of all this pain and tragedy. Just some little nugget of hope. This is the light. And we must celebrate it. Never forgetting never, ever wanting to forget. Always wanting to cherish those who we've lost, who we love.

**Chris Dall:** [00:05:52] Mike, let's start our international discussion again this week with North Korea. With the acknowledgment that it's difficult to really know what's going on there, given the government's lack of transparency, what is the latest on the outbreak in North Korea?

**Michael Osterholm:** [00:06:06] Well, Chris, I think difficult is a very fitting term that can be used to describe so many different parts of what's happening with COVID in North Korea. It is a disaster. Of course, there's the upfront challenge of trying to understand with some certainty the levels of morbidity and mortality that they're seeing from this virus, which is clouded by the lack of transparency that you mentioned. However, at the same time it is a country that doesn't have the resources or ability to conduct wide scale testing for COVID. So there are multiple factors that limit our understanding of the complete situation there. And I think what's been reported there over the past week really illustrates that notion. Remember, this is a country that in previous years experienced severe famine and many, many thousands and thousands of deaths that they actually kept somewhat secret from the rest of the world. Of course, a number of confirmed cases from this outbreak, which is described as explosive, have been identified and officially reported as Omicron. However, most of these cases aren't necessarily being confirmed since they lack the testing capacity and are instead being reported as fever. Now, according to sources in South Korea, some of these unspecified cases of fever could be linked to diseases like measles, typhoid and pertussis, all which are endemic in North Korea. However, the vast majority are almost certainly COVID. As you know, Omicron's initial arrival into the population is synonymous with widespread infection. So that no doubt explains the explosive nature of the outbreak there. And while this isn't necessarily new or surprising information, I just wanted to reemphasize the point that we touched on in last week's podcast and that in Omicron's arrival in North Korea is notable because that significant vulnerability that exists there. In fact, even with all the damage that this virus has done worldwide to date, I'm not sure we've seen another example equivalent to what likely could and will be happening in North Korea. Of course, when Omicron first emerged in North Korea, there was really no previous exposure at the population level that existed anywhere. Well, as we know, the original version of the virus was plenty capable of spreading. However, in some ways, the original version of the virus, at least from a transmission perspective, almost seems slow relative to what we now see with Omicron. In fact, it kind of feels like comparing the top speed of a Model T to that of the latest sports car. Omicron has largely been in a league of its own. Nonetheless, while we've seen it spread widely in country after country, including those with notable levels of immunity on a population scale, that previous exposure, whether it occurred via vaccination and/or prior infection, helped limit the severe disease and death that would have occurred otherwise. We'll be talking more about that in a moment as we talk about other international and national aspects of this Omicron surge. Now, that being said, Omicron has resulted in significant amounts of severe disease and in many places, including Hong Kong and even the US. Why would it be different in North Korea? Of course, in Hong Kong, which had largely contained COVID prior to Omicron's arrival, previous exposure was less of a factor, and they were instead banking almost exclusively on vaccines. Now, if there's really high vaccine uptake across the population, particularly among those groups most at risk for bad outcomes and additional doses aren't glossed over, then this approach could provide a solid barrier that limits hospitalizations and deaths. However, as we saw with Hong Kong, where just one third of elderly residents were fully vaccinated, Omicron spread in a population that hasn't effectively shielded its most vulnerable members, can result in an