

## Episode 35: The Last Mile to the Last Inch

**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] It's December 10th, and though the United States is currently in the midst of the worst phase of the coronavirus pandemic since the virus first came to our shores, by this time next week, we could be looking at a much brighter future. Later today, the Food and Drug Administration's Vaccine and Related Biological Products Advisory Committee will meet to review data on the covid-19 vaccine from Pfizer and BioNTech and Emergency Use Authorization could come within days of that meeting. Then, distribution of the initial doses of the vaccine to health care workers and nursing home residents will begin. It's a time of hope. But amid that hope, they're going to be challenges. On this episode of The Osterholm Update, we're going to focus on those challenges and what questions need to be answered as we go from a vaccine to vaccination. We'll also take a look at the state of the pandemic in the US and what impact the Thanksgiving holiday has had on the trajectory of cases and hospitalizations, discuss other world hotspots, explore what we know and don't know about coronavirus transmission in schools, and celebrate a life lost to covid-19. But first, we'll begin with Dr. Osterholm's welcome and dedication.

**Michael Osterholm:** [00:01:47] Thank you, Chris, and welcome everyone to this week's podcast. Before I go any further, I just have to tell you that this has been a remarkable week. We've had a number of them with regard to your feedback to us here at the podcast. But the notes we received this past week from you and read by the staff have been nothing short of really magical. And you have been incredibly kind, very thoughtful. And really, it just feels like we know you all and you know us. And so I just wanted to thank you for that. That really, it means a lot to us. And this connection, while we may be many miles apart and surely a lot of electrons separate us, but at the same time, I feel like you're right there. And when we read these emails and we try to respond to as

many as we can, but I just want to thank you. This week's dedication really is one that is overdue and it's one that I can't say that any of us really ever think about this. I don't hear it discussed often. But right now, some of the most remarkable efforts going into the response to the pandemic are those professionals working in our laboratories to bring us the testing day after day after day. This is nothing short of remarkable how much testing gets done, how efficient it is. And really to be able to take this amount of data and move it from labs to clinicians, clinics, health departments, etcetera, is really simply remarkable. So I just thank all of you who spend many, many hours a day doing the testing that is so important to us to understanding where we're at in this pandemic and always on the alert to look at new testing methodologies, understand what the test results you are generating mean, and you're really, truly unsung heroes in this situation. So thank you very much. This podcast is dedicated to you.

**Chris Dall:** [00:04:02] So let's start with an update on the US situation. We're now averaging more than 200,000 new infections a day. More than one hundred and two thousand Americans are hospitalized with covid-19. And there have been many days with well over two thousand deaths. And yet the Thanksgiving spike doesn't seem to have hit yet. So, Mike, what are you seeing in the data and what are your concerns about the coming weeks?

**Michael Osterholm:** [00:04:25] Well, I continue to look carefully at what I call the rolling trends, meaning seven day or 14 day averages, because we surely can see ups and downs that are often an administrative function of when a test gets run, a report comes out, a death gets recorded, gets reported. And so to hang on every day is really a challenge. So but if you look at across the board for the past seven days, you'll see that case numbers are up by 17 percent, as you pointed out, well over two hundred thousand. Remember when thirty two thousand cases was an unrealistic, unbelievably high number? Man, if we could only be back there again, and I continue to fear that, as we'll discuss in a moment, that one day we'll look back and say, man, wasn't two hundred thousand cases a day a much better number. So that's continuing. The number of deaths is continuing, as you pointed out, it's well over two thousand deaths. I'm going to comment on that more in a moment, because I don't think people really get a full measure of the impact of what's happening. Deaths are up forty seven percent over seven day averages. And the number that continues to really sit front and center for me is the one hundred and two thousand plus hospitalizations, up twenty three percent.

Now, again, I want to remind all of us this is a reminder day after day, every one of these numbers is a loved one in someone's life. Every one of these numbers had a mother and a father. And far too many of these numbers died alone, but for the hand of an incredible health care worker. We can't forget that. But I look at these numbers and hospitalizations, for example, and I can just see them going up substantially in a way that is surely going to bring a number of our health care providers literally to a point of being overwhelmed. They just can't take more patients, in a sense, I hate to say collapse, because it's not going to collapse, they'll still provide care, but basically the health care system we know won't exist. And I think we'll talk about that in a moment what's happening. Right now, we're seeing cases increase in 40 states and increase substantially. It's down in 10 states, still high numbers but coming down some. Of those 10, five are South Dakota, North Dakota, Minnesota, Wisconsin and Iowa, this upper Midwest area that got hit initially and then started to come down. I'm going to come back to these in a moment because I think they actually are going to change again. And then we have one where the case numbers have stayed low and continue to be low. And that's the state of Hawaii. Congratulations to you. Please keep it up. But I want to share with you that when we think about the issue of what's going on, you know, we talked last time about the Thanksgiving activities and the fact that there was such substantial activities going on. And I must tell you, covid-19 keeps getting closer and closer to me. Family, friends, colleagues are now becoming infected more today. And it's a function of where I still don't think people quite understand the gravity of what it means to be swapping air. And I'll talk more about this later, this new campaign we have about stop swapping air. But I want to share with you an email I received from a nurse practitioner who I think really illustrates the point that we've been trying to make about events like Thanksgiving and what this is going to do. The email begins, "Dear Dr. Osterholm, I'm a nurse practitioner currently managing a covid testing site. This week has been very upsetting. We have been flooded with people being tested because "We found out my brother in law had it. We found out that our granddaughter tested positive. I have symptoms that our son has it." All of these resulted from Thanksgiving gatherings the week before. Dozens and dozens of them are coming in. I'm so frustrated by this behavior. People are so anxious to gather with family that they're willing to risk next year's gathering being without grandma or their cousin or their child. I don't know if they don't understand the risk or they just don't care, whether pandemic fatigue has reached the point where they are so eager to see their family, they're willing to take the risk. I wish people would understand it's not worth it. All you can say is chalk it up to the covid

