**Harlan Krumholz:** Welcome to *Health & Veritas*, I’m Harlan Krumholz.

**Howard Forman:** And I’m Howie Forman. We are physicians and professors at Yale University. We’re trying to get closer to the truth about health and healthcare. Usually at this time we have a guest. Unfortunately, our interview with Dean Jeffrey Sonnenfeld of the Yale School of Management faced significant technical difficulties, and we’re going to bring him back at a future time for the podcast.

For this week, we’re going to talk about healthcare topics as we usually do in a more extended format. And I’m curious to know what’s on your mind right now, Harlan.

**Harlan Krumholz:** I keep getting drawn back to our twin pandemics now. I’ll call them the twin pandemics because that’s actually—according to the WHO, we’ve got two active pandemics going on. Well, actually, since there’s a case of polio in the U.S. just recently reported, I know you’re going to talk about that later. All three pandemics are operative right now, Howie, all three pandemics are operative.

But just, people may not have been aware that there was a [pre-print](https://www.medrxiv.org/content/10.1101/2022.07.26.22278042v1) that was posted recently from the WHO that focused on the transmissibility of monkeypox. And I’ll give a hat tip to [Katelyn Jetelina](https://yourlocalepidemiologist.substack.com/), she’s an epidemiologist who writes often about what’s going on in the world. And she tipped me off that this was recently posted. And it’s an issue because a lot of people, as they hear about monkeypox, they know the WHO’s designated it a pandemic emergency, are worried—how easy is this thing to catch? If I just touch a doorknob or if I come anywhere close to other people.

And lots of people are getting scared about this because they’re ... You saw Scott Gottlieb wrote [an editorial](https://www.nytimes.com/2022/07/30/opinion/monkeypox-public-health-failure.html) in *The New York Times* and said we’re missing the opportunity to get ahead of this and this is going to bear a lot of consequences. This virus is a relative of the one that caused smallpox, which was totally eradicated from the globe. It exists only in the form of being frozen in certain places where scientists are doing research on it. But this thing, monkeypox, the reason it was called monkeypox was it was first detected in monkeys in 1958 during an outbreak at an animal facility, interestingly enough, in Denmark. And then the first human case was only documented in 1970 in Central Africa.

Anyway, like we said, as you know, in May, or beginning of May, the World Health Organization was informed that there was a confirmed case of monkeypox in the United Kingdom in someone who had traveled from Nigeria. And then a short time later, 10, 11 days later, Portugal, Spain, and the United States, where outbreaks had been unheard of before, started reporting a relatively small number of cases.

But by mid-July over 70 countries had reported a total of over 16,000 cases of monkeypox. And that was where there was a sense that there was a global response that was needed and was starting to be galvanized, including this idea of a vaccination, they call “ring vaccination,” sort of cordoning off the pandemic. And it was really at that time that the World Health Organization began to call this a public health emergency of international concern and declared the emergency on July 23rd.

So what I wanted to talk about was this pre-print that come out and made an estimate of what we call this reproduction number. The reproduction number is, for every person who has it, how many people do they spread it to? And the reproduction number for one of the most infectious agents that we’ve talked about, measles, is something around 12. That’s why the thing just spreads like wildfire and people get so concerned about measles outbreak, because if somebody got measles ... one of the most infectious things we know about. Somebody gets measles, 12 means that for each person infected, if they’re exposed to an uninfected population, they may spread to as many as 12 people. Of course, all this depends on how close contact people have, what kind of behavior, what kind of mitigation strategy.

This reproduction number is highly dependent on not just the transmissibility of the virus but the milieu, the context in which people live. Obviously people are living in very close contact, they’re going to spread it to more people. They’re spread out, they’re going to spread it to fewer people. You got to understand that it’s not just about the transmissibility of the virus. But let’s just say it’s directionally correct, it’s giving you some sense of it. And they estimated it based on aggregating all the cases in the 70 countries as of July 22nd. They wanted to get a sense of what this was. And I don’t know if you’ve seen this. Did you see this, Howie?

**Howard Forman:** I tweeted it yesterday. I think, well, 1.29. Is that the paper you’re talking about?

**Harlan Krumholz:** Yeah, exactly. And Howie’s tweets are full of great information so everyone should be following, and I should follow him more closely, Howie’s tweets. But the 1.29 should tell you that in the range of infectious transmissible viruses, this one’s at the low end, based on what we know so far. Well, based on their estimate.

