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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 Dahl, reporter for CIDRAP news and I'm your host for these conversations. We have several topics to get to today on the podcast including a look at the pandemic's impact on global public health programs, the latest in vaccine developments, and CIDRAP's forthcoming COVID-19 viewpoint on contact tracing, but before we get started, Mike, who are you dedicating this episode of the Osterholm Update to?

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DR. OSTERHOLM: Well, thank you Chris, it's good to be here, and in keeping with tradition, I am going to dedicate this, having talked to a number of people who have done everything they could to protect themselves by staying indoors, not going out, not socializing, I know that we're all well aware of the fact of what I would call a growing epidemic of lonely people in this country, people who want to reach out. They don't want to be socially distanced. They'll be physically distanced, but not socially distant. So it reminds me of a song by America back in 1974, for all the lonely people, and so this podcast is dedicated for all the lonely people thinking that life has passed them by, and we know better. We've all got to reach out and touch these people and help us all get through this. So for all the lonely people, this is dedicated to you.

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I also want to make note that last week I very proudly shared with you that Bill Putnam and Dan Fulop from Universal Audio had very kindly offered to provide us with better recording equipment. I have a hard enough time recording just so I don't wix my mords, but sometimes the quality was also a bit of a challenge, and so we're working yet to put that together. All the equipment has arrived. I am quite convinced that if I could understand it all, there's probably a good chance I could fly this to the moon, but by next week we will have that equipment in place, and again to Bill and Dan, thank you very, very much for that. I just want to add one other piece, this past week here in Minnesota we've seen a tough week in terms of cases of COVID-19. Our hospitals are filling up, intensive care units are almost full,

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and I had the opportunity to talk to one of the intensive care nurses over the weekend who talked about how difficult it is right now in her hospital here in the Twin Cities where they have historically, over the course of previous illnesses, previous issues, in ICU care often provided care for two, sometimes three patients per nurse, but with the COVID patients having been so severely ill that they had to meet up one nurse, highly skilled and trained with one patient, and things got so overwhelming that they didn't have enough ICU nurses, and now they have one ICU nurse for two to three COVID patients with progressive nursing, or nurses who are surely skilled and trained, but not in the art, you might say, of intensive care medicine, who are now helping out with these ICU nurses,

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and this goes also for the physicians, for the respiratory therapists, all the people who work in the ICU that make that possible, and in just sharing with her this story of what was going on at her place, what you could hear in her voice was something that you just don't forget. It was a combination of fear, of commitment, of hope, and, at the same time, challenge what was going to happen if this got any worse. So as much as I've dedicated this to the lonely people, I also dedicate it again to all those on the front lines, who are those people making it possible for our patients with COVID-19 to be protected.

CHRIS DALL: Mike, it's an understatement to say that the COVID-19 pandemic is the most important public health issue in the world right now, and will be for foreseeable future, but as you know, it's not the only one. last Friday, the World Health Organization warned that immunization programs around the world are being

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disrupted. Advocates for infectious disease programs around the world have issued similar warnings. How concerned are you about the pandemic drawing away resources and attention from these other critical issues?

DR. OSTERHOLM: I am very concerned about this issue, and recognize why it's happening, but that we need to almost send in a team B, a second team to help out where their full attention is to these other issues. I think it actually even can be addressed, first of all, just in healthcare itself, not just public health programs. We're recognizing now that many people are not availing themselves to the needed medical care that they should have. We're seeing, for example, prescriptions not being filled, at levels that we haven't seen in many, many years. Why? Because people aren't getting the care that they need, and normally would have had those prescriptions filled.

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We're learning of an additional number of individuals who, out of fear of going into a hospital or medical clinic, are not getting, in some cases, very critical health care they need. Apparent heart attacks, early stroke symptoms, etc. and this is one of the casualties of an infectious disease war that we're in, and we've got to pay as much attention to that as possible and I know it's very difficult for those leaders in our healthcare delivery system to try to accommodate or account for those areas, but we've got to look at that as a nation, as a world, and say, "how do we maintain these kinds of programs, these outreaches? How do we make it safe for people to come in, and at the same time feel safe?" So this is a huge challenge. When we get to the public health programs themselves, you know, public health has always been,

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you know, trying to get that rock to the top of the mountain, and, you know, we never get there. We have a new cohort of children born every day. We have new problems emerging that we couldn't have anticipated six months ago, and so our job is never over with either, and you very appropriately hit on some of the really foundational aspects of public health, and the measures that we put forward: childhood immunizations. CDC, last week, indicated that there had been a very major drop in vaccines for doctors ordering through the VFC program they ordered more than two and a half million fewer doses of routine non-influenza vaccines and non-measles-containing vaccines compared to the same time period in 2019. That's just

remarkable, because you know those doses were needed. There wasn't suddenly an absence of new births and birth cohorts in our country.

