# Episode 40: An Imperfect Storm

**Chris Dall:** [00:00:05] Hello and welcome to the Osterholm Update: covid-19, a weekly 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.

**Chris Dall:** [00:00:42] On January 21st of last year, the Centers for Disease Control and Prevention reported the first U.S. case, what was then called the 'novel coronavirus', and announced it was expanding airport health checks for people traveling to the US from Wuhan, China, where the patient had been traveling when the virus was first detected. There was some hope at that time that such efforts might, at the very least, slow the spread of the mysterious virus in the United States. A year later, the nation now stands at more than twenty four million confirmed covid-19 cases and over four hundred thousand deaths. And while the wave of infections that has been surging since October appears to be hitting a plateau, vaccines are being administered and a new president is promising a stronger federal response to get the pandemic under control, the emergence of more contagious coronavirus variants is raising fears that the situation could soon take another turn for the worse. On this episode of the Osterholm Update, we're going to discuss how the variants could change the trajectory of the pandemic in the US and what can be done about it. We'll also discuss the continuing issues with the vaccine rollout, answer listener emails about the impact vaccines will have on coronavirus transmission, and honor a life lost during the pandemic. But first, as always, we'll begin with Dr. Osterholm's welcome and dedication.

**Michael Osterholm:** [00:01:59] Well, thank you very much, Chris. Good to be back with you and with all of our listeners out there. Thank you for joining us. As I say each week, and said with heartfelt thanks, we appreciate the time that you spend with us and sharing in this podcast family. It's always an amazing gift each week to read the letters, the emails and all that you share with us, so thank you very much. And through the course of this podcast, I hope that we can give you something back. I want to clarify one issue right out of the chute. I know that some of you have been concerned about the fact that these podcasts may end if, in fact, I were to pursue further activities with the Biden/Harris administration. I just want to assure you that that's not the case. The advisory board that I was on actually ended yesterday with the inauguration and that at this point, I will still serve as an adviser to the administration on issues around covid-19. But I'm here at the University of Minnesota and I am committed and dedicated to this podcast, as are the staff from CIDRAP. So let me just reflect a bit as we get into the podcast. This has been a powerful week where the pandemic has at last been treated with the degree of reverence at the national level that has really been lacking since the start. A beautiful moving ceremony was held on Tuesday in Washington, D.C. at the reflecting pool, and it echoed around the country. The Empire State Building was bathed in red light that pulsated like a beating heart. The National Cathedral had the number four hundred thousand projected on its side. Beautiful but sad. The mayor of Tucson rang a bell for four straight minutes, one minute for every hundred thousand lives lost. Seattle had a similar bell ringing ceremony. In Miami, police officers flashed their emergency lights. And back on the Capitol Mall people wept as a gospel singer sang Hallelujah! all out of respect for those who had lost their lives in one year now since the first case of covid-19 was detected in Seattle. I can't help but share with you how moving it was to see a number of these activities. And at the same time as we've often shared in this podcast, each one of these numbers is a person. Someone loved by someone. Someone's son or daughter, someone's father or mother. And this was a week to pay that tribute. So how can we begin to really process the enormity of four hundred thousand lives lost? You all have suffered during this year. We all have suffered. With this podcast, we've tried our best to listen to your experiences and hopefully provide at least a little bit of comfort and guidance. We are on a long journey doing our best to work together as a community. Now we have new leadership. We're gaining more hours of daylight, and you can rest assured a new team will be making use of every waking hour to end the pandemic. I don't say that in a partisan way, I say that out of a balls and strikes call. Yesterday was actually quite exciting in that the president, in his first order of business, actually issued a number of day one executive actions that address the covid-19 situation specifically. For example, he launched a 'one hundred day masking challenge' in which he basically asked Americans all to do their part, as he called it "their patriotic duty" and mask up for one hundred days. He ordered that at all federal buildings, all federal properties, that masks would be used throughout the duration of their time on the property or in the building. Another one that he did yesterday was a very powerful move internationally by reengaging with the World Health Organization and now reestablishing our membership status there, which is really important as we are working to deal with this pandemic on a global level. He also issued a order that the federal government, in order to act swiftly and aggressively to combat covid-19, really needed to have a new position of covid-19 response coordinator established. This person reports directly to the president and be responsible according to all elements of the covid-19 response across government, including managing efforts to produce, supply and distribute personal protective equipment, vaccines and testing materials. This