unprecedented amount of pain, suffering, and death from this virus. So with North Korea, we're really talking about dropping the sports car version of the virus into a population of 25 million with no previous exposure through prior infection or vaccine, a considerable amount of risk factors, including severe malnutrition and virtually no access to extensive health care. In fact, if it helps put things into perspective, the country provided a voluntary review to the United Nations last year in which they reported that only about a third of the entire population has access to electricity. So unfortunately, Chris, I don't see a situation where this virus, especially in the form of Omicron, doesn't create a major challenge for North Korea. That being said, we're largely left guessing as to what actually is going on there. After reporting at least 200,000 cases of fever a day for a week, including a total of around 390,000 last Monday, the country is claiming the activity has now peaked, representing a positive trend in the situation. In fact, as of this Tuesday, the country reported just over 134,000 cases of fever, extending a streak of several days with less than 200,000 cases. In addition, it reported zero new deaths on Tuesday, marking the first time that this has happened since they first acknowledged the outbreak on May 12th. So when you add up all these reports over the past several weeks, you find that the country has officially documented almost 3 million cases and yet less than 70 deaths over the past month. Of course, even as a lagging indicator, the death toll is unbelievably and I believe, not believably low. For example, although it's not an apples to apples comparison, by the time the US reported a cumulative total of 3 million cases on July 8th, 2020, deaths were at more than 130,000. As you know, Omicron wasn't dominant in July 2020, so the virus was a bit different. But this was also a time when the American public had virtually no previous exposure to the virus and vaccines weren't available. The conditions now being faced in North Korea. So notwithstanding the difference in testing, you can see that 3 million cases I believe, should lead to plenty more than 70 deaths. In fact, even if you use South Korea as an example of what Omicron can do in a population that has notable levels of vaccine uptake. It doesn't take long to realize that the death toll being reported out of North Korea doesn't align with any sense of reality. Again, it's not a perfect comparison, but you can see that South Korea reported just over 3 million cases of COVID from early January to early March of this year, representing about two months time. In that same amount of time, they reported more than 3,000 deaths. Additionally, if you factor in the weeks and months that followed, you can see that around 75% of South Korea's overall death toll from the pandemic, which currently sits at 24,000, were likely due to the Omicron surge. And notably, this is a country where more than 86% of the residents were fully vaccinated and more than 60% of the country had received an additional dose. So again, North Korea's claim of less than 70 deaths despite 3 million suspected cases is simply nonsensical. In addition, I find it hard to believe the cases are actually on a decline there. Again, it's been just two weeks since they first acknowledged the outbreak, and even if it started taking off in late April, I really don't think they've hit a true peak in just a few weeks time. Of course, they did announce a lockdown in response to the outbreak, but we've seen just how long it can take lockdowns to make any notable difference. Ask the Chinese. And at the very least, even if one does consider the possibility that things are somehow already improving there. There's a sense that the country's numbers, again, which have a number of inherent limitations already, are largely indicative of what's happening in the larger metropolitan areas of North Korea. In other words, activity in many parts of the country, especially the rural areas, isn't necessarily being represented in these official numbers. So Chris, in short, the moral of the story is that the numbers being reported out of North Korea should be taken with a grain of salt. And while I hate to speculate, I don't see a situation where Omicron isn't wreaking havoc there. And that is so painful to see.