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WHO has put out the same warning. We covered that in a story in CIDRAP News, where right now, routine vaccine services in at least 68 countries have been documented, affecting over 80 million children under age 1, again the casualties there can be huge. If we look at places like New York just specifically, which was so heavily impacted last month, and up to six weeks ago with the COVID, in New York City there's been a 42 percent drop in the number of vaccinations administered to children two years of age or younger, according to Mayor Bill de Blasio, and a really shocking 91 percent drop in vaccination rates for children over age of two. He went on to state, in an interview with ABC news, "I'll give you a comparison. The same six week period of time, last year, in 2019, almost 400,000 vaccine doses were administered in this city." He then went on to say, "in the six week period this year, fewer than 150,000 doses were delivered."

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Something has to be done immediately to address this. Well, one of the challenges we have is public health agencies have been largely diverted to working in all or any aspect of COVID, and we're seeing this in so many ways. In HIV/AIDS, WHO has begun to address the service disruptions caused by COVID there, could cause hundreds of thousands of extra deaths from HIV over the next a year, because of treatment issues. Clearly the concerns are legitimate about disrupted services, could also reverse gains made in preventing mother-to-child transmission of HIV. You know, when you think about this, just since 2010, new HIV infections among children in sub-Saharan Africa have declined by almost 45 percent, and that is a number that was only

achieved with hard work and every attempt to get the appropriate therapy there.

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One area that many of us have been following closely for years is polio eradication. House to house immunization efforts have been suspended and disease surveillance officers can't travel in a number of the areas that we're concerned about with regard to ongoing polio. WHO estimates at least 13.5 million children are unvaccinated right now, or under vaccinated for polio,

and that number could rise to 60 million by June in the eastern Mediterranean region alone.

That's just incredible. So, we have to look at these other program areas and ask ourselves, "how can we supplement them?" We don't want to minimize what COVID is doing. It is a critical issue. Again, I remind everyone, 85 days ago COVID was not in the top 75 causes of death in this country, and a number of days last month it was the number one, but we also don't have the luxury of neglecting these other areas, and so this is where governments of the world,

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the WHO we all have to come together and say, "how are we going to create this additional team that can make sure that this kind of work is going on?" I think that it's also really very important to understand that it's not just childhood issues. It's both maternal and child health. We're seeing early estimates of the indirect effect of this on maternal child health mortality in low income and middle income countries. There have been now, a number of additional reports of both child deaths, and even looking at as high as 60,000 additional maternal deaths, just since

the beginning of the COVID outbreak, directly attributed to not having access to care, so we have to look at that. So, at this point I just have to say that, you know, it's not an easy answer when you're up to your south in alligators. It's a hard time to think about draining the swamp, but this is what we have to begin to plan for.

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This is not going to get over with soon, and when I mean soon, I'm talking about the COVID-19 pandemic. We can't wait until this gets over to begin to address this issue. This is key right now. Whether it's healthcare services delivery in this country, or any other country of the world, whether it's the classic public health programs. I'm hearing stories now of sanitarians who are no longer needed in the food side to inspect, but are now doing contact tracing in many health departments. Well, the food services are going to start coming back. How are we going to deal with that? We're hearing about engineers who oversee water plant safety and water system safety in this country have been diverted to work on COVID issues. Again, important, but we've got to have them back in the infrastructure of water services and making sure that we have safe water supplies. So we do have some real challenges before us and, you know, just merely talking about them doesn't make a difference. I hope, more than anything, we can see a plan B of some kind where we then talk about, okay, we've got to deal with this.

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Okay, we can fight more than one huge fire at a time, or, at least, I would say we don't have a choice. We have to fight two large fires at a time and that means public health, as well as dealing with COVID-19.