year and hope for the next year". This email arrived this weekend. I have had other similar emails coming in from people on the testing side who are finding their clinics this week, overwhelmed with the post Thanksgiving cases. Remember, from the time you're infected, five or six days before you might become clinically ill or someone around you, and then maybe several days before you get tested, we're right at that point right now with Thanksgiving. And I look at that and I say, what does this bode for the future? Well, we've been doing follow up with airlines, with TSA and AAA, those that monitor travel and early indications of reservations. And I can tell you right now that the Christmas holiday season, as best as I see it, is lining up to be a deja vu all over again with Thanksgiving. They're estimating that we may be within 10 percent of the travel levels of last year for the Christmas holiday season. Oh, my. What can we do to help people understand what's happening here? And let me just give you some sobering information that may reflect on that in a way that at least, you know, it's abstract public health, but it should give a sense of an impact. Last week, so up through this past weekend, more than eleven thousand eight hundred covid-19 deaths were reported in the US. This passed heart disease, which had ten thousand seventy deaths, lung and tracheal cancer at 4000 deaths, chronic obstructive pulmonary disease at three thousand seven hundred deaths and stroke at three thousand six hundred deaths. The death rate right now for covid-19 is greater than four per million in thirty four states. This is remarkable. It is now the number one cause of death in the United States. Again, this is going to continue to get worse and worse. But even more sobering and this is maybe more relevant to an epidemiologist, but, you know, we talk about US life expectancy at birth. So in other words, today, if a person's born, how long might they expect to live? And to have a fluctuation on that takes a pretty major change in mortality. We saw that in nineteen eighteen. This is a paper from Patrick Heuveline, who's at the California Center for Population Research at the University of California, Los Angeles. And in his very thoughtful piece of work on covid-19 reduce US life expectancy at birth by more than one year in 2020. Let me just share with you what this virus is doing and compare it to what else has happened before. As in the abstract of Patrick's paper on December 3rd, Patrick determined that already the number of covid deaths had reached two hundred and seventy five thousand for the year. This surpasses the number at which covid-19 mortality will lower the US life expectancy at birth by one full year for this year. Such an impact is unprecedented since the end of World War Two. With additional deaths by year end, the reduction in the 2020 life expectancy at birth induced by covid-19 deaths will clearly exceed one year. By comparison, the opioid overdose crisis led to

a decline in the US. life expectancy at birth averaged about 0.1 year annually. From 78.9 Years, in 2014 to 78.6 years and 2017. At its peak, HIV reduced US life expectancy at birth by 0.3 years in a single year from 75.8 years to 1992 to 75.5 years in 1993. As of now, US life expectancy at birth is expected to fall back to the level it first reached in 2010. In other words, the impact of covid-19 on US mortality can be expected to cancel an entire decade of gains against all causes of mortality combined. That's unheard of. So when people tell you this is not a serious disease, that it doesn't impact society, that it only basically impacts 'old people', that term which I find very difficult to say. The impact of this disease on our society is remarkable. And as we look at what's happening in December, going into the first part of next year, I see it continuing to be a real challenge. So from the standpoint of the United States, let me just say, I don't know where this number is going. You know, back in August, when I said that I thought we would see up to two hundred thousand cases a day by Thanksgiving, that was a stretch and people were very skeptical of that. Well, now we know what happened. This one is beyond a stretch for me unless we change our behaviors, the number of cases could increase substantially between now and early to middle of January. And I don't know what that number could be, but it's bad. And let me make one thing really clear about the US cases right now. I'm going to go out on a limb again. I did it before. I do not agree with most of the public health people in this country that are telling people to limit the number of people they have at the Christmas gatherings. Somehow as if that were the magic number 10 or less. I don't find that helpful at all. It's about who's bubbled and who is not. Four people, if one of those people is not a bubble person is enough to kill a mom or dad. And we have to just be honest about this, this is our covid year. This is a tough love for ourselves, not just those who we truly love. And so I think that anybody who says, "Well, you know, if it's under 10, we can get together". And there's a number of very prominent people saying that, including organizations. I think that's wrong, it's a mistake. These are the same people who said that before Thanksgiving. And unfortunately, organizations like CDC didn't get off that approach until a week before when they said, no, you shouldn't travel. By that time, people already had their reservations, we're already going forward with their Thanksgiving plans. Please, public health community, stand up now and say for the love of your family, for the love of your colleagues, for the love of yourself, don't put yourself in harm's way on Christmas Eve. As I said last week, for the first time in thirty eight years, I will not be in person with my kids and then my grandkids to read the Polar Express, I will do it virtually. That will be very hard. I understand that challenge, but I