is such an overdue, such an important new activity to provide that kind of coordination. We also understand the very severe mental health challenges and the economic challenges that this pandemic has posed. Another one of the orders addressed the ever growing and unprecedented housing affordability crisis. He realized and stated in that order that one in five renters and one in 10 homeowners with a mortgage are behind payments. So he asked the Centers for Disease Control and Prevention to consider immediately extending the federal eviction moratorium until at least March 31st, 2021, while calling on Congress to provide much needed rental assistance and extend it further. And he asked the Department of Veteran Affairs, Department of Agriculture and the Department of Housing and Urban Development to consider extending foreclosure moratoriums for federally guaranteed mortgages and continuing applications for forbearance for federally guaranteed mortgages until March 31st, 2021. Finally, this involves recent student graduates who are now in the workforce and in many cases not finding work, realizing that student loan borrowers owe over one point five trillion dollars in federal student loans. He asked that the Department of Education consider immediately extending the pause on interest and principal payments for direct federal loans until at least September 30th, 2021. These may not seem significant, but for those who are in financial straits, for those who have been so severely challenged by this pandemic, this is indeed good news and I think is a representation of the kind of additional activity you're going to see. Why do I feel certain this new administration and this leadership team will make a difference? Because I've been part of it for the past two months as a member of the Biden/Harris Pandemic Advisory Board. We've logged very long days on Zoom sessions and conference calls, laying the groundwork for a plan that will give all of us a fighting chance with this virus. And yet, I must say, with all honesty, I can't emphasize enough how urgent this action is needed as we find ourselves at sea in the midst of a pandemic storm. Red sky at morning, sailors take warning. As you know, that's an ancient and prescient adage for mariners. And the phrase keeps playing in my head, and I fear that we're in a scary red sky at morning moment with this pandemic. We are in a terrible covid-19 storm and we're at sea. We're exhausted from nearly a year of pandemic conditions. Everyone. Everyone wants it to end. But there are no options other than to deal with the storm that is approaching. I believe like ocean sailors, we just can't afford to lose focus. For the pandemic you've heard so many stories over the past year, people who slipped. Three weeks ago, an elderly couple in Salina, Kansas, who couldn't help themselves, they needed to go to the family Christmas celebration. They're infected there. Subsequently, and so sadly, they died from covid-19, two hours apart in an ICU holding hands. We are all at sea. We are. Last week I talked about the truth. This week, I have to say that the truth is very painful. Just as the sailor who looks to the horizon and sees that storm strengthening, I say this with understanding of its implications, but I fear that the worst of the pandemic is still approaching. Why do I say this? Because science. Our knowledge of science tells us that the worst of the storm is approaching. We can definitely get past it. We have to get past it. We know how to survive rough seas. The term perfect storm was going to represent multiple factors converging into one gigantic disaster. We may be heading into a perfect storm at this stage in the pandemic. The forces at play include staggering case numbers and hospitalizations, ever increasing pandemic fatigue and even pandemic anger, ongoing denial of the reality and politicization of even the simple act of wearing a mask in public, devastating economic hardships for many, immense mental health challenges now, and now the emergence of new sars-cov-2 variants that will likely lead to new surges across the country, and even have the potential to compromise the protection of our vaccines. We've got ways that might let us outrun the storm at least somewhat. Maybe. Honestly, we just don't know. I'm hoping I'm wrong. That is why for now, I'm calling this podcast an imperfect storm and hoping it will not be as bad as I fear. If I'm right and we act on it, we will save many lives. If I'm wrong, then hallelujah! And all those who have been my severest critics can have a field day which I will enjoy even more than they. I have two last issues I'd like to address on this opening. One is the dedication. And in light of that notable number of four hundred thousand deaths and of course, even looking more to the over two million sixty thousand deaths reported worldwide, a number which we know is grossly underreported, I'm dedicating this podcast to the family members of all those who have died. All those who missed their loved ones and who will never get them back. The second thing I want to address is the optimistic piece of all of this is about light and how, as you know, each week I have taken very seriously to understand how much light we're receiving here in Minneapolis/St. Paul from Mother Nature. And as you know, on December 21st, I noted that we had eight hours and forty six minutes of light. Now, today, I'm happy to report on January twenty first with this podcast for up to nine hours and twenty three minutes. We've gained 14 minutes of light since last week and overall we've gained thirty seven minutes of light since the spring solstice. And the speed at which the light increases is going to itself get faster and faster each week. So there's good news on the light side and we'll just keep remembering that.