CHRIS DALL: So you mentioned immunizations, and speaking of immunization Merck announced today that it was going to start work on two COVID-19 vaccines, and last Friday, Chinese researchers published the first phase one trial findings for a COVID-19 vaccine. What do you make of the latest vaccine development?

DR. OSTERHOLM: Well, I'd like to take a step back and just reflect on not just the science of these vaccines, but also what I guess I would call the public relations of these vaccines. You know, on last week's podcast I shared with you my thoughts about the Moderna vaccine announcement, what did it mean, was this in fact the big breakthrough, et cetera, and you heard me, at that point, being very cautious.

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I think it was even, the caution was further felt this week by me, in two regards. One is that the data that has come out now on several of the vaccine studies show that there very well may not be sterilized immunity that occurs with these vaccines, meaning that in the animal models, the animals were, in fact, covered from developing severe clinical illness, but they still actually had virus recovered from them, and may very well have been infectious. Now, you know, if you could just prevent serious disease, that by itself would be a major benefit, and of course, deaths on top of that if you can prevent serious disease, hopefully you can prevent deaths, but the challenge is, right now, is I'm fearful that we're selling these vaccines to the American public that they'll be here much earlier than anyone thinks are going to be here,

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from I guess I would call the wise vaccine researchers of the world, and that we've set up expectations that when they do arrive, they'll be perfectly protective. I mentioned last week that

maybe that wouldn't be the case, that we still had to figure out how these vaccines would cause us to develop immunity in people who had underlying immune deficiency issues, other risk factors that might put them at increased risk for having a severe COVID infection. Would they too respond like younger otherwise healthy people might, and so I'm afraid that, when I look at the markets, and I am no expert on the economy or markets, but I look at what is, at this point, almost a group think, that these vaccines are coming, they're gonna be here sooner than not, and they're gonna be highly effective, and that's going to be a challenge, because if we set up an expectation, then the backfire is a problem.

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In 2009, HHS got themselves in trouble with the H1N1 pandemic, promising vaccines by mid-summer, then backing it off a month after that, and then the big peak occurs from late August through early October, and decreases then, on its own without human intervention, and then that's when the vaccines arrive, and there were a lot of people who were extremely upset about that issue, and you know I've always been to the mindset measure twice, cut once, and I would say about the messaging here as we get closer to a potential vaccine, as we have more understanding of will it happen or not, how well it protect, when can we make it available, how much can we make available, how safe is it, then we can start to focus more closely on exactly what the answers are to all those questions, and give people a better sense. You know, if we've said it time and time again, just be straight with the public.

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Tell them what you know, and what you don't know. Don't over promise. Don't make it worse than it is. Just tell it, and I fear that we're setting ourselves up right now for failure in this area, because it seems that there's this desire just to promise, promise, promise. Now, I'm not naive. I understand that there's a political election coming up, that there's going to be issues around you know miraculous save with this situation, but I think it will hurt us immensely if we are not mindful of this, and I would also say, just be mindful of how we message about this. I was one of many who thought Operation Warp Speed was the worst title you could possibly think of for this program of accelerated vaccine work. I was really glad to see the program, but the title just played into what is now, a lot of traffic on the internet in the anti-vaccine world, that, of course, we're just going to skip through at warp speed, we will not assure safety,

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we will in fact put many people's lives at risk by the vaccine itself, and that was an unforced error in our part. We didn't need to do that, and so we have to message about this. As much as we have to have good R and D, we have to now be working on the supply chain issues to make the vaccines, and move forward there. There was news this week of a Chinese vaccine that's in the research portfolio, they reported results, it's one that is coupled with a part of a virus that is not that uncommon in humans, and so one of the challenges has been, would, in fact, giving this vaccine mean you have a reduced response because people have been already primed to part of the vaccine itself, would in fact make that reduction occur, and the point though is whether we thought it was a good vaccine or not is one thing, but the point of it is that they are potentially a leading candidate to have vaccine that may work somehow at some level,

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even if it's a 50 protective vaccine. Why is that important? Because we are still in this discussion about, what happens if some other country in the world gets a vaccine first? Who will be the countries to benefit from that? Will we be one of them? We've already, pretty much I think, put a stake down saying if we get vaccine we'll supply our entire country first. Understandably so, every country is going to want that, but I think we have to be very, very careful at this point about the language we use, the the approach we take, this really has to be a global resource, and, you know, we sometimes with our American approach to things, which borders on a surely pride, it is pride, but also to the extent that it's us first,

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may find ourselves in a position where we're not first on the vaccine side, and I would find that really unfortunate if we, for whatever international relations reasons, couldn't be part of a global consortium to make, supply, and receive vaccine. I think this is going to be a very important issue and one that our Center plans on weighing in on through work that we're doing right now to help prepare the world for a vaccine or multiple vaccines.