love my kids, I love my grandkids that much, and they love me that much to help me be protected. So I just want to leave this opening session here of this podcast with one, we're in trouble and it's getting worse. Number two, it's bad. Don't let anybody tell you it's not. And number three, it's still up to us. We can make such a difference. Our behavior can determine, are we going to do a repeat of Thanksgiving or are we not? And I want to believe that we're not. And that will be the beginning of these curves starting to flatten. And we won't see the hospitals nearly as stretched as are going to be otherwise. And then let's glide our way into vaccine. So at this point, this is really the most dangerous time in this pandemic, at least for me, in terms of assessing where we're at, what it's doing and where we're going.

**Chris Dall:** [00:17:42] Does a number of people hospitalized with covid-19 tell us the whole story about the situation in US hospitals right now?

**Michael Osterholm:** [00:17:50] This is a very important point, because I made a comment earlier about the number of people hospitalized and following that and what it means. You know, is there a breaking point at some number? And while case numbers have gone up, the hospitalizations have gone up, too, but they seem to be leveling off a bit while case numbers continue to go up and deaths, by the way, or continue to go up. And I've discussed this with several of my colleagues, including several intensivists. Other public health officials have commented on this also. And I'm convinced at this point what's happening is so many of our hospitals are already overflowing, that unless patients are hitting a higher level of critical illness, they're not being admitted, they're being sent home. Their O2 stats are being monitored and they're told to come back only if they hit these certain thresholds of illness. These are the same people that would have been hospitalized five, six, seven weeks ago. And so, in a sense, it means that they're not getting the same level of care and we'll see whether that then means that they end up ultimately having a much more serious outcome. Or maybe this is a better way to treat patients by sending them home like this. But what I heard from the clinical colleagues was that they are concerned about this. But what is the choice when they don't have people to care for these patients? They don't have the ability to provide the kind of care that they would have gotten had they been able to get intensive care. And that care might just as well be done at home with loved ones helping out. And so we'll see. I'm convinced what we're seeing in the United States is a higher bar right now of clinical illness to get admitted to some hospitals just because of how they're so

overworked, overwhelmed and understaffed. So we'll see what happens with this. But it's giving another new meaning to the number of people hospitalized when that number does start to go up substantially, know that that's on top of the fact it might even have been higher had we actually been hospitalized the same level of illness as we were four, five or six weeks ago.

**Chris Dall:** [00:20:13] So the United States is not the only house on fire right now. Mike, what are some of the other global hotspots that you're seeing?

**Michael Osterholm:** [00:20:22] Well, let me do a quick overview, I know that this can be boring, but I want to give a sense of what this virus is doing around the world. And when we talk about hotspots, which is the term being used, just to put into perspective where these countries are compared to us. For example, when you look at Canada, Canada now is up to four hundred thousand cases of covid since the beginning of the pandemic. On a daily basis, right now, they're reporting six thousand four hundred ninety nine cases per day over the last week. Eighty four deaths per day. When you realize that their population at thirty eight million is roughly about 1/9 of ours, that in fact think of eighty four deaths a day compared to our two thousand a day, when you look at their case numbers of sixty four hundred a day compared to our two hundred thousand a day, you can see they're still really in much better shape than we are. Now the numbers are going up and they've already put into place what they call a two week circuit breakers in some locations and we'll see what happens. But again, very different. Take Brazil, where now more people have died of the virus than any other nation in the world except for the United States. And it looks like things are going to become real bad real soon. The number of new cases is going up substantially. This is actually after hitting a low in number of cases in early October. It's back. Already there's reports in the media and unfortunately many personal accounts of sick people unable to get help in the medical system are just dying at home. Lines are stretching into the many hundreds trying to wait to get into a hospital. And so Brazil is clearly in a very, very serious situation. And last week, director general of the World Health Organization, Tedros, actually said that this is a very worrisome, worrisome situation. Mexico, which has now surpassed one hundred thousand officially confirmed covid deaths, even though the testing access in Mexico is limited, meaning that their death toll could really be much higher than this. The hundred thousand deaths puts Mexico among the worst per capita covid death rate in the world. They, too, are seeing big increase. So the Americas, given

