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ReachMD
www.reachmd.com
info@reachmd.com
(866) 423-7849

Diving into the Spread of Monkeypox: A Microbiologist Weighs In

Mr. Nacinovich:
Microbiologists play a huge role in discovering how to control the spread of infectious diseases, such as monkeypox. Learning more about the molecular makeup of this disease can help us stop the spread. But what have we learned so far?

Welcome to *Clinician's Roundtable* on ReachMD. I'm your host, Mario Nacinovich. And here with us to share what we know about monkeypox is Dr. Charles Gerba, microbiologist and Professor of Environmental Science at the University of Arizona.

Dr. Gerba, welcome to the program.

Dr. Gerba:
Thank you.

Mr. Nacinovich:
Dr. Gerba, let's begin with some basics on the transmission of monkeypox. What can you tell us about when it spreads the easiest from human to human?

Dr. Gerba:
Really, it spreads the easiest with close contact. Really, skin-to-skin contact is believed to be the main mechanism of its spread or when it came to acquiring it from animals, close contact with monkeys or rodents either as pets, or preparing them for a meal even as, as done in Africa, for example and that, so close contact. Close contact also means maybe face-to-face contact as potential for aerosol spread of this, or contact with surfaces that you might be touching or clothing or bed sheets, for example, have been shown to potentially be a route of transmission of this group of viruses.

Mr. Nacinovich:
So let's talk a little bit more about the animal transmission. How easily can this disease be transferred from animal to human?

Dr. Gerba:
Well, it depends on the contact. It does take some intimate contact. There was an outbreak of monkeypox in the United States back in 2003 from prairie dogs that eventually acquired it from imported animals and in spreading the virus, so usually, it takes some type of close contact with animals. And the animals that can acquire this virus are both primates and various rodents. And, of course, that's one of the concerns that this virus may, uh, uh, become adapted to rodents like, say, in the United States, like it is in other continents.

Mr. Nacinovich:
Now, let's dive into the molecular makeup of the monkeypox virus. Can you describe its structure and its behavior?

Dr. Gerba:
Well, it really looks like a brick. It's a very large virus kind of ovoid shape, and it's about 10 times larger than the common cold virus, and it's a double stranded DNA virus that is unusual, and it replicates in the cytoplasm of infected cells rather than nucleic acid. And, and it's got an envelope around it, which makes it more sensitive in some ways to detergents and that, anything that might dissolve a fatty substance.

Mr. Nacinovich:
Now, given the current outbreaks we've all been experiencing around the globe, do you think the virus could also mutate into other strains?

Dr. Gerba:
Yeah, I think that's the big concern, how much mutation we might see. Now, we have 2 clades of it, you know, previously referred to as the West-African clade and the Congo clade. Now, World Health Organization has renamed them clade 1 and clade 2, clade 2 being the one we're currently concerned about. But viruses always evolve and mutate on a regular basis, so the concern is how much mutation we might see taking place as this spreads through the human population. Will it evolve in some way to make it more infectious, less infectious?

It doesn't spread very readily among secondary contacts, usually less than 10 percent, about 9 percent, so it's a virus that we don't see spread very rapidly, and hopefully, it doesn't evolve like we've seen with the SARS-CoV-2, evolving into more infectious strains. It seems unlikely with this group of viruses, but that's always a concern.

Mr. Nacinovich:
For those just tuning in, you're listening to *Clinician's Roundtable* on ReachMD. I'm Mario Nacinovich, and I'm speaking with Dr. Charles Gerba about the transmission of the monkeypox virus and its molecular behavior.

So, Dr. Gerba, with all the information in mind, how should clinicians counsel their patients on the monkeypox virus and their risk of contracting it?

Dr. Gerba:
The risk of contracting it is very low in the general population too. I think the concern is with intimate contact with individuals you might not know, you're increasing the risk of potential transmission of the virus, but usually, it requires intimate contact or contact potentially with the scabs, or pustules that may be present on individuals and contamination of surfaces like bedding, clothing and that. I think otherwise it's very low potential for its spread among people, so concern is low.

But now, if you have somebody infected in your house with the monkeypox, then you might want to take precautions, you know, in handling like the clothing, and the bed sheets, bedspreads, anything that might come in contact. Regular disinfectant is recommended. If you're going to be handling clothing or bed sheets, don't shake them because you could aerosolize the virus. That's been seen in hospitals where they change bedding and they get aerosolized monkeypox virus.

So there are precautions, and they are listed, uh, on the CDC's webpage of what you should be taking to ensure that you're not going to transmit this to other members of the household, particularly by contact or aerosol spread.

Mr. Nacinovich:
Dr. Gerba, do you think that the preparation and now the standard operating procedures that were afforded us with the use of PPE, during the COVID pandemic—do you think that prepared us well to be able to address monkeypox virus and be prepared to handle it?

Dr. Gerba:
I think the current PPE precautions that have been recommended are adequate, and I think everybody became very familiar with that. It makes it easier. Now, again, monkeypox is not as easily spread. You know, probably recommended, you know, that you might want to wear a face mask and gloves, certainly, but we don't see it as being as infectious as the SARS COVID-2 was of it so, but you should still follow the same precautions of a face mask if I was seeing a patient, or wearing gloves, of course, as always avoiding maybe close to face-to-face contact with the patient.

You know, I think we're in a situation we know the virus is spreading. You know, one of the big things that happened with SARS COVID-2, we started doing wastewater-based epidemiology to monitor these infections in the community, and we're already seeing it popping up in the wastewater around the country, the monkeypox, so we know it's spreading around the country at a low level. So, really, this wastewater epidemiology is giving us a lot of insights. Now we're more prepared to look how this is spreading and how many people are likely infected, and I think you saw it already too, the announcement of finding the polio virus in the wastewater in New York and that. So we have a new tool now to really look at how viruses are spreading in the human population very rapidly without looking at thousands of clinical samples. I think it helped us be better prepared for the monkeypox.

Mr. Nacinovich:
And as we close, I'd like to give you the final word, Dr. Gerba. Are there any thoughts you'd like to leave with our audience today?

Dr. Gerba:
I think we're seeing the situation with monkeypox continually evolving as it's spreading, and I think the door is still open as how this is going to be contained. Eventually, we know we can contain it with smallpox vaccination. It's about 85 percent effective in that. But it's a rapidly evolving situation, and it's going to be really not known what's going to really happen until the next few months and that.

I think it pays to be cautious though. We believe this virus is not spread very readily compared to like the SARS COVID-2, and it can be

more easily contained; we do have a vaccine that works; so I think the situation is currently at hand. A big concern now, is it going to be permanently established in the human population? And I don't think we'll know that for a while yet.

Mr. Nacinovich:
As we come to a close for today's program, I want to thank my guest Dr. Charles Gerba, for his insights on the monkeypox virus. Dr. Gerba, it was a pleasure speaking with you once again today.

Dr. Gerba:
Thank you.

Mr. Nacinovich:
I'm Mario Nacinovich. To access this and other episodes in our series, visit ReachMD.com/CliniciansRoundtable where you can be Part of the Knowledge. Thanks for listening.

Dr. Gerba:
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