CHRIS DALL: Last week CIDRAP released a COVID-19 Viewpoint on testing, and in light of that, Mike, I'm wondering what you make of the news reported recently that the CDC is lumping together the results of active virus tests and viral antibody tests in its reporting system, and can you explain why that would be an issue?

DR. OSTERHOLM: Last week I spent some time in this podcast defending the CDC against criticism, you know, and I have to do that here again.

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First of all, having been at a state health department for almost 25 years, I understand what happens when the house is on fire. There are never enough resources, public health has been under supported since almost the beginning of time, and suddenly of people who are working out of job expertise, they're doing whatever they can to help out, everyone at the healthcare delivery system level is overwhelmed, and we're now supposed to be systematically collecting information that then comes together in a nice report that they can be basically forwarded up the chain to the CDC, which is then presents those data as the summary for what's happening in our country. They are the recipient of the information that comes from the state and local health departments. Josiah Stamp, a famous British statistician once said that,

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"When you look at the data regarding what goes on in one's community, you must remember that it comes from the village watchman, and he always puts down what he damn pleases," and so, in a sense, the CDC's data is only as good as what a state and local health department can supply. Now, they surely need to provide the oversight, they need to provide the ground rules for how it's collected and so forth, but at this point the issue that came up in several states was they did lump antibody testing and PCR testing together, as this is who they tested. Technically and factually it's true, but that's not helpful to us to understand new infections, in particular given the

challenges we have with interpreting antibody, etc. There were several states that actually included antibody data, and not inconsistent with what we put in our smart testing document a week ago, and that was when they had patients who were 10 to 14 days out from their illness onset who are now presenting with severe illness,

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but had not at the time of their first onset actually had testing done, so that they may be PCR negative by now, but that doesn't mean that they're not suffering from an ongoing COVID-19 disease process, and so they did antibody studies where we now know that you can actually pick up IGG and IGM antibody, potentially as early as 12 to 14 days. Now, those should be rare, they shouldn't be many, but again, that's how data got combined. So I know for a fact, I've talked to the staff at CDC working on this issue, they're trying very hard to, in a sense, clean it up to

make sure that there's a line between the PCR testing and the antibody testing, and I can honestly say, I don't believe there was any intentional effort here to misrepresent the data.

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It's part of the fog, again, of an infectious disease war as I mentioned earlier, and but we had to have it. We got to improve it. This is not acceptable. It's got to be done. It's got to be fixed, but it's about another resource issue. You know, we're already talking now about how we need to have resources to help support the immunization programs etc. etc. If anything that this pandemic does, it lies open completely the vulnerability of our populations when public health can't do their job. This is huge, and so I hope this is a wake-up call to everyone why what you don't routinely see every day is so very, very important to our public's health.

CHRIS DALL: And can you give us a preview of the next COVID-19 Viewpoint from CIDRAP.

DR. OSTERHOLM: Well I'm actually quite excited to see this document get published. It's actually on contact tracing. Kris Moore is again leading this, our medical director at CIDRAP, but includes a number of senior public health officials that Kris and I have had an opportunity to work with over the years from a number of different states,

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state epidemiologists, people who led major contact tracing programs, and, in a sense, what we're trying to do here is bring back some of the contact tracing efforts to a sense of reality. I felt like almost we're in a public health poker game here. You know, if you've got eight thousand, I need ten thousand, I'll call you, well I'll go 12,000 and then I'll call you. You know, what can we really do with contract tracing? How do we do it? There are many, many challenges in terms of just something as simple as every other previous contact tracing program we've ever had in public health in modern times has been associated with some benefit to the contact. So if I were to give you the names of those contacts that I had, whether they were sexual partners, whether they were related to a respiratory transmitted agent,