Canada, on a whole are not doing really well at all. And we see that across the board. The one country that appears to have made big improvements is Peru, and they had a house on fire situation in August. But for reasons it's unclear, they've really brought the cases down. If one goes to Europe right now, we're seeing this unfolding and continuing saga of what started in August with this big peak in Germany. Premier announced yesterday of state of emergency as daily infections of the country have not significantly decreased despite a nationwide partial lockdown. His announcement prohibits people from leaving their homes in areas where there are more than now two hundred infections per hundred thousand people in a week. The governors of two other German states have also indicated the very same thing that they're doing. Greece is now extending its lockdown until January 7th with schools, courts, bars, restaurants, gymnasiums, ski resorts all closed. Same thing. Denmark, same thing, expanded their lockdown measures until January 3rd. And thirty eight of ninety eight municipalities, including Copenhagen, all the same kind of things closed. And even select grade school students and university students are being sent home. In France, health authorities there said on Monday that a drop in the number of new infections and of hospitalization in the country was far short of what the government had said was necessary to end the lockdown rules. And this raised fear that a hope for end of the year holiday reprieve would now not happen. So let's move on to Asia. You'll see a very big difference here between what they're doing in the Asian countries versus the rest of the world, the Americas and Europe. South Korea reported six hundred and fifteen new cases yesterday. They have a population that's about one fourth of ours. Imagine what our rate would be if, in fact, these were comparable situations. It is, in fact, though, a situation in Korea where they now have had 30 days in a row of growth. They're basically at this point concerned that even at sixteen hundred and fifteen cases that they may actually start stretching their health care systems. They've now put restrictions in the capital area in the past weeks, shutting down nightclubs, karaoke rooms, gyms, reducing in person school classes, etcetera, etcetera. So they're all over it. Sixteen hundred and fifteen cases which extrapolated to the US would be about twenty four hundred cases a day as opposed to two hundred thousand. And guess what they're doing? They are putting restrictions on even much more severe than we are, where we're at these high levels. Japan here again, a population of one hundred and twenty six million about basically given the US we're only two and a half times larger. They right now, have a total of twenty three hundred and thirty five deaths as of December 7th. That's less deaths than we're seeing per day right now in the United States. And they



are seeing an increase in cases, but it's still at that level that would be very far short of anything we're seeing in the United States. Singapore has basically not had any real case activity since August. And Australia yesterday actually celebrated the opening of their Christmas holiday with full opening of their economy after having really stomped that virus down the summer. And so here is a country that successfully contained it, a democracy, not an autocratic country, and that's where they're at. Let me just say a few words about Africa, because this keeps coming up over and over again. The number of daily new cases there has been rising gradually since September, although there's a lot of variation across the continent. You know, the reported death rate per capita has been quite low compared to other parts of the world. And this is despite a weak health infrastructure in many African countries. Part of the reason for this is potentially the relatively young population in Africa. More than 60 percent of the African population is under age twenty five. Amazing. And so that may account for part of it. According to the African CDC, there have been really three main trajectories in African countries. Those that never flattened the curve or had low case numbers until August when cases rose significant. These include countries like Tunisia, Morocco and Libya. There are those who flattened the curve after cases peaked in July: South Africa and Kenya. And although even there, they're starting to see cases rise again. And finally, those who have had sustained decline in cases over time, only Senegal and Equatorial Guinea have shown that. So really, if you look worldwide, case numbers are continuing to increase substantially in almost every location around the world. The one area where they're increasing but relatively at a much lower level is Asia. And I think this just goes back over and over again to their willingness to exercise control measures. And I think this is a lesson for us in terms of trying to get our economy back, trying to basically bring the public back to all those things that they want. We, in many cases, have been our own worst enemy in not doing early aggressive intervention to drive case numbers down. Is it the American independence? I don't know. Is it the unwillingness to have a national plan that really provides that leadership as exactly what to do? I don't know. But I think countries around the world are now beginning to separate out into those that are willing to really take steps to reduce case transmission and those that are not. And in the end, I guess the only thing that's going to become common among all of them is hopefully one day we all have lots of vaccine use.

**Chris Dall:** [00:29:11] So speaking of vaccines, we are on the cusp of emergency authorization of the Pfizer/BioNTech vaccine, and that could quickly be followed by

authorization of the Moderna vaccine. So a big part of this journey has nearly been completed. But, Mike, you've noted that what you're concerned about now are the last mile of this journey and the last inch. So let's start with the last mile. What does that look like?

**Michael Osterholm:** [00:29:36] Well when I talk about the last mile, I'm actually talking about that part of the journey from the manufacturing plant and the distribution center to the ultimate clinic where this vaccine will arrive, or wherever, pharmacy, and will be delivered. And we've all been aware of the challenges with these messenger RNA vaccines in terms of temperature, particularly the Pfizer vaccine, Moderna obviously doesn't have nearly the same challenges. And how are we going to distribute these? In health care settings today where the house is on fire in these hospitals, how do we actually take workers who are not available because they are dealing 16 hours a day with patients to have them become both vaccinators and vaccine recipients? And what happens if you are a vaccine recipient and you get that sore arm and which is going to happen in 15 to 20 percent of people, can you work the next day, etc.? So I worry because that's the part where the challenge is how do you deliver that vaccine? How are we going to deliver it in long term care? What's going to happen? A lot of people have put a focus on this piece, and I think that's fair. But as I will comment in a moment, I don't think that is the most critical piece. Now, one issue about the last mile is the fact that how much vaccine are we going to have? Originally, there were early promises of a vast stockpile before the end of 2020, and that has fallen far short. Now, instead of a delivery of three hundred million or so doses of vaccine, as had been promised immediately after, emergency use authorization approval and before the end of the year, now the administration is saying that we may have thirty five million such doses by the end of the year. At this point, the states still need support for their vaccine efforts, meaning they've received federal support for planning. But they don't have the financial support to hire people to go and to do many of these vaccination clinics that will be required for public health to do. So, at this point, the last mile is working itself out. I think it's still going to be very bumpy, but it's not going to be the challenge, the challenge is the last part that, what I would call, the last inch.