**Chris Dall:** [00:14:27] Mike, as I mentioned in the intro, we are seeing some signs of new infections and hospitalizations leveling off in the US, though the situation remains dire in places like California, Arizona and Texas. But the CDC warned last week that the more contagious UK coronavirus variant could drive another surge in cases over the next eight to 12 weeks. So do you agree with the CDC's assessment? And aside from more rapid vaccine administration, what can we do to head this off?

**Michael Osterholm:** [00:14:55] Well, let me first add context to this question, a very important one, and we need to understand where we've been, where we're at and where we're going. I've already mentioned this on previous podcasts, but I think it really deserves mention again. And that is all about the shifting baseline, this concept of what numbers do we find unacceptable or challenging and which ones do we say, "Well, that's business." And while we recognize that all of these about cases and particularly about deaths should never just be business. But it's interesting how as a society and as a world, we are becoming almost numb to what's happening with the covid cases and deaths. Let me remind you, last April we had a house on fire kind of mentality when we had thirty two thousand cases reported a day with much of that coming from the New York area. Most of those who have worked in infectious diseases, the media would tell you, boy, this is as bad as it's going to get. By the end of May, we were down to 20 thousand cases a day being reported with some hot spots, including the upper Midwest, showing some major increase, but other areas, heavily populated areas of the country, seeing big decreases. We kind of thought we're over this. We flattened the curve. We're done. Well, then after Memorial Day, pandemic fatigue set in, pandemic anger became ever more present, and by the second week of July, we were seeing major increases, particularly through the southern states from California all the way over to Georgia. We hit 70000 cases a month, more than twice what we had in April in July. And suddenly the April high didn't seem so high. By September, with all the activities again to try to reduce transmission, limiting contact, distancing in many of those southern states, by Labor Day, we were down to twenty six thousand cases reported per day. Somewhere between what the low and the high were in April/May. And then again, it set in. And some of you are aware that I commented often at that time that I was very concerned about what we would see. And sure enough, by November 20th, we had gone from twenty six thousand cases to two hundred thousand cases reported each day. We saw it come down a bit in early December to one hundred and sixty thousand cases a day. But then we took off. December twenty ninth we were at almost two hundred thousand cases a day. By January 8th that had gone to three hundred thousand cases a day. Remember when thirty two thousand cases seemed like a lot? And now we're at three hundred thousand. And why is that important? Because now today we're down at about 175/185 thousand cases and people are saying "Wow, that's a big drop from three hundred thousand cases. We're in good shape." Oh, no, we're not. That's our new baseline. And while activity is surely being reduced in a number of areas in the country, we have twenty six states that are still high with increases occurring or stable numbers. We have twenty four where the numbers are still high, but coming down and then we have one where it is low and staying low, Hawaii. So for the 50 states, the District of Columbia, twenty six, twenty four and one. I expect that those numbers could come down even further in the near term. But what's going to change that and why am I so concerned? And this is where we get into the issue about the variants. Let me just remind everyone that these variants are virus strains in a sense that are fit enough through their mutation process to actually still circulate in humans. So in many cases, viruses that mutate do so in such a way that is detrimental to their survival in a population. And today we are, in a sense, providing that kind of pressure on the viruses that survive to be ones that survive a sense of immunity. A year ago at this time, no one in the world was immune. There was no advantage to be able to have mutations would get around that immunity that might make you survive this immunity coming from either natural disease or from vaccination. In some cases, even to the extent of using a convalescent plasma and being treated by that. So we look at these variants, I talked about them last week, there's the B117 in the UK. We've seen increased transmissibility, no evidence of more severity. And now we're seeing it throughout the United States. We have B1351 in South Africa, which basically is going to be a very big challenge for us. And I'll talk more about that in a minute. And we've got these other variants, one from Nigeria, one from Brazil called P1, which is also a challenge like the one from South Africa. And so don't be surprised by seeing an ever increasing number of these variants develop, because as we keep passing this virus through more and more people, we are creating the evolutionary pressure for the virus to actually mutate and adapt. Those mutations that are beneficial means that this may become the primary variant. For those that are not, it won't. So what's the context of understanding these variants? What do we need to think about? Well, let me just first put into some perspective where we're at on the overall protection within our society, whether it's