**Chris Dall:** [00:14:02] Are there any other notable trends you're seeing in other parts of the world, Mike?

**Michael Osterholm:** [00:14:07] Well, Chris, from a global perspective, it seems like we've reached a point these past several weeks where cases are no longer declining but are rather staying fairly steady. And of course, I always preface any of these comments about how complete is reporting in any one country, and what does that mean in terms of interpreting the numbers? If you look at this current level of overall stability of cases reported worldwide, it hasn't existed at this level since basically November of last year. Otherwise, since then, we saw them shoot up from 4 million cases reported a week to 23 million cases reported a week in a span of just a couple of months from the initial Omicron surge. Then they dropped to around ten and a half million cases by late February before bouncing back up to 12.8 million by mid-March and then dropping yet again to just under 3.7 by early May, which was just a few weeks ago. In two weeks since then, weekly cases have stuck around 3.8 million, which is largely due to rises in the Americas and Western Pacific, offsetting case declines in other regions. So we've had a few weeks of overall case stability now. At the same time, deaths have only continued to decline, which is a trend that really began in mid-February. In that span of time, we've seen weekly deaths go from over 77,000 to less than 10,000 as of last week. So from a mortality standpoint, the global situation with COVID is continuing to improve. But of course, as this pandemic has reminded us, things are subject to change. And while that's always exhausting to hear, it's a reality we need to acknowledge. So that being said, there are just those select locations that stand out for one reason or another, which I continue to monitor a little more closely. Again, at no surprise, China is still up there on my list of concerns and despite their reports of slow but steady case declines overall, I continue to believe that they're in a very precarious position. I hate to sound like a broken record, but the constant cropping up of cases there across numerous cities and provinces is a reminder of the ever present threat that exists to their zero-COVID approach. As of right now, they claim that cases are continuing to shrink in Shanghai, which has been under lockdown for two months. And although they've announced some plans for reopening, which will reportedly take place throughout the month of June, they're fairly opaque from what I've seen, and it could be a slow going process. Of course, the reason they've taken this very careful approach stems from the idea that the city is still highly vulnerable to the virus. So it's not as if this is the end all or be all for outbreaks there. It could be days, weeks or months before they uncover more cases. In fact, that's what's happened in the city of Tianjin right now. Back in January, the city had an outbreak that led to restrictions in which the ripple effect impacted supply chains for companies like Toyota and Volkswagen. Eventually, that outbreak was controlled. However, they're now seeing cases again and have locked down a central district of the city as a response. Meanwhile, the pattern of several dozen cases being reported out of Beijing on a daily basis continues, despite the ever tightening restrictions implemented there throughout the past month, which includes stay at home orders in a number of select districts. And while the country's commitment to this approach doesn't surprise me, I'm still taken aback at how seemingly one dimensional it is. So I keep wondering what are they doing to resolve the reasons or vulnerabilities causing them to resort to lockdowns in the first place? In other words, are they committing to campaigns to vaccinate the elderly, with as much effort as they're putting into these lockdowns? Why are they not doing that? Well, in Shanghai, the vaccination rate for 60 plus year olds, which sits at around 62%, hasn't changed since March. So I fail to recognize what the cities and the country's long term plan or strategy is. Otherwise, another country we've been keeping an eye on is South Africa, which has had a wave of cases linked to be BA.4 and BA.5 sub-variants of Omicron. As a quick recap, they saw cases grow from 1,200 a day in mid-April to 7,700 cases a day in mid-March, so in around a month's time. However, since May 11th, cases have dropped to 5,400. So it appears that the potential BA.4, BA.5 peak that I mentioned in the last week's episode was authentic. And the good news is that hospitalizations and deaths in the country have remained low so far, even compared to previous waves with Omicron. At the same time, we might be seeing another BA.4, BA.5 driven surge in Portugal. Cases there have gone from under 9,000 a day to more than 18,000 a day in just a couple of weeks, which has coincided with the rise in frequency of these sub-variants, particularly BA.5. Although publicly available sequencing that I've seen to date is somewhat sparse. In addition, a growing number of cases there are thought to be reinfections. However, some gaps in reporting and testing make it difficult to understand exactly what's going on. Otherwise, hospitalizations have risen slightly in recent weeks, going from 1,100 to 1,500, but the overall level remains relatively low compared to previous surges. So in short, stay tuned. Hopefully, any uptick in cases that might be seen won't be followed by a significant rise in hospitalizations or deaths. But in the meantime, I maintain the position that we should surely know enough by now not to ever underestimate this virus.

**Chris Dall:** [00:19:39] Here in the U.S., the nationwide uptick in cases continues with the seven day average of new daily reported cases now hovering around 108,000. But as we've discussed in the past few episodes, and as I mentioned in the introduction, we're not seeing the level of severity we saw with the initial Omicron wave or other previous waves. And that's not to be dismissive of what's going on. Hospitalizations are rising. We're still seeing around 330 deaths a day and there continues to be the issue of long-COVID. But is this lower severity linked to the level of vaccine or infection-derived immunity that we have in this country? And unless a different variant comes along, are we looking at more of these type of waves in the future where a lot of people get infected, but we don't see the same level of severe illness and death?