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TB, we could test the contacts, and if they were positive we could treat them. Even with HIV, and, you know, we started the very first contact tracing program in the country for HIV in 1985, and we, at the time, had the ability to offer them AZT, and so one of the challenges we have today is what you pretty much offer people is, if you're a contact you say, "you're now going to be home for 14 days. If you had a job as an essential worker, you're done." That doesn't play well, and we're already beginning to see, I think, some impacts of that, and people's willingness to be tested because of their fear of that if they gave up contacts names that would happen. There's questions about using electronic contact notification. I don't want to say that it couldn't be very important, but by bluetooth, how good are those data? You know, we're already

getting reports of situations where if I'm sitting next to a big metal object like not too far from the stove or refrigerator,

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object like not too far from the stove or refrigerator, I get a very different detection on my bluetooth to somebody sitting near me than if I'm not, and I might even, if my phone is under the table or on the table, that may give me a different reading. So, one of the challenges is, if you have all these contacts, just how good are they in terms of reliability, and what we can tell people about, "you've been exposed." So, I don't want at all make these comments sound as if I don't think that contact tracing can't play a role. It can, but just like the testing program, you know, where our smart testing approach was really to try to get the most out of what we could do, in the time that we have to do it, with the resources we have to do it with, and the same thing is true with contact tracing. I think this is a huge issue that we need to look at very Carefully. I will just say right up front, you know, I work a lot with the private sector,

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our Center works a lot with the private sector, they bring such incredible opportunity, and in many cases essential services to what we do in public health, but I'm beginning to see this situation where we're now outsourcing contact tracing into business consulting companies. I think this is a huge mistake. I think that ultimately we're going to pay a price for that, because there's a talent, there's a skill set, they're requirements that, for confidentiality, etc. not that that can't be done by some of these companies, but we're already hearing the horror stories about some of the issues that have come up there. So I'm looking forward to this viewpoint coming out, I think you all as listeners will find it very useful and very helpful. It's just meant to be practical. It's meant to be realistic, and it's also meant to be, we got to do whatever we can, but there are limits to that based on just what

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the effectiveness might be, and what the potential implications would be for causing harm.

CHRIS DALL: Mike, you took part in the webinar today on the COVID-19 pandemic co-sponsored by CIDRAP and the Federal Reserve Bank of Minneapolis and featuring several public health and economic experts. What was your takeaway from that webinar?

DR. OSTERHOLM: Today was actually a very special day for us here at CIDRAP. We had the opportunity to collaborate with the Federal Reserve Bank of Minneapolis, under the leadership of Neel Kashkari, the president of the bank, to actually hold a webinar on the issue of COVID-19 and health and the economy, and it was a three-hour long program attended by almost 2,000 people around the world, and the whole purpose of this was to actually begin to address the questions we're not. This is a false choice between responding to COVID-19 and basically completely destroying our economy.

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We have to figure out, is what I've been calling all along, how to thread the rope through the needle, and today was an attempt to help do that, and we had a remarkable group of people who participated. It was moderated by Tom Brokaw, former news anchor NBC news. The keynote was presented by Sir Jeremy Farrar, who is the head of the Wellcome Trust. He provided an overview of where we're at and where we're going with COVID-19 that was simply



remarkable, and really hit home to the points of where we're at, and the fact that we have a long ways yet to go. In addition we had a panel discussion that was made up of both economist and public health experts. Katherine Baicker, who is the chair of the Harris School of Public Policy at the University of Chicago, and Lawrence Summers at Harvard University,

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former treasury secretary represented the economic issues, Dr. Margaret Hamburg, who is now at the National Academy of Medicine, but former FDA commissioner, and Julie Gerberding who is one of the leaders in vaccine work today in the country, who's at Merck and companies and the former director of the CDC, participated in a panel with Neel. It was really a very lively and thoughtful panel, and then we had a closing conversation and audience question and answer with Tom, Jeremy, Neel, and myself. I think the important message here that came out of this is, number one: this is going to be a long, long haul. You have to understand this is not going to get over with in a few months. This could easily last several years if we don't have an effective vaccine, and even with an effective vaccine we could have another 12 months of what could be a much more severe situation than we've seen to date.