a variant or not. I think a lot of people think we're farther along to this herd immunity issue. And I hear a lot of my colleagues out there talking, saying, "You know, it's going to happen here, it's going to happen there." I don't think we can go anywhere close to that yet. Based on our own data where we've looked at the seroprevalence rates in various states, or for that matter, looked at the kind of calculations that have been based on studies looking at seroprevalence in each of the states, our studies would say that about thirty one percent of the US population has had a covid-19 disease or infection in the past and likely have some sense of immunity. Thirty one percent. Now, it's higher in some areas lower in others, but on average it's that. If you look at the proposed efforts around vaccine and the one by President Biden, which lays out the delivery of one hundred million doses by the end of April, that first hundred days. Now, remember, one hundred million doses is not one hundred million people vaccinated. If, for example, we give two doses to, say, 33 million people and one dose to thirty three million people, meaning that they haven't had time to get their second dose, that's a total of 66 million people. That averages out to about 14 percent of our overall population. So you can see that at that point, if you add the percentage up of people who would be protected from vaccine at some level, two doses higher than one dose, and if you look at the number of people who are previously infected and immune, that's only about forty four percent. We have a long ways to go over the next three to four to five months with 56 percent or more of the population being susceptible to this virus. And we could see a variant come in, take off, and that whole issue I just shared with you about the shifting baseline is huge. Imagine now, instead of seeing a big surge of cases when the baseline was twenty six thousand. Now it's one hundred and eighty five thousand. That is going to be a surge upon a surge that we have not seen and as we have seen with one hundred and thirty thousand people being hospitalized in this country recently, what a challenge that was to our health care delivery systems and the quality of care. Now, imagine that number being substantially higher than one hundred and thirty thousand hospitalized people a day. That's what we're up against, possibly. Number one, the people are there to become infected. Number two, we still have people doing things that put them at risk for transmission. And number three, now we have these variants. So let me just give a brief update on the variants and where we're at. And next week, we're going to actually do a much more detailed dive into this. But I just want to give you a sense of it. Right now, let me just say, what do we know, what do we don't know, and what do we think we should do about it? Number one, we should just continue to expect new variants of sars-cov-2, the virus, to emerge over time. This is normal and expected and we shouldn't be surprised. But we need to have a robust surveillance for detecting these and a plan. How are we going to respond, given the information we gather about these new strains? The public needs to know that this pandemic situation is still emerging, even though we've been at it for a year. Imagine where we're at. I will reiterate what I said weeks ago. We're still on the bottom of the third of the top of the fourth inning. The more transmission we have, the higher the likelihood of more infectious or virulent strains emerging. You know, evolution is driven not by the environment the virus finds itself in, but also the number of times you roll the dice. Courtesy of Wendy Barclay. There is so much we have yet to learn about the emerging sars-cov-2 variants. And what do these trends mean for transmission and epidemic growth? What do they mean for disease severity and case fatality? What is the effectiveness or ineffectiveness of existing vaccines against these new strains? Well, what do we know about a very important key emerging strain that is in our backyard right now? As you know, in the United Kingdom, a new variant called B117 emerged with an unusually large number of mutations. The variant spread more easily and quickly than other variants. Currently, there is no evidence that it causes more severe illness or increased risk of death, fortunately. However, when you overwhelm your health care systems with so many patients, we know care is compromised. That has been associated with increased deaths. B117 likely emerged in the UK in September and circulated at low levels in the population until mid-November. And then look out. It took off. It clearly appears to be more infectious and is rapidly becoming the dominant strain in places like the UK and other European countries. Secondary attack rates, in other words, once somebody is infected, how many people get infected from them, can tell us a lot about the transmission potential. In one contact tracing study out of the UK, 11.4 percent of people in contact with someone infected with the wild type virus were infected. Not the variant. But among context of the people with B117 infections, 15.6 percent were infected, almost a third higher. The group that does such incredibly important modeling work at the London School of Hygiene and Tropical Medicine made estimates that the virus was at least 56 percent more transmissible. And for those in the epidemiology area, they estimated that B117 increases the reproductive number by between 0.4 and 0.7, which means that that could be the difference between gradual increase or surge like increase. The authors here did some backwards modeling and determined that the Rt, which is basically the reproductive rate in the population, during UK's second lockdown in November, was 1.45 for B117 and only 0.92 for the non-B117. For those who aren't familiar with these terms, anything above one means that there is, for every one person, more than one person gets infected, means the numbers rise. When it's below one the infection process begins to die out. So again, 1.45 for B117. 