Now this doesn’t mean that we should put our heads in the sand. It doesn’t mean that we should ignore it. It doesn’t mean it’s not important. And it doesn’t mean that it doesn’t merit the designation of public health emergency. I’m not saying that at all. I’m just trying to give people a sense of proportion here. And to suggest that the estimate of 1.29 would say it’s kind of hard to transmit. People aren’t transmitting it to a large number of numerous ... It’s like every three people may be transmitting it to another person, when you’re getting—

**Howard Forman:** Right. I mean, let’s say, every three people are going to transmit it to four people. The problem is, anything above one means it’s growing. And so it’s so important that we get it below one. But that paper dovetails tremendously, Harlan, with [the paper](https://www.medrxiv.org/content/10.1101/2022.08.01.22278199v1) also on your pre-print server, medRxiv, by Gregg Gonsalves and his group with Alyssa Bilinski, who’s also a colleague from, I think, Harvard. And what they looked at is, they modeled out what interventions can work. And they had to do this all based on modeling. They didn’t have the 1.29 number, but they modeled 1.2 up to two. And basically their paper said that we have basically precisely the right number of vaccines available to us right now, if you could perfectly get those vaccines in the right hands. And with that perfect number, we can get this below one. But it does point out to me that we need a coordinated response that involves communications, vaccinations, identification of cases, treatment of cases, and so on. But that paper, that 1.29, it took us over two months to get that. We had papers like that on COVID within a week, so we’re a little bit lagging behind here.

**Harlan Krumholz:** Totally agree with all your points. And by the way, that paper that you’re citing out of Yale is a terrific one too, great modeling. And I guess my major point is, people listening, is just to suggest that our best knowledge is it really takes prolonged contact. In many cases, it seems like the kind of contact you get with sexual relations.

At this point we should be taking seriously doing all the things you’re talking about, but also, people don’t have to be fearing every time I touch a surface now. It has been shown probably can be transmitted by fomites to us. Even aerosolization, especially people who have lesions in their mouth, but in general this is not the kind of thing ... Even with COVID, it’s much less transmissible. So I wanted to make that point, and then I have one more quick point.

**Howard Forman:** Go ahead. I mean, I’ll just, I want to add one thing for our listeners, that we know about 25 cases in kids under the age of four worldwide right now. Which is either scary to you, or it’s comforting because it means that relatively little household transmission is going on.

**Harlan Krumholz:** The one other paper I wanted to just keep people into that came out. This does go back to long COVID, it’s an area of interest of mine and project and work that I’m doing with Akiko Iwasaki and others, trying to figure this out. But there’s a group out of the VA, which I’ve mentioned before on the podcast, who now came out with [a piece](https://www.nature.com/articles/s41591-022-01840-0) around long COVID after breakthrough SARS-CoV-2 infection, in which they studied over 30,000 people with breakthrough infections. And then matched them with lots of other controls, different kinds of controls. Because this ends up being hard to do, to figure out whether or not people who are infected with a breakthrough infection have got a higher risk of long-term problems. They need to compare them with other people. And they did a lot of good work to figure this out.

But here was the concerning part, was that lots of people are dismissing, “I get a breakthrough infection, big deal. I’m sick for a couple of days.” Most people get over it. But they’re indicating that it seems like, when you look at long term, these breakthrough infections are also associated with long-term increase in risks from cardiovascular problems, coagulation, which would mean blood clots or bleeding, gastrointestinal, GI stuff, kidney, mental health, metabolic, musculoskeletal, neurologic. I’m only just saying that as we start to understand COVID, we can’t just be looking at the acute side. So we’re focused a lot on hospitalizations and early deaths, but we’re going to need to be looking at the long term.

The government just came out with [the report](https://www.whitehouse.gov/briefing-room/presidential-actions/2022/04/05/memorandum-on-addressing-the-long-term-effects-of-covid-19/) on Wednesday, in which they’re talking about a coordinated effort that’s going to take place. And it’s already ongoing across the entire government, trying to create a coherent response, both with regard to supporting people who have long-term harm from COVID, but also investing in research and coordinating efforts in ways that have been unprecedented before. You and I were part of [a report](https://science.house.gov/imo/media/doc/Emanuel%20Written%20Testimony.pdf) that called for this, and the government has responded. They will need to be accountable. We’ll have to see how this plays out, but I continue to be worried and advocating for investments so that we can learn rapidly and figure out what it’s going to take to prevent and mitigate these kind of long-term consequences.

And we should continue both to try to pay attention to what happens early, but not be satisfied that, okay, that’s the whole ballgame here. We got to recognize there’s a lot going on downstream. To many people it doesn’t end when they get over the initial period. And we’ve got lots more to learn.

**Howard Forman:** And by the way, I’m not saying that there is such a thing as long monkeypox, but God, I pray that we’re actually learning some of the lessons that we had from COVID and following large cohorts of individuals over time. Because we should not make the same mistake with two separate pandemics happening within two years of each other.