**Chris Dall:** [00:32:09] And what does that last inch entail, Mike?

**Michael Osterholm:** [00:32:12] Well, let me just start out with, I think, a warning shot that gives us a sense of what we're up against. In early September, officials in South Korea announced really a quite ambitious plan to vaccinate 30 million people against influenza, 10 million more than they had the previous year. And really, their whole intent was an increase aimed at keeping down the rates of flu while the country was battling coronavirus. But unfortunately, life got in the way. Initially as the vaccine was being distributed, a few logistical problems popped up and the South Koreans began circulating really, you know, very negative stories online about what was happening and the delivery of these vaccines that made it seem as if somehow they were unsafe or that they had been mishandled. And that kind of negative attention obviously was a big challenge. But then things got much more serious. And as was reported in the New York Times, a 17 year old died after getting the vaccine. And we saw additional stories then appear where more deaths started to be reported. And as I'll show you in a minute, this should not be unexpected, that if you vaccinate a group of individuals, particularly a large enough group of adults, you're going to start seeing these health consequences occur, but not related to the vaccine, just related to life. But nonetheless, while the public health officials continue to maintain the vaccine was safe and from their evaluation and follow up, they determined that the deaths were only coincidental. But it set the program back dramatically. And once you stumble and fall, it's hard to recover. It's like the Kentucky Derby, if you get stuck in the gate and all the horses are five seconds ahead of you right at the start, it's hard to catch up. So why am I concerned about this last inch? In my discussions with health care providers, infectious disease physicians, many nurses, intensivists, public health agencies, media and the public, all of this concern that has been expressed about will I or will I not take one of these new covid-19 vaccines, I think is coming home to roost. You know, we saw the Gallup poll several weeks ago show that forty five percent of US residents said that they very well may not take the vaccine. I've seen recent data, which is really concerning to me, thirty six percent of physicians in this country said, well, it's kind of a wait and see, let's wait for six months and see what happens around safety and then maybe take it. Well, do you have any more important influencer in a community than a physician? What they say is what people will likely remember and do, and some of these were infectious disease doctors. The nurses. There was a survey done in October by the American Nurses Association, I believe this has changed a bit by now, but one third of a panel of thirteen thousand nurses said they would voluntarily take the vaccine. Another third said they wouldn't and the rest said they were unsure. When we look at those populations at

highest risk for serious disease and death it's particularly in the BIPOC community, the black, indigenous and communities of color populations. And yet that's where we see some of the strongest resistance and I'm aware of some recent data showing that particularly in young black men, it may be as high as seventy three percent of them said, no, I'm not going to take this. This is Tuskegee all over again. And here we have spent nine billion dollars on this high level technology. But we have not understood that that last inch of getting that needle in the arm is all that really matters. Vaccines to vaccination. And so I think that until we have a major national initiative, support at the federal level where we do a number of studies throughout the US looking at knowledge, attitude and beliefs, trying to understand what the public perceives these vaccines to be. Develop the stories of telling the story. Why Operation Warp Speed may be a horrible name, but it did not compromise on safety. Why messenger RNA vaccines are new platforms relative to an approved vaccine but we've been using them for some years in cancer vaccines, other types of vaccine research, and that we have really quite a remarkable safety profile for these vaccines other than the sore arms. So until we do this and really come up with a comprehensive plan, I fear that we will have a shortage of vaccine initially and people will be really upset that want it badly, just like we saw in 2009 when HHS overpromised the amount of flu vaccine that would be available in August and September. And then when we fulfill the needs for those that really want it, we're going to keep bringing vaccine into the community. And I fear that a lot of it is going to sit there. Which has two impacts. One for the individual, of course, that means they're not protected. But number two, in a population basis, we might not even get close to herd immunity. And while we want to believe that next summer we're going to see a very different world, I'm not sure that's the case and I think that some of my colleagues who are out there saying that haven't thought through the implications of this yet. I hope I'm wrong, but let me just give you one last set of data that I think are really critical to understand not only do I worry that there are people who won't take the vaccine, but there are people who are going to take the vaccine and then have bad things happen to them. But not because of the vaccine. Today, people die in this country every minute. People have bad things happen to them like heart attacks and strokes with no precipitating factor of a vaccine or anything else. We've done some calculations, which actually, this should be done by a federal agency. This should be a major effort in place like CDC, elsewhere. Think about this, if you vaccinate basically 10 million people, in a week after the vaccination of those 10 million, and you can take the numbers however you want, if you want it to be one million, whatever. If you look at the