0.92 for non-B117 strains. Also, we know that increase infectivity leads to more cases in shorter time periods, which, as I pointed out, could overwhelm our health care systems. So what do we need to expect to happen in the US over the next few weeks to months? I must honestly say I can't tell you for certain, but my worst fear is that the US will follow a pattern just like the other countries who have seen the emergence of B117. I think we're going to see this pattern expand here in the United States. It may take weeks before it becomes dominant, but then when it does, it could be really a challenge. Next week, we'll talk about what can we expect and preemptively do to respond to the increase in cases, meaning are we going to wait until the cases take off? That, to me, is like hitting the brakes after you've wrapped the car around the tree. What are we going to do beforehand? Our questions to ask. We've already seen how stressed our health care system has been in this country with the level of cases we've had. The question to ask is, could they be prepared for even a sizable increase in the number of cases? Do we have the resources to test, isolate and quarantine people? What other strategies are necessary to deal with this new variant? I can tell you it could be such a game changer. So at this point, all the evidence points to the fact that this B117 will become the dominant strain and is going to be much more infectious. We need in this country to greatly beef up genomic surveillance of the viruses, which I can tell you the Biden administration is in the process of doing. And we need to understand the increased access to respiratory protection. How can we get the public more protected? Now, lest you think that I am overstating the case, the CDC actually just published a Morbidity Mortality Weekly report in which they modelled the potential impact of the B117 in the United States. And frankly, their results are just like I shared with you just now, that the high rate of transmission will lead to more cases, increase the number of persons overall who need clinical care, exacerbating the burden on the already strained health care system and resulting in more deaths. So we're not alone on this issue, but I worry that no one is putting out the clarion call yet to what are we going to do about it? Let me just address one last issue, Chris, that is really important about variants. And this one is also, and as one of my mentors in this business of coronavirus immunology Christian Anderson from Scripps would say, the news I'm about to report to you, in a sense, no way to sugarcoat it. This is not good news. His quote. We have a new report out in the last two days from Wibmer and colleagues in South Africa that looked at a variant there, the South African variant, which is 501YV2. And this is another one that we've talked about that has the potential to escape neutralisation or meaning that has changed enough so that the antibody that might be induced by a vaccine would not be protective. And in their paper, they found using the antibody recovered from individuals who had had covid-19 clinical disease or using monoclonal antibodies, that in fact that in twenty one of forty four serum samples, the novel variant wasn't recognized by the antibody of those serum samples. Now, I want to make a really important point here. This is not showing the vaccine didn't work, meaning the antibody from the vaccine, but rather the antibody from either from natural disease and the patient or the combined serum plasma. But this is not a good sign. So what does this mean? What it means is going to have to watch very carefully and understand could our vaccine protection be compromised and how much? Maybe it's only going to be a limited amount and the vaccines won't be ninety five percent effective. Still effective, but maybe, I'm just throwing this out, at 60 or 70 percent or maybe even more. So I think, Chris, to come together with this answer, I know it's been long, but it's really important, number one, I worry about the shifting baseline and I worry about the fact that we may see this B117 take off in the next several weeks. And if that happens on top of the high level of cases we have now, we're in deep trouble. We're in deep trouble. And we have to start planning for that now. Second of all, we've got to monitor very, very carefully this other variant that has been found in South Africa as well as in Brazil in terms of what it means for vaccine protection. And this is going to be a challenge. We're going to get through it. We, if we need to, we can make new vaccines. But for the time being, this is going to be a challenge.

**Chris Dall:** [00:33:39] Let's turn now to the vaccine rollout in the United States. Mike, you know, two weeks ago on this podcast that we would get to a point where there would be more people who wanted the vaccine than there are doses available. And we've already reached that point. New York City this week already announced that they've run out of vaccine doses for the week and they've had to cancel some inoculations. So do you think a more coordinated federal response will solve some of these problems?