**Michael Osterholm:** [00:20:23] Well, Chris, with the average daily reported US cases above 100,000 per day and the true number of daily cases obviously being much higher, there is no question that this virus is everywhere. Just as I said last week and I again emphasize this week, I know more people who have developed COVID infections over this last several week period than I have at any several week period through the entire pandemic. According to the CDC's Community Transmission Map we discussed last week, 60% of counties in the US have high levels of community transmission, 16% have substantial, 17% moderate and only 7% low. This compared to 52% of the counties having a high level of transmission last week. So we've gone up 8%. I also want to note that the Omicron sub-variant BA 2.12.1 is now the dominant strain in the US, making up around 59% of the new cases last week. But let me just add context what I just shared with you. As we have been talking about over the past several weeks, the number of cases in our communities that are being detected through PCR based testing, being reported to state and local health departments, people who are actually availing themselves to at home testing, who are not then subsequent reporting positive results, and those who just have milder illness and never get tested are such that I don't really have much faith in any of these numbers. If you have cases, you know, you have at least that many. But in the absence of cases right now, you can't assume that the absence of evidence is evidence of absence. So let me just summarize. We have a lot, a lot of SARS-CoV-2 transmission in our communities. Now, despite the rise in cases and community transmission levels, hospitalizations, ICU admissions, and deaths remain comparatively low. This is a very different pandemic than it was six months ago, and in that regard I think we're fortunate. The US is reporting 2.2 new daily hospitalizations per 100,000 and an average of 25,300 people hospitalized for COVID in a given day. This is 30% higher than it was two weeks ago. 48 states and the District of Columbia have reported increasing hospitalizations over the past two weeks, compared to 45 states in the D.C. last week. In other words, three additional states. But remember that these numbers are substantially lower than they were during the Delta surge and the winter Omicron surge, where they were 5.3 and 8.5 daily new hospitalizations per 100,000 per day compared to here now of 2.2. I also want to emphasize that in terms of reporting, some people will say, well, you can't trust these numbers. I don't trust the absolute case numbers. But when we look at hospitalizations and deaths, we do have a much better understanding of what's going on as there's much less likelihood of underreporting hospitalizations and deaths. If we take a look at ICU numbers are slightly increasing right now, but they're remaining relatively low with 2,700 patients in ICUs daily for COVID in the US. Consistent with the last couple of weeks, 11% of patients hospitalized with COVID are in the ICU. This is lower than what we have been seeing during previous surges. During the Delta surge, 25% of the patients hospitalized with COVID were in the ICU and 17% of patients during the Omicron surge. So again, now we're at 11%. These lower ICU numbers are relatively good news. Like I mentioned last week, with previous surges, we saw ICU numbers shot up as case numbers increased. During the 2021 Delta surge, ICU numbers went from 4,000 in July to 26,000 in September. This is a completely different story than the one we're playing out today. And the same goes for deaths. I would add one caveat. We do see increased number of these cases occurring in the Northeast and the upper Midwest as well as the West Coast. So for some ICU units in the country, they do feel more pressure where in many other parts of the country, the ICU bed use is actually even lower. In short, what we're seeing now is a very different situation with ICU case numbers. When we look at deaths, we were at more than 2,000 deaths daily during Delta and the early days of Omicron. And now we're seeing daily deaths continue to decline now at 331 lives lost on an average day. This is, in fact, 10% lower than it was just two weeks ago. So it's hard to tell exactly why we're seeing less severe cases now than during previous waves. But to answer your question, Chris, yes, it could be due to a number of different things, including the immunity we've built up through vaccination and/or previous COVID infection. Even though we're seeing a number of breakthrough infections among people who were previously infected or vaccinated or both, it's clear that the disease is less severe and likely is a function of both B-cell and T-cell immunity. It's unclear if this type of protective immunity will wane over time. But it's concerning to consider what might happen if this immunity does wane considerably over the weeks and months ahead. There is the possibility that the decrease in severity is due to the unique characteristics of the Omicron variant and its sub-variants. In that case, we can only hope that future variants are similar or cause even less severe disease. This is why we actually can also consider the possibility that maybe one of our goals should be zero COVID deaths, not zero COVID cases, but zero COVID deaths. Or is it a possibility that new variants could result in a reduction of population level immunity, in which case we would be in for a world of hurt? Each variant seems to throw a new curveball so we can't count on milder illness from each subsequent variant. We can only hope. And hope is not a strategy, as you've heard me say many times. As I've explained time and time again, we don't know exactly what the future of this pandemic looks like. So I can't say with any certainty that we will see waves like this in the future with high numbers of infections but not much severe disease. There are many uncertainties remaining with this virus. First, what variants will emerge with continued transmission in human populations? Or more concerning, what variants might we see as a potential result of the virus jumping back and forth between animals and people, as we are now beginning to document with deer and mink populations in the US? Will there be cross protection against these infections, severe disease, and death? It's hard to make any predictions when it comes to this virus that has proven itself unpredictable time and time and time again.

**Chris Dall:** [00:27:02] So, Mike, there are a lot of parents of young children in this country who are likely tearing their hair out as they await for authorization of COVID-19 vaccines for ages five and under. So what's the latest update on vaccines for this age group?