number of heart attacks or fatal coronary disease by age and you look at 35 to 44 year olds, ten million of them were vaccinated, in the following week, you'd have two hundred and forty that would either die from a heart attack or fatal coronary heart disease. From those 45 to 54, that's four hundred and fifty seven people would die in the week after that vaccine if 10 million were vaccinated. If you look at 55 to 64 year olds, that number goes up to seven hundred ninety three. Now imagine somebody gets vaccinated on a Monday morning. They have a fatal heart attack Tuesday afternoon and die. Do you think that the families, friends are going to say right away "Oh my God, this was, he got vaccinated". That'll be a story. Then somebody will read that story and say, "Well, wait a minute, my uncle had the same thing happen". And think of all the chances here in this 10 million of us, even one million, you could come up with forty five or twenty four people. This will get out. And we know this happens. The federal government did a great deal of work preparing the 2009 H1N1 campaign with a lot of information that went to the medi, etc, priming them for this. If we look at strokes, same thing. 45 to 54 year olds, you'd expect to see four hundred and twenty three strokes. If you look at 55 to 64 year olds you'd expect to see 736 strokes per 10 million. And if it was 65 to 74, we're now talking about those in long term care, you'd expect to see 1389 strokes all within a week of vaccination. If you actually look at all cause mortality, again, nothing to do with the vaccine, just what you'd expect to see. In the period of one week following vaccination of 10 million people, you'd expect to see for 35 to 44 year olds, seven hundred and fifty one dying. For 45 to 54 year olds, seventeen hundred and five dying, and if you looked at 55 to 64 year olds, three thousand four hundred twenty nine dying. Imagine whatever the cause was, John Doe gets vaccinated Wednesday afternoon, he's dead Thursday morning. Do you think people are not going to draw some comparison to this? We're not prepared for this at all. And now is the time we have to help people understand that these events will occur. They will be investigated with very important pharmacovigilance that we need to have just to be sure, but that this should not be a reason to halt a vaccine campaign, unlike in the clinical trials, where, of course, that was really critical to understand that. And as you remember, those trials were halted to look at adverse events and in fact, none of them were found associated with the vaccine. So I point this out because I worry we are not ready at all. You know, you get one chance to make a first impression. And I worry that over the course of the next four to six weeks, as vaccine starts to roll out and these adverse events could possibly happen, social media will have a heyday. And it won't be long before it'll be a front page story on every newspaper, it'll be on every cable news show that in fact, oh my, we had

three heart attacks yesterday with people who just got vaccinated. And even if we come back later and say, no, they had nothing to do with vaccination, it was coronary artery disease, the damage has already been done. So this last inch to me is huge. One, we have a lot of people that have hesitancy about this vaccine right now, and I understand why. Number two, we have not done anything to tell our story that would somehow give them an understanding of why their hesitancy is, in fact, it's legitimate to have it initially, but with more information, they can understand why the idea of dying from covid-19 begins to take a much more important role relative to this theoretical concern. We have to have much more trust in many of the populations out there that are at increased risk, particularly in the black community right now. They don't have trust in a lot of these vaccines. And I understand why. What have we done to address that? What have we done in community engagement and dialogue? What have we done to listen to people tell us what's going on? Why are doctors so concerned? What have we missed? So, again, I just come back to the fact that we spent nine billion dollars bringing these vaccines through and now we're going to slip up on a twenty five cent part. We need to do this work now. And I don't speak for the Biden transition team, everyone knows that I've made that disclaimer with each of these. But I'm confident that the incoming administration gets this. But by January 20th, when this happens, this could already be very damaging before that ever takes place. And so we just have to understand that we got to try our best with the conditions we have. We need to bring in experts who really understand vaccine communication and how to put these recommendations forward. So please, if you hear a story about someone out there who, in fact, had an adverse event with this vaccine in short order, consider it not necessarily associated with the vaccine. We got to find that. I don't want to say that something couldn't happen. I want to be really clear about that. I'm not just giving a blanket imprimatur to these vaccines. I have no reason to believe that there will be a serious outcome. But in fact, each one will be investigated. But please don't leave the impression behind that this vaccine is not safe and therefore you shouldn't take it.

**Chris Dall:** [00:45:38] Back in the summer, we spent most of an entire episode talking about whether schools could reopen, even though at that point we had very little data, if any, on viral transmission in schools. Fast forward six months and the debate about whether schools should be open remains. And new research is indicating that remote learning is having negative impacts on many children. So we've had a lot of questions about this. And here we have two listener emails on this question about schools. Tracy

writes, "I would love to ask you one hundred questions, but I'll ask just my most important one. What is research saying about kids in school and spread of the virus, specifically in high school?" And Pamela writes, "Could you provide an update regarding primary school aged children's role in transmission to others? Recently, there have been references that this age group isn't as much of a factor as previously thought". So, Mike, what do we know and what don't we know about viral transmission in schools?