**Michael Osterholm:** [00:34:04] I would refer us back actually to a podcast we did almost five weeks ago entitled The Last Mile and the Last Inch. The challenge we have right now could have been and should have been fully expected, anticipated, and we should have been prepared for it. As much as Operation Warp Speed was this incredibly successful program getting vaccines from the basic research and development stage to ones actually tested in the field for safety and effectiveness, as well as going through the regulatory process to get emergency use authorizations and being manufactured, was an incredible accomplishment, simply incredible. But as I pointed out before, it's like the person or groups that build the bridge that is fourteen hundred and twenty feet long and it's incredible how it looks, but they didn't have enough money to finish the last 20 feet. That's not a very effective bridge. And what happened was Operation Warp Speed never anticipated what would it mean not just to drop the vaccine off at a depot somewhere in a state, but who was going to administer that, how was it going to be planned? How would you do the rollout? What kind of electronic systems would you use to keep track of the data to enroll people to get vaccinated? How would you bring together the many different aspects of vaccinating a community that differs by every community in our country, by every county, by every state. That can't be a federal top down activity. But the support could have and should have been there for our state and local health departments that in some cases they themselves will not be vaccinating, but they are the air traffic control tower to make it happen. And we didn't do that. So now we're playing that catch up, which is so frustrating for so many people who want a dose of vaccine for which the recommendations are now everyone sixty five years of age and older should get and yet we don't have nearly enough. One of the challenges is states don't know when they're going to get vaccine. So we've had examples right here in Minnesota where clinics were set up that had to be canceled days in advance just because they found out the vaccine they thought was coming last week is not coming this week. So the feds need to fix that part. We absolutely have to understand how much vaccine is coming and when. You know, manufacturers, I believe, are producing absolutely as much vaccine as they can. It's not like anybody's holding back. So we have to live with what we're getting. Now, that doesn't mean, however, that we should be in the dark about how much is coming and had we had that kind of information on a routine basis, we could have planned much more effectively. I know that the incoming administration is committed to that transparency, that understanding. In the meantime, states and local governments are trying to get better systems for how people register for getting a vaccine, how the recommendations roll out. I was just chagrined when I saw the former secretary of Health and Human Services a week and a half ago make a recommendation that everyone under sixty five years of age who had an underlying health problem now would be eligible. That's eighty one million people on top of the fact that we couldn't even meet the needs of those sixty five years of age and older. Now some people will be confused by the fact that they see this constant issue in the news media about somehow the vaccines are sitting on a shelf somewhere. You know, I think kind of the Fort Knox of a given state must have them. That's just not true. When you look at doses distributed in the data, that really is misleading because in many cases those are doses that operation warp speed are basically saying are coming to your state, but they may not even be here yet. And so therefore, you're being counted against a number that's not even realistically measurable because you don't have them. Second of all, we did see that some of the doses were slow out of the shoot from the two pharmacy companies that had contracts to vaccinate long term care facilities. That was a greatly delayed program. It was a problem that contracts with the federal government that's catching up. So you're going to see over the course of the upcoming days, the numbers between delivered and distribution to your local area will match up much more closely. One point to add that several of the states have demonstrated very clearly the challenge of keeping the number of doses administered updated and the current electronic system we have, just because of the fact that it's often two to three days behind. So even in a state, you may find that people have already vaccinated substantially more than are being reported. This is going to work out. The problem still exists, we just aren't going to have enough vaccine. And we have to understand I mean, remember, the president said, as we call these hairy, audacious goals, one hundred million doses, not a hundred million people, hundred million doses by the end of March. And people are saying, "Well, is that doable or not?" I've already shared with you the challenge. That's only going to mean about 14 percent of the US population be vaccinated. We have got to do a much better job of helping the public understand that. And we all want these vaccines, or I should say many of us do. And we have to understand it's going to be a while. I also just want to comment briefly on the fact about safety, because we've been hearing about the safety issues. We have had a recent report out of Norway that twenty three individuals in long term care died not long after having been vaccinated here and that this was potentially related to the vaccine. I've already talked about that in previous podcasts, that, in fact, when you look at the ages of the people who were vaccinated in places like long term care or those sixty five years of age and older, we do see increased number of deaths that just happen as part of growing old, being frail. The Norwegian Institute of Public Health has evaluated 13 of these cases to date. And of those, they found that all of them were due to their frail status, not because the vaccine caused them to die. Remember, I shared with you before, if you look at heart attacks in the United States and you look at the incidence per 10 million people getting vaccinated, if you just looked at 10 million people got vaccinated today, which is roughly the number we have vaccinated in the US. In that age group from fifty five to sixty four, you would expect to see seven hundred and ninety three individuals die from a heart attack in the week, that week, following vaccination. Just by chance alone. If vaccination never occurred, seven hundred ninety three individuals would die. So imagine just on a daily basis, it wouldn't be surprising to find adverse health outcomes occur associated with the vaccine by time, but not associated by actual cause and effect. I just want to point that out because you're going to hear more about events happening after people get vaccinated. We are studying all of these as a public health community to make sure something's not missed. But to date, we've seen nothing that supports that these vaccines, other than the reaction you have at the time of the vaccination or as some of you have pointed out, after the first twenty four to thirty six hours, which during that time you can feel a little rough, particularly after your second dose of vaccine, but beyond that, we have not seen anything yet that supports that these vaccines have any adverse health outcomes. Again, get vaccinated when and where you can.