**Michael Osterholm:** [00:27:16] Chris, I do sympathize with these parents and how long and hard this wait has been. In terms of numbers, we're talking about roughly 18 million kids in the United States for this age group. Luckily, we're seeing some progress here. You may remember that back in February of this year, Pfizer and Biontech announced that they would be delaying their application for emergency use authorization or an EUA for the vaccine in this age group. They said they needed additional time to evaluate whether to recommend a two or three dose series of these vaccines. These trials on a two dose regimen indicated that there may not be sufficient enough immune response with just two doses. On Monday of this week, Pfizer and Biontech announced that the three dose regimen performed well for kids ages six months to four years. This is really great news. Each dose is 1/10 of the adult dose, three micrograms. And there were not any safety concerns identified in the clinical trials. Because the study took place while Omicron has been dominant, it's really encouraging that it's showing that it's 80% efficacy in preventing symptomatic infection among the almost 1,700 trial participants who were six months through four years of age. For the next steps, Pfizer Biontech said that they plan to submit their EUA application to the FDA this week and to the European Medicines Agency and other international regulatory agencies in the coming month. Review by the FDA and their advisory committee will take place on June 15th. They will also be reviewing Moderna's submission to the EUA in this population on June 15th. I really think this is a positive step and a big sigh of relief for many parents. My only reservation is, is that COVID-19 vaccine hesitancy for this age group is still very, very high. A recent Kaiser Family Foundation poll found that only 18% of parents plan to vaccinate their children under five once it's approved. My greatest hope is that this poll will be wrong. However, to date, they have done a great job understanding what's going on in the community. We all know optimism is not a strategy. We will need to do significant community engagement at the public health level, as well as with our own friends and families to get shots into the arms and to protect this age group.

**Chris Dall:** [00:29:35] While the world continues to deal with the COVID-19 pandemic, we've had news over the past few weeks of a growing outbreak of another infectious disease. That brings us to this week's non-COVID query, which is from Jack, who asked on Twitter if you could discuss monkeypox in our next episode. Mike, we started hearing about monkeypox in early May with some cases reported in England, and since then we've had more than 200 cases reported in Europe, the United States, Canada and Australia. So what is monkeypox? What's behind this current outbreak that we're seeing, and how concerned should our listeners be?