**Harlan Krumholz:** Well, I hope we’ll learn a lot. I think there’s been a lot to these post-viral syndromes that has yet to be uncovered. And maybe this is going to be the impetus that opens up the entire understanding of people, including MS, diabetes, Alzheimer’s, and there’s lots of diseases—

**Howard Forman:** Exactly. A lot of chronic illness.

**Harlan Krumholz:** …a lot of chronic illness that may be related to how the body reacts post viral infection. So anyway, lots to learn.

**Howard Forman:** A hundred percent.

**Harlan Krumholz:** But let’s pivot here to the next part, which is really your part in trying to hear what’s on your mind lately.

**Howard Forman:** Yeah. I’ve been following, as you have, all of these infectious outbreaks and as you mentioned, polio is one of them. The Global Polio Eradication Initiative issued [a statement](https://polioeradication.org/news-post/report-of-polio-detection-in-united-states/) this past week in response to the recent case of paralytic polio in a young man in Upstate New York. His case appears to be caused by type 2 VDPV, it stands for vaccine-derived polio virus. This can sound scary to many folks, so it’s just worth briefly unpacking this.

The oral polio vaccine that is used in other parts of the world but not in the United States, contains live attenuated, which means less dangerous, polio virus that stimulates an immune response. It cannot cause polio itself. That vaccine, even though we don’t use it in the United States but it is used broadly, itself cannot cause polio, and the vaccine itself doesn’t cause polio in immunized individuals, you or I or so on. But those individuals who get this oral vaccine can shed the virus, because it is living in them as it provokes its immune response, and that shed virus can infect someone who is not immunized. Someone who has not previously received a vaccine to polio.

And then mutations occur, and those mutations allow that original vaccine, that live attenuated vaccine, to become dangerous again, including the causation of paralytic polio, such as in this young man that we mentioned. In the United States, we administer only the inactivated polio vaccine by a series of four shots, by the way. To those people that keep saying, “Why are we getting so many COVID shots,” polio is four shots. And those are typically finished by the time of first grade. You and I, Harlan, received the oral form, which is basically what dominated in the United States until 1987. But everybody else is now getting the inactivated vaccine in the United States.

The single best way to avoid paralytic polio is to be vaccinated. And the GPEI, the Eradication Initiative, has pointed out that the current case is genetically linked to wastewater sampling from London, Jerusalem, and New York. So this man is not the only person because he has not recently traveled to those other areas. Any cases of paralytic polio, just to repeat this, are completely avoidable, but only if individuals are immunized. And a reminder to our listeners, that the 1952 outbreak resulted in 58,000 cases, 3,000 deaths, 21,000 individuals left with mild to disabling paralysis. The pandemic interrupted many childhood vaccination schedules. And particularly, as we approach a new school year, it is a great time to remember to get your children fully vaccinated and keep them safe.

**Harlan Krumholz:** Really important and well said, Howie. And I like it when we can use our platform here to try to promote some of these public health messages, so thank you so much for sharing that.

I do want to, since by the way, we’re just ending up here today, and I don’t know if you saw that [Eric] Topol [tweeted out](https://twitter.com/EricTopol/status/1554854773261602827) and actually had a nice explanation. It does seem like hospitalizations from BA.5 are plateauing, and maybe we’re getting this wave—

**Howard Forman:** We need good news.

**Harlan Krumholz:** And that would be good news. I always like, we have so much on here that may give people concerns. So anyway, I was happy to see that.

**Howard Forman:** Yeah, that is good news.

**Harlan Krumholz:** Yeah. You’ve been listening to *Health & Veritas* with Harlan Krumholz and Howie Forman.

**Howard Forman:** So how did we do? To give us your feedback or to keep the conversation going, you can find this on Twitter.

**Harlan Krumholz:** I’m [@hmkyale](https://twitter.com/hmkyale/), that’s HMK Yale.

**Howard Forman:** And I’m [@thehowie](https://twitter.com/thehowie/), that’s @T-H-EH-O-W-I-E. You can also email us at health.veritas@yale.edu. Aside from Twitter and our podcast, I’m fortunate to be the faculty director of the Healthcare track and founder of the MBA for Executives program at the Yale School of Management. Feel free to reach out via email for more information on our innovative programs, or you can check out our website at [som.yale.edu/emba](http://som.yale.edu/emba).

**Harlan Krumholz:** *Health & Veritas* is produced with the Yale School of Management. Thanks to our researcher, Jenny Tan, and to our producer, Miranda Shafer. As a quick programming note, we’ll be taking a four-week break starting next week. We’re giving people the summer off, yahoo. We’ll be, we’ll resume releasing episodes in September. Talk to you soon, Howie.

**Howard Forman:** Thanks very much, Harlan, I’ll look forward to seeing you again in early September. Talk to you soon.