**Chris Dall:** [00:41:55] So we've received a number of emails from our listeners over the past week asking whether the vaccines will lower the risk of coronavirus transmission and how vaccination might impact people's behavior. Janet asks, "My question is, does the covid 19 vaccines stop transmission as well as symptoms? That is, if my mother in law were to fly out to visit us after her two doses, are we safe from contracting covid-19 from her?" And Cindy writes, "I'm very concerned about this transmission issue because I fear those who are vaccinated will become more lenient in their behavior, human nature being what it is, and those of us in the purgatory of waiting for the vaccine will be at increased risk for becoming infected." Mike, we've gotten a lot of variations on this very question. What can people do and what can't they do after they've received two doses of the vaccine?

**Michael Osterholm:** [00:42:42] Well, thank you for these questions, they really are very good questions and right on the mark. In terms of what happens to someone once they're vaccinated, they've had two doses with the current approved vaccines, we may have a one dose vaccine coming down the pike eventually. At this point, we don't yet have the data which supports that once vaccinated and expected to be protected against clinical disease, that you might not get infected, have asymptomatic infection, and still be able to transmit the virus. Now, personally, this is all personal, I don't think that's going to be the case. But we have studies in the works that will be available soon that will address that and tell us, you know, do we see asymptomatic infections in people who are protected from clinical disease who then might also be capable of transmitting the virus to others? I'm hopeful that the data are going to support that no, that doesn't happen. It doesn't mean you can't have waning immunity months and months later, and we'll need to look at that carefully. But this will help us a lot in terms of advising people, what is your risk of either getting infected, i.e. the protection from the vaccine or getting asymptomatic infection and transmitting the virus on? This is an area that I keep coming back to over and over again. We need to start working on recommendations for once we have an area where many people have been vaccinated who now are, in a sense, protected. And if we have the data to show that they don't transmit to others, how are we going to begin to change what we do every day for protection? Will it be necessary to wear a mask for the rest of your life? No. And so we need to have this discussion now. What will be the breakpoint? What will be what we will do in terms of making recommendations for who should do what? So for now, I would say to both Cindy and Janet that we're still on the hold pattern, keep doing what you're doing as if you hadn't been vaccinated. But hopefully that's going to change very, very soon.

**Chris Dall:** [00:44:55] We received a very moving celebration of life this week from one of our listeners and Mike, I'm wondering if you can share it with our listeners.