**Michael Osterholm:** [00:30:10] Well, Chris, this is another one of Mother Nature's curveballs that she's throwing at us, and it's one that, in a sense, we should not find unexpected. We are going to see more of these kinds of changes of how a virus operates in our communities based on how we as humans change our behavior, our practices, whatever we do. Let me just start out at the very, very top level line summary and say that if you had to put COVID and monkeypox on a scale of public health significance, I would continue to put COVID at the 8 to 10 level. I would put monkeypox at somewhere between a 1.5 and a two. So right now, while it's getting lots of publicity, lots of attention, it's not all the same virus in terms of public health significance that we're dealing with Omicron. But let me just take a step back. I'll start by addressing the first part of your question, Chris, what is monkeypox? The monkeypox virus is an orthopoxvirus put it in the same family of viruses as smallpox and cowpox. Despite its name, it isn't related to chickenpox, which is a herpes virus, unlike this one, which is an orthopoxvirus. Monkeypox is not a novel pathogen. It was discovered in the late 1950s in laboratory monkeys, hence the name monkeypox. And the first human cases were identified in 1970 in the Democratic Republic of the Congo. Prior to this time, it was basically covered protection wise from ongoing smallpox virus transmission or smallpox vaccination. So it was, in a sense, not yet recognized as existing in communities, even though it was there because both smallpox, illness and recovery as well as vaccination also prevented monkeypox from occurring. This virus is what we call a zoonotic disease, meaning that it affects both animals and people. The reservoir for monkeypox is still unknown, but we know that both African rodents and non-human primates can carry the virus and infect humans. Monkeypox causes symptoms somewhat similar to that of other orthropoxviruses like fever, headache, pus filled blisters that resemble smallpox lesions. But unlike smallpox, which can kill up to 30% of those infected, the mortality rate for monkeypox is estimated to be about 6% for the strain of virus from Central Africa or what we call the Congo Basin Clade. And it's about 1% for the West African strain that is now causing the current outbreak. Monkeypox virus can be transmitted via respiratory droplets, contact with lesions or other body fluids, or contact with clothing that has been contaminated due to contact with monkeypox lesions. As I noted before, it is a zoonotic illness, meaning it can be transmitted between animals and humans, as well as animal to animal and human to human. In some countries like western central Africa, the virus is endemic and outbreaks typically occur as a result of animal to human spillover, which results in human to human transmission. In the rest of the world, the virus is very rare, which is why this current outbreak is making so many headlines. As of Tuesday, there have been over 130 confirmed cases and over 100 additional suspect cases in over a dozen countries outside of Africa, including the United States. Most of the cases have been in the U.K., Spain and Portugal, but case numbers in other countries are quickly increasing. So far, there have not been any reported fatalities in the outbreak. Cases in this outbreak have mostly, but not exclusively occurred in men who have sex with men, particularly under the age of 50, with transmission often occurring between sexual partners. It is possible that the virus is transmitted through fluids during sexual contact. It is also possible that the virus may just be spreading due to close contact and not specifically sexual contact. We mentioned that most of these cases are occurring in men that have had sex with men because it helps us understand in what networks transmission is occurring and who may have been exposed or most at risk of contracting the virus. However, I want to emphasize that there has been cases in other demographics as well, not just men who have sex with men. Investigations to date have identified several parties that a number of these individuals have attended where sexual contact likely occurred, and that therefore this is their route of exposure. This brings me to the second part of your question, Chris, which is how concerned should our listeners be? I want to acknowledge that for many people, this could be causing a lot of fear, frustration, anxiety, given how quickly COVID took over our lives a few years ago. I know many may be listening to this, wondering if monkeypox is going to do the same. As I previously noted, the good news is that there are many aspects of monkeypox that make it very, very different from COVID. And I believe, therefore, it will not cause anywhere close to the same amount of death and disruption across the world as COVID did. This is not me saying that it's not a concern. It absolutely is a concern. But I want to emphasize this will absolutely not cause a pandemic similar to what is happening with COVID or what has happened in the past with influenza. There are a few reasons for this. The first is that though we are seeing more transmission across more countries than we have previous monkeypox outbreaks, it does not even compare to what we're experiencing in the early days of COVID. I'm not downplaying the seriousness of the outbreak, but just know that the kind of transmission that occurs and the required close contact is very, very different than we see with the very dynamic transmission of a respiratory pathogen like SARS-CoV-2. Also, we have something we didn't have at the beginning of the COVID pandemic, vaccines. Vaccines for smallpox are also very effective against monkeypox. They were used in previous monkeypox outbreaks and already are being used for contacts of monkeypox cases in the UK and likely will be used in other countries as well. In addition, we actually now have a specific vaccine for monkeypox, which we will see being used much more extensively among contacts of these cases. In conclusion, let me just say that we will see more monkeypox cases. They will continue to be found in more locations. We will identify infected individuals. We will continue to do contract tracing around cases, particularly among sexual contacts or other close contacts. These individuals will likely have access to vaccine, and in addition, they will know that should they start to have any signs and symptoms of monkeypox, that they need to isolate themselves so that there is not ongoing transmission. With all of this combined, I'm quite certain we will end up containing this within several weeks to several months. And while this is a situation where public health must act swiftly and with extensive outreach to at risk individuals, this is not going to be a situation where we will see it causing a major public health problem from serious illness and deaths.

**Chris Dall:** [00:37:09] While we're discussing other infectious diseases, Mike, what's the latest on the pediatric hepatitis cases we discussed a few weeks ago?

