

How dangerous is monkeypox?

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Monkeypox, which is normally encountered in Central and Western Africa, has spread to more than a dozen countries, including the United States. Cases in the current outbreak now number in the hundreds. This has fueled more infection fears, no surprise in the wake of the still quite active COVID pandemic.

Monkeypox can occasionally be deadly, especially in poor places with inadequate healthcare, and is closely related to smallpox, which plagued humans for millennia. Smallpox was eradicated due to a worldwide vaccination campaign. In the United States, mass vaccinations ended in 1972, but the vaccines remain stockpiled. Monkeypox has been known since the late 1950s, and despite its name, its natural reservoir is rodents. It most often spreads between humans through contact with disease lesions, or through exhaled respiratory droplets during prolonged close contact.

Air travel from Africa is believed to have triggered the outbreak. Contact tracing is underway. The Centers for Disease Control and Prevention (CDC) hosted a press briefing this week in which officials focused to a large degree on spread of the [virus](#) among men who have sex with men, who appear to account for most cases of the current outbreak.

We spoke to Seth Blumberg, MD, Ph.D., an assistant professor of medicine at UC San Francisco, who is clinical specialist in infectious disease, as well as a computational scientist who studies the population-level emergence and elimination of disease. Monkeypox is among the diseases he has studied.

What are similarities and differences between monkeypox and smallpox?

Monkeypox and smallpox are in the same class of viruses. They share cross-immunity, which means protection against one confers protection against the other. In particular, vaccinations developed to protect against smallpox protect against [monkeypox](#). There is overlap in clinical symptoms. Both are associated with fevers, swollen lymph glands, fatigue, and a vesicular rash—a rash with little blisters, which may be

distributed anywhere on the body, and which is easily confused with chickenpox. Fortunately, the biggest difference is that monkeypox is much less disfiguring and deadly than smallpox, and in particular, the Western African strain of monkeypox which is circulating now is less pathogenic than the strain found in Central Africa.

Is monkeypox becoming more widespread?

We have seen an increase in cases of monkeypox in recent years in Africa. The increase is due to a combination of factors, affecting both animal-to-human transmission and human-to-human transmission. One key factor is that people are not getting vaccinated against smallpox anymore, so there is some loss of immunity within the population.

Routine vaccination for smallpox in the United States ended in 1972. How much protection from monkeypox do vaccinated and unvaccinated people have?

We are not as protected as we were 50 years ago when smallpox vaccination was common. We don't really know how much population immunity remains because monkeypox has not presented much of a disease burden to gauge protection. Hopefully the elder part of the population is protected from prior vaccination, and there is a good chance that it is. We just don't know for sure.

How is it that a vaccine developed more than a half century ago to fight smallpox still is effective today against monkeypox, while a COVID vaccine developed just a year ago already needs updating?

Viruses have a remarkable ability to change over time by genetically

mutating. But the rate of change is different for different viruses. The genes in monkeypox virus is encoded by DNA, while the genes in SARS-CoV-2 are encoded by RNA. RNA viruses, including the SARS-CoV-2 virus that causes COVID 19, tend to mutate much quicker than DNA viruses, such as monkeypox. Because of this it generally is harder to come up with a vaccine that remains effective for a long time against RNA viruses in comparison to DNA viruses.

What have you learned from your past studies of monkeypox and other disease outbreaks in humans and animals?

I think one of the things that monkeypox demonstrates is the interplay between individual health, people's habits and behaviors, [national health](#), global health, politics, economics, poverty, wildlife, and climate change. As aspects of the world change, it affects the epidemiology and emergence of diseases.

Most physicians have not seen monkeypox. Is it difficult to diagnose?

Monkeypox is one of several diseases that present as a vesicular rash. A trained physician can often identify which disease is most likely. For example, the rash of herpes simplex virus is typically localized to genital or oral regions. Shingles, caused by reactivation of the virus which causes chickenpox, results in a distinctive vesicular rash that usually wraps part way around the trunk in a narrow band and affects just one side of the body. However, it may be harder to distinguish monkeypox from chickenpox. Both lead to widely disseminated rash. Chickenpox is much more likely, but any such rash deserves medical evaluation.

Do you have any suspicion that the monkeypox virus may be spreading differently than it has in the past?

It's possible that it is evolving in a way that makes it more transmissible. In some cases in the current outbreak the virus has been genetically sequenced, and we have not seen major changes, but the importance of subtle changes can take some time to figure out. We certainly have not previously seen this many cases emerging outside of Africa. Perhaps there are easier pathways for transmission in cities or during large events where the virus has not been before. Although it might not be a factor in this outbreak, you should also consider environmental changes as well, such as whether a different animal population has become a new reservoir for the virus.

Is this monkeypox outbreak potentially a major global health threat, like COVID?

I think we have a much greater chance of controlling monkeypox than COVID. For one, monkeypox is not as transmissible, unless the biology has changed drastically, and that seems unlikely. Secondly, it takes much longer for a monkeypox infection to develop within an individual and to become transmissible. Therefore, there is a greater opportunity to protect contacts. Third, monkeypox may not be very transmissible before its visible rash highlights the need for quarantine, while COVID can be transmitted before symptoms emerge and even in asymptomatic cases.

Many cases in the current outbreak have been among men who have sex with men, a focus of the CDC. Do you think these men are at greater risk?

Because we don't yet have full data on the modes of transmission in the [current outbreak](#), it's important to recognize that the case reports we're hearing about—transmission events between sexual partners—potentially is due simply to prolonged close proximity or skin-to-skin contact. I have not seen any data showing that the virus is transmitted by semen or vaginal fluid. The virus is not targeting people specifically because of their sexual practices. I would be concerned about close contact between any two people when one of them has a rash.

How concerned should we be now about monkeypox?

Based on the prior history of monkeypox over the past few decades, and from what we have seen so far with the number of cases now, monkeypox has not reached a level of threat comparable to the ongoing COVID pandemic. So, while I think we can be cautiously optimistic that the outbreak will be controlled, I think it's important to have some level of awareness about monkeypox and to be ready for the unexpected. We need to support the public health agencies and laboratories that are working hard to understand the epidemiology, pathophysiology and [treatment options](#) so that we are prepared to address whatever circumstances come our way with as much scientific precision as possible.

Provided by University of California, San Francisco

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