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I remind people over and over again, it's a sobering thought, but it's necessary to consider if we're trying to figure out how we're going to make our way through this, that about five percent of the U.S. population to date has been infected with this virus. That's it. Even if you take the hot spots of New York and add that in to the overall national average, it's about five percent. Think how much pain, suffering, death, and economic disruption have occurred at five percent, and yet this virus is going to continue to transmit at this very high rate, until we get to at least 60 or 70 percent of the population infected and develop immunity. That way, hopefully we can get immunity that way, or we have a vaccine that gets us to that level, and as we know that's not coming soon. So this webinar really laid out why we have to begin planning, not just for the next few weeks, not just to how to unlock, and release the society back into everyday life, but what do we do for the next months ahead.

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Will we have to close down again? Why would we close down? Have we learned anything about closing down the first time, that would give us an opportunity to do it better the second time? How will we make those decisions? The other thing that came out of this is just the fact that we are so vulnerable to pandemics and infectious diseases in general, and that, you know, we can't change that right now, but we must not forget that as we work through this pandemic, so that we understand in a kind of a hot wash way, you know, kind of the black box out of the crashed airliner, to learn what went wrong, what could we have done better, and where does that go. I published an article this past week in Foreign Affairs on this very issue. It's ironic that the it's a rather larger article about 5000 words,

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but the opening paragraph and the closing paragraph were taken from my 2005 foreign affairs paper and inserted in there, and it could have just as easily been written today. It just gives a sense, I think of, how little we've done to be better prepared for these pandemics, so we need immediate answers. We need to figure out right now, today, how do we reopen. We need to

figure out today, how do we protect people that may be at increased risk of disease. We need to understand today, what it means to actually take care of those who are most at risk of having severe disease, and so that was part of this discussion, but it also helped us understand that society can never again look at public health preparedness as a option. It is a requirement, and what we have paid for this in lives and dollars lost, and the pain and suffering, we can't suffer again, and there's a lot we can do to deal with that.

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CHRIS DALL: And if you're interested in viewing that webinar you can find a link to it on the CIDRAP website. So, Mike, as our listeners well know you like to share some parting thoughts every episode. What thoughts would you like to leave our listeners with this week? Things are tough right now. We are unfortunately finding ourselves more and more in a divided community, and not coming together over issues that should unite us against a common enemy, the virus, and those are tough. We're at a different level of public health than I've ever seen before, and I think that's really an important understanding, because it's not enough to just use the science to address the science, we've also got to figure out how we can help society in general come together. I've said to you before, I will continue to say it, everyone on this podcast, there's a price to pay for listening to this thing, and that is go out and do your random acts of kindness, and again, every day if we could use that epidemic of kindness,

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that epidemic of kindness, we could start to take on that pandemic of a virus, and so I do that, and I just have to share one last perspective. Again, I can't begin to tell you the people who write in, who provide their thoughts, their comments, surely some of them are a little hard to read, but I read them, and at least I try to, in terms of finding them, and learn from them, but there are those who out of the goodness and the kindness of your hearts, share so much, a very important part of you, and I just have to share one that came in from Paul, who I found to be so enlightening, and one that surely I will keep for many years to come, and he wrote, "I fear that so many of us, myself included, have unintentionally shifted our intention and focus to the future. When will there be a vaccine? When are things going back to normal? When will I become infected? All of these are

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All of these are natural thoughts to have, but we must remember that the only thing we have for certainty, is the events going on in the present moment. Just a few nights ago, I found my mind wandering off to worry about my wife who is a nurse, and her risk of infection. Certainly an understandable concern, however my mind was off in future thought, while I was reading to and putting my three-year-old daughter to bed. I wasn't really there with my daughter in that moment. I missed out on a moment that could be meaningful. It is a false dichotomy to assume that in order to experience joy and happiness, COVID must be in the rear view. Rather, it is possible, and now essential to experience positive emotions like the joy in the midst of this COVID storm." What incredible words to remember. We're living the moment. We can't forget that. That's part of kindness, and so I thank you again for another opportunity to be with you,

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this is a wonderful gift you give me to be able to spend time with you, and thank you and I wish all of you a very safe and very rewarding week, and go out and do that kindness. Thank you.

CHRIS DALL: Thank you, Dr. Osterholm, and thanks for listening to the Osterholm Update: COVID-19, a weekly podcast from the Center for Infectious Disease Research and Policy. We'll be back next week with another episode. Until then, you can keep up with the latest COVID-19 news by visiting our website: [cidrap.umn.edu](http://cidrap.umn.edu).