**Michael Osterholm:** [00:37:18] Part of the reason we haven't discussed this for a few weeks is because we still have a lot of the same unanswered questions. There have been now over 600 confirmed or probable global cases of unexplained hepatitis in children under the age of 16 since October of 2021. At least 26 have required liver transplants, and at least 11 children have died. Numbers of hepatitis cases have continued to climb in recent weeks, but I want to point out that this doesn't necessarily mean that new cases are increasing. Many of the cases being reported right now are retrospective, meaning that doctors are reporting cases that may have occurred months ago. The cause of these hepatitis cases remains unclear. We discussed the link with adenovirus infections a few weeks ago, and this remains a leading theory. However, we still have no explanation as to why healthy children are developing hepatitis from such a common and mild virus. Further, the liver tissue in these children is testing negative for adenovirus, which does not rule out completely the possibility that adenovirus is involved. But it does make it less likely to be a direct cause and effect. It is not entirely unheard of for a rare complication of a common virus, which usually causes mild illness to become more prevalent. We experienced something similar in 2014, 2016, and 2018 with cases of acute flaccid myelitis associated with enteroviruses. During this time, we saw a typical mild virus causing severe neurologic symptoms in a very small number of children, compared to the likely number infected in the community. It is possible that what we are seeing with hepatitis and adenovirus is similar to this, or it is possible that another factor in addition to adenovirus is at play here. Many are continuing to speculate that COVID infections could be involved. As I said a few weeks ago, some of the children had COVID at the time of their hepatitis or had previous COVID infections. But again, given the widespread transmission of this virus throughout this age population, we would expect to see a certain number of kids infected just by chance alone. There is some evidence that COVID could cause liver problems in both children and adults, but it is not enough to say that COVID is certainly related to the illness we are seeing now. Some are still pushing the theory of COVID lockdowns as a cause, but that would not really explain why they were experiencing hepatitis and not just more severe symptoms typically associated with adenovirus 41 or why this is only happening with adenovirus and not other common infections. Unfortunately, most of the questions were unanswered the last time that we covered pediatric hepatitis remains unanswered today, but we are slowly gathering more information and putting the pieces together. We still need to determine if and to what extent the COVID is involved. If it is, why are some children developing the serious complications and others aren't? The same goes for adenovirus. Is this situation similar to cases of acute flaccid myelitis associated enterovirus or is there another significant risk factor exposure combined with adenovirus causing these cases of hepatitis? I hope that by the next time we update you on this that we have some more concrete answers. But in the meantime, I urge all of you not to be misled by the increasing number of cases, even though so many of those are from months ago. We will keep you updated as more data becomes available.

**Chris Dall:** [00:40:41] And Mike, what do we have for this week's beautiful place submission?

**Michael Osterholm:** [00:40:46] Well, Chris, we actually have a wonderful submission from Meryl and she shares with us not only the beautiful place, but the experience with the pandemic that led her to this beautiful place. So she writes, "Hello, Dr. Osterholm and Mr. Dall. My husband, son and I just returned from a week in Victoria, British Columbia. I'm a pediatric nurse at a large regional hospital in the Pacific Northwest, where my unit has taken care of the majority of COVID positive patients for the last two years. I work with tremendous nurses who have, like all other health care workers, committed to provide the very best care with the added sparkle of trying to bring light and laughter to our young patients. During this time, my husband and son have supported me in so many emotional and concrete ways. In the past, we've loved to travel, but because of COVID, we have repeatedly canceled the vacations we planned many months in the future as COVID stubbornly evolved and spiked. During this time, we decided to homeschool our son, and my husband left his job to become a full time teacher, which has been a blessing for our family. With the use of high quality masks, creativity, flexibility, commitment and perspective, we have carved out a new life for ourselves. Though COVID numbers right now are high, we decided to continue our plans for our first family vacation in three years. Victoria, British Columbia is a gorgeous town in the southernmost tip of Vancouver Island. If we owned a private boat, the trip across the water there would take about 2 hours. So although we're in a different country, it didn't feel like we were too far from home. We discovered friendly people who never made us feel less than for wearing our mask or asking to eat on patios or decks bundled up a bit when no one else was. After a cold winter and a cool, rainy spring to feel the sun in my face and the breeze through my hair was rejuvenating. We'd love to share some pictures of this splendid place with you. Thank you for professional expertise, honesty, humility and calm demeanor. I look forward to hearing each new episode first thing every Thursday morning. Meryl." Thank you very much, Meryl. We actually have included your pictures on the website and I applaud you for how you've been able to carve out your safe living and during COVID. Thank you for your service as a nurse and what you've done there as a pediatric nurse in particular. I so appreciate that very much. Our entire team appreciates that so much. Thank you. And I hope all of you take a look at Meryl's wonderful pictures.