**Michael Osterholm:** [00:46:32] Well, let me start out by saying this is one of those areas where number one, don't trust anybody's numbers, including mine. OK, be skeptical. Number two is, I have to say, with a great deal of humility, I think I know less about the school situation today than I did six months ago. And, I'm afraid that there are many people out there right now who have various points of view that are sharing those points of view with some certainty when I don't think they have the grounds to stand on to be so certain. What I'm talking about is, number one, kids. I find that term terribly unhelpful. We're talking about children, zero to four, five to nine, adolescents, 10 to 14, 15 to 19, young adults, 20 and older. And yet they all get lumped in as kids. Study after study does that. You know, it's like nails on a chalkboard to me when I see that, because it does very definitely appear that the epidemiology, or what happens to kids who get infected, what they do to transmit the virus and the concerns that they have, are very different by these age groups. So we've got to stop talking about schools and kids. We got to talk about school age kids and the programs that they're in. Number two, we have to understand the impact that having distance learning is having on each of these different age groups and what that may mean in terms of how we assess the risk/benefit of being in school or not being in school. Let me begin. I've been through so many studies, I have been involved with so many discussions in different states about opening schools, reopening schools, closing schools. Nine out of the 10 discussions have all been about politics. It's not been about science. It's people wanting to find the data that's to point their point of view. And I understand that, that's not a bad thing. And in many cases, their point of view is, is that it's so important to get kids back in school, what can we do to do that safely? Well, they did this way in Europe. They did this here, they didn't do this here. Doesn't take into account at what part of the outbreak that they were looking at. You know, when cases were out of control in a community, when they weren't, etcetera. But let me just say what I've come to conclude. Number one, all kids are at about equal risk at this point of getting infected and being infectious potentially. Let me just give you some data from the Minnesota Department of Health, my

colleagues there, who I have the utmost respect for, who have really wrestled with this issue and have done as good a job of anybody on a statewide level trying to pull together the information. When you look at age groups across the board, let me just give you the total number of individuals who are infected by 5 to 9, 10 to 14 and 15 to 19. So roughly the same widths in ages so the numbers are the same. So far since August 1st until last week, the Minnesota Department of Health had documented 3165 kids positive for the virus who are between 5 and 9 years of age. They documented 4878 cases among 10 to 14 year olds, and they've documented 4966 cases among those 15 to 19 years of age. Surely a slightly lower number of cases among those 5 to 9. When they looked at the percent that attended while infectious based on testing, it was about the same, 35.7% for the 5 to 9 year olds, 35% for the 10 to 14 year olds and 35.6% for the 15 to 19 year olds. Now, if I look at that, what's different? Is there anything different? Nothing. Yet when we look at transmission, to a student or from a student in the younger age group, it does appear from a number of studies that it's much less. I think that is still not clear, but I'm willing to accept that it may be true. If you start looking at the 10 to 14 year olds and the 15 to 19 year olds, we do have every bit of evidence that says there is increasing transmission in those areas. It's social events, it's sporting events. It's all kinds of things that happen. Adolescents and young adults act like adults in terms of transmission. So I can, in my own mind say, you know what, I know that 5 to 9 year olds are being harmed by not being in school. Distance learning just isn't as good. The mental health issues, socialization. All those things are key issues. We want to protect the teachers and staff. Where are they likely to get infected? I've tried and tried and tried to find data on the frequency of infection among teachers and staff by the grades they teach. And what I'm finding more often than not is what we see in health care workers. The vast majority of them appear to be infected in the community, not at their work. Health care workers, you know, we're seeing hundreds and hundreds of health care workers infected. They're getting infected in the community or in the break room. So far, the data looks similar for teachers. I'm willing to change my mind on that if any new data comes forward. So I don't think at this point we have evidence that younger kids, the 5 to 9 year olds, even though they're getting infected, the frequency of serious illness is substantially lower. Their likelihood of transmitting to family members based on a series of studies appears to be lower. Not always, but appears to be in most cases. And the same is true of teachers. So where do I come down on this? Well, you know, kids, they're the one thing that we have to take complete responsibility for and we can't experiment on them as such. I've come to the conclusion that I think that 5 to 9



year olds can clearly be in a classroom right now with the appropriate prevention practices in place. Teachers can safely teach. And that basically we can go on with that and we will have to reassess that over time. I don't want to carve it into stone. On the other hand, I look at the older kids 10 to 14 and 15 and 19, I say, you know what? When the house is on fire in the community, these kids are going to be getting infected. They are going to transmit it in the school. And distance learning really is the most valuable way to continue learning short of all the crises that will occur as a result of quarantine, transmission, teachers, exposures, etcetera, etcetera, in the schools. So I have come down on saying, you know, try it at 5 to 9 year olds, bring them back. Let's see how it goes. I don't want to make that sound like an experiment. We just have to make sure we're monitoring them all the time for safety reasons. And until the case numbers come down, I'm very uncomfortable with 10 to 19 year olds coming back in the classroom when there's this kind of activity in our communities. So, do I have hard empirical science on this where I can really argue from an epidemiologic standpoint and take this to the Supreme Court of epidemiology? No, I can't. Some of it's common sense. Some of it's experience, some of it's just a sense that I have of what's going on here. And as someone who has grandchildren in these ages, trust me, this is very personal to me. This is very personal to me. So I wouldn't put a child in harm's way if I thought that, in fact, that was it. I won't take a political position on this. I'll take the data and let that tell me where it's at. So for what it's worth, I'm going to keep an open mind on this. I will look at it every day, not just every week, every day. And if I see something different, I'll let you know. But in the meantime, I feel that we can open up in most locations the, basically, kids 9 and younger and move forward with that.