**Michael Osterholm:** [00:45:03] Yes, this is from Ruth. And it is a very, very important reminder of both an act of kindness, but also what this pandemic has done to us and how we can respond to take the pandemic on. Ruth wrote, "Dear Dr. Osterholm and CIDRAP staff, I'm a music teacher and theater and choir director on the West Coast. Obviously most of my vocation has been curtailed for many months, but I'm so thankful to be at a charter school which honors the arts and I have not been out of work. But of course, we can't act together. We can't sing together. I can't spread out the drums before my beloved students and watch their eyes light up when they get to choose their very favorite instrument and make a great joyful noise with their friends and classmates. When I was in high school, I connected with a beautiful girl who loved music as much as I did. We took all our music classes together, learned our craft together, and then became music, choir and theater teachers together as adults in our community. We performed together, took our groups to festivals together, taught each other's children as we became mothers. This fall, in the midst of the pandemic, after months of no singing, no acting, no outlet for her beautiful craft, my friend suddenly took her own life. Our community, our students, our families, our colleagues were shaken to their core. Her family and friends are devastated, confused, dazed with pain. She did not die of covid-19 illness, but I can't help viewing her death as part of the wake of tragedy that the virus leaves behind it. And I have worried so much about other naturally sensitive and generous artists whose vocation is inaccessible, even in a way vilified, whose loneliness might include severe self-doubt." She noted the reason that they would be vilified as, of course, live singers and actors communicate many particles and aerosols with their art. "One of my choirs, the Anti Divas, is a small non-profit group which her performances are all fundraisers and it's made up mostly of my grown children and godchildren. Our goal is lovingly sing beautiful music as a generous gift, not to serve others. After my friend's death, I couldn't stop thinking about whether we could somehow bring a bit of live music back to our community in a safe and beautiful way. I think it was part of my grieving process to want to do this. After listening to your answer to a letter a few weeks ago about family caroling outdoors, I felt even better about my idea. And so my family and I have been going out into community beautiful parks and hiding in the trees 30 to 40 feet away from the main path, staying quite a distance from each other also. We sang through the music for our last concert one year ago this month as a memorial to my dear friend and an offering to whoever might be jogging or walking or biking past on that chilly winter morning. I can hardly describe the joy it was to harmonize together again and to offer it as a gift to others. We deeply hope it ministered to even one person as they were passing by. I'm sharing with you a rough recording I made on my phone of one song we sang last week. You can hear the birds singing with us and our dogs playing in the brush at our feet. This is the Anti Divas singing Hail Mary Full of Grace, a medieval hymn from the 15th century, as transcribed by Anonymous. I hope you and your staff enjoys. My grateful prayers with all of you in this New Year with love and hope. Ruth." Well, let me just say, first of all, the recording is beyond beautiful. It'll be hard to listen to that and have a dry eye. We have put the recording on our website so that you can link to it and listen. Second of all, Ruth, I just want to thank you for sharing this very painful yet beautiful story. I hope all of us remember the mental health challenges that we're experiencing during this pandemic. It reminds us of the need for the mental health services that so many of our listeners so wonderfully provide in their communities. And it also reminds us that, again, acts of kindness don't have to be some spectacular event. Just singing in the trees. Oh, my, how beautiful. So thank you, Ruth. This was a very meaningful act of kindness. And I know that our listeners will love hearing this song. And I promise you, it'll be played over and over again once you have a chance to listen. Our thoughts are with you and the family of your friend and all of her friends and colleagues. Thank you for sharing this beautiful, beautiful note.

**Chris Dall:** [00:50:24] And just a reminder to our listeners that if you want to share a memory of a loved one or friend who's been lost to the pandemic or just to share an act of kindness, please email osterholmupdate@umn.edu. Mike, your closing thoughts for today?

**Michael Osterholm:** [00:50:39] Well, yes, I am trying to pick out some fitting words to end on. I think we're at that time right now where there is so much excitement in the air about what can be about bringing people together. About the fact that we're all in this to fight this virus. And in looking through the many, many different musical scores that might give us that hope, I think we as a group have come together with one that had been discussed before but not used, and I'm very happy that we're going to use it this time. This is a song from the nineteen forty five Rodgers and Hammerstein musical Carousel. It's been recorded by numerous artists over the years, including Frank Sinatra and Judy Garland, Elvis Presley and Gerry and the Pacemakers. It's also become well known in England as the anthem of the Liverpool Football Club and in the early days of the pandemic, became the anthem of support for medical staff, first responders and those in quarantine. The title of the song is You'll Never Walk Alone. "When you walk through a storm, hold your head up high and don't be afraid of the dark. At the end of the storm, there's a golden sky and the sweet silver song of a lark. Walk on through the wind, walk on through the rain. Though your dreams be tossed and blowing, walk on, walk on with hope in your heart and you'll never walk alone. You'll never walk alone. Walk on, walk on with hope in your heart, and you'll never walk alone, you will never walk alone." I want to thank all of you again for another session. Remember, next week we're going to spend more time really get into the variants and helping you understand that. Thank you again for all the expressions of kindness that you share with us and for all the acts of kindness you share with everyone else in your communities. We appreciate them so much. This is an amazing experience as a podcast family and we love hearing from you and suggestions on what we cover and how we cover it. Be kind and be safe and right now have hope. Have optimism. I've shared with you some tough news today, but we're going to get through this. We're going to get through this. And next week we'll talk about how we're going to do that. So thanks again, you're really something.

**Chris Dall:** [00:53:24] 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. The Osterholm Update is produced by Maya Peters, Cory Anderson and Angela Ulrich.