**Chris Dall:** [00:43:20] 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 need to be a physical location. 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 a friend, coworker or neighbor that you lost during the pandemic. We're calling these messages, celebrations of life. Again, you can share those with us at osterholmupdate@umn.edu. And just a quick housekeeping note. In light of the steady state of the pandemic and the fact that next week is a holiday week, we are going to take next week off. So we will not have an episode next week, but we'll be back with you on Thursday, June 9th. And Mike, what are your take home messages for today?

**Michael Osterholm:** [00:44:09] Well, Chris, first of all, I just want to let everyone know among the listeners that if, in fact, there were some change in the status of the pandemic, if we weren't more in the steady state right now, we, of course, would be here next week. But this team has worked so hard. I'm so appreciative of all they do to get prepared each week for this podcast. So next week they will have their their week off from this, but we look forward to being back with you. In terms of summary, let me just very succinctly say, number one, the pandemic right now in the United States is in this almost stable state situation, lots of transmission, relatively low hospitalizations, even lower ICU bed use, and even lower deaths. Now, how long that will continue and stay like that, I don't know. It is largely impacting the Northeast, the upper Midwest and the far west, more so than any other areas of the country. We'll continue to watch this. This is true actually for what we're also seeing in Europe. So number one is we're in this steady state situation right now. I expect that to change with new variants or sub-variants, and it's just a stay tuned moment. Number two, is the fact that for all those parents who have children five years of age or younger, who are wanting that vaccine, I think it's going to be here soon. You'll be able to get it. I just wish we could find a way to get the majority of parents who have children of that age group vaccinated. And at this point, I'm concerned that that will happen. The third point I want to make is monkeypox is surely something making the news today, and that it is one that is of public health importance, but it is not anywhere close to being on the same scale as COVID. So don't worry, it's not going to cause another pandemic. We will be on top of this. It will take us weeks, maybe even several months before it's largely brought under control globally. But that monkeypox is not the disease of real concern right now relative to what we see with COVID.

**Chris Dall:** [00:46:16] And do we have any closing songs for this episode, Mike?

**Michael Osterholm:** [00:46:20] We do, Chris. And last week we seemed to have hit somewhat of a high note. We had a lot of feedback about the Broadway tunes. And as you may recall, last week was the song from "Wicked." This week we've decided to add to that Broadway repertoire, another one of their more well known songs that actually also was part of a very famous movie. So the song that I've chosen today is really about hope. And given how we started this podcast and the senseless deaths that we referred to and talked about, what we all need right now is hope. So this song, which actually has been used twice before, was first in "Episode 30: A New Dialog" on November 6th of 2020. It was also used in episode 76, a year later, November of 2021, and the song is "Tomorrow" as part of the musical and subsequent movie "Annie." Given that we've already talked about this as a show tune from "Annie," music by Charles Strouse, lyrics by Martin Sherman, I will not add any additional comments to that other than to say right now, imagine yourself eyes closed listening to one of the famous stars that have sung the song and feel the love and feel the hope for tomorrow. So here it is "Tomorrow." "The sun will come out tomorrow. Bet your bottom dollar that tomorrow there'll be sun. Just thinking about tomorrow clears away the cobwebs and the sorrow til there's none. When I'm stuck in a day that's gray and lonely. I just tick out my chin and grin and say, Oh, the sun will come out tomorrow. So you got to hang on til tomorrow. Come what may. Tomorrow. Tomorrow. I love you. Tomorrow. You're always a day away. When I'm stuck in a day this gray and lonely. I just stick out my chin and grin and say, Oh, tomorrow. Tomorrow. I love you. Tomorrow. You're always a day away." Thank you all very much for being with us this week. I hope that we've given you information that can be useful to your everyday decision making and concerns about the public health challenges of the moment. As I've said time and time again, more now than ever, with all the pain in the world right now, whether it's from an infectious agent or from a bullet, it's a challenge. So what I hope for is as we close out with "Tomorrow," tomorrow will be a better day. And to make that happen, we all must embrace kindness, understanding. We must embrace the sense of tomorrow. So be kind. Be thoughtful. Care, just care. Thank you so much for being with us. We so appreciate it. Keep those cards, emails, etc. coming in. We read them all. We learn a lot. We're very humbled to be with you. Thank you.

**Chris Dall:** [00:49:45] 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.