**Chris Dall:** [00:55:12] Last week, we highlighted some acts of kindness that listeners have shared on the Osterholm Update website. This week we have a celebration of life to share. Who we're hearing about this week, Mike?

**Michael Osterholm:** [00:55:22] Well, I want to thank the Reverend Michael Davis, who's a cardiovascular chaplain in the Department of Mission and Ministry at Baylor, Scott and White Heart and Vascular Hospital in Dallas, Texas. Reverend Davis sent us this memorial note and it was very kind of him. And he went on and said, "Hi, Dr. Osterholm and team. I wanted to suggest a possible dedication. The family authorized me to share this. James Graves was a transporter for our hospital. He got covid this past May and was tragically taken from us far too soon. He was much, much beloved

for his willingness to do anything to help people. James embodied this in every encounter. He would chat patients up on the way to the O.R., to their rooms and to test. He never failed to bring a light touch. All of our staff were touched by his death and they told story after story about him. I know how much he mattered because I provided support to all of them. There are so many heroes in our health systems, really, the work of environmental services, transport, nutrition services and other providers is so undervalued. They are often the lowest paid. But day to day they show up doing really hard labor, but they make all the difference. James symbolized the work that they do". Thank you, Reverend Davis. This is such an important celebration here. You know, I so appreciate and hopefully that has come through over the months that we've been together, the doctors and nurses and the respiratory therapists, the lab techs that all work in the various parts hospital, particularly the intensive care area. But we really know that it's people like James that in the end make the trains arrive on time. That are the ones that keep the lights on. And they are the ones that make sure that the other critical members of the health team can do their work. And they often are at the bottom of the pay run. They're often undervalued, as Reverend Davis said. So this is such an honor for me to be able to read this celebration about James and to the Graves family, thank you. I want to remind everybody that our Front Line Families Fund, [frontlinefamilies.org](http://frontlinefamilies.org), is doing very well right now. We will continue to seek your help as we provide support to those families who have lost a family member who is a health care worker to covid-19. And we will be in touch with with Reverend Davis to make sure that we follow up with the James's family, too. And so thank you very much, Reverend Davis. This was a really important reminder. And James, thank you for what you did and how you did it. You are remembered and appreciated.

**Chris Dall:** [00:58:21] And just a reminder to our listeners that if you want to share memories of a friend, a loved one, or colleague who died from covid-19, please email us at [osterholmupdate@umn.edu](mailto:osterholmupdate@umn.edu) and tell us what made that person special. Mike, on the Thanksgiving episode, you closed with the lyrics to Over the Rainbow and I understand you have another song about rainbows to close with today.

**Michael Osterholm:** [00:58:41] Thanks, Chris. You know, this is that time for hope. This is the time to envision what our world can be and will be if we just do our part. And right now, we need that hope as we go into the season here of the holidays. These can be tough weeks for people, the darkest days of the year from a sunlight's standpoint and

sometimes, the ways we all know the holidays and as much magic as they can be, they can also be very difficult. So I want to keep this in that very happy, hopeful mode. And one of my very most favorite songs ever was actually sung by a frog. Kermit the Frog in The Muppet Movie in 1979 sang The Rainbow Connection. Of course we know Kermit was the late Jim Henson. The song reached the number twenty five spot on the Billboard Hot one hundred in November of '79, 30 other artists have recorded it. It had an Academy Award nomination at the 52nd Academy Award ceremony. It was written by Paul Williams and Kenneth Asher and literally done in short order. You all can imagine that green frog and what this means. The Rainbow Connection. 'Why are there so many songs about rainbows and what's on the other side? Rainbows are visions, but only illusions and rainbows have nothing to hide. But so we've been told and some chose to believe it, I know they're wrong, wait and see. Someday we'll find it the rainbow connection. The lovers, the dreamers and me. Who said that every wish could be heard and answered when wished on the morning star? Somebody thought of that and somebody believed it. Look what it's done so far. What's so amazing that keeps us stargazing and what do we think we might see? Someday we'll find it the rainbow connection, the lovers, the dreamers and me. All of us under its spell, we know that it's probably magic. Have you been half asleep? Have you heard voices? I've heard them calling my name. Is this the sweet sound that calls the young sailors? The voice might be one in the same. I've heard it too many times to ignore it. It's something that I'm supposed to be. Someday we'll find it the rainbow connection, the lovers, the dreamers and me.' Every day I look for that rainbow connection with covid-19. When we get to that place, this will all be behind us. And we will understand that hope was never, never wasted. That to me right now is the message we have to keep remembering. So I just want to thank all of you again for spending your time with us. It means the world to us that you interact as we do, and your notes, your messages, your kindness. We listen to you. We hear you. And I hope your voice comes through in these podcasts because you have provided us a lot to think about and what we need to share. So with us, please have a great week. Be kind.

**Chris Dall:** [01:02:23] 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](http://CIDRAP.umn.edu). The Osterholm Update is produced by Maya Peters, Cory Anderson and Angela Ulrich.