

# Study: Pig virus is easily transmitted among chickens and turkeys

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The first animal study of a pig virus' potential to jump to another species shows that the virus, once introduced to a select group of birds, is easily transmitted to healthy chickens and turkeys.

The researchers who led this work were part of a team that previously found in a lab setting that the virus could infect cells from multiple species, including chickens and humans.

In this study, [birds](#) that were given the virus developed diarrhea by two days after infection. Healthy birds housed with infected chickens and turkeys also developed diarrhea two days after exposure.

That rapid spread of disease surprised the Ohio State University scientists.

"We weren't even sure the virus would transmit from bird to bird. That's a significant finding," said senior author Scott Kenney, assistant professor of veterinary preventive medicine based in Ohio State's Food Animal Health Research Program at the Ohio Agricultural Research and Development Center (OARDC) in Wooster.

"It looks like it's pretty readily able to spread between birds. It's a little concerning because if the virus gets into one or two animals in a large layer or broiler house, it would probably permeate through the entire house pretty quickly," Kenney said.

Susceptibility to a [pig virus](#) can't ethically be tested in humans—but the previous work in cells showed the virus attaches itself to the same type of receptor in many different host species.

"If the human cell culture model is as predictive as it was with the chickens, then humans are definitely susceptible to having virus-related disease," he said.

The study is published in the online journal *Emerging Infectious Diseases*.

This virus, porcine deltacoronavirus, was first detected in pigs in Asia in

2009 and caused a swine diarrhea outbreak in the United States—involving Ohio pigs—in 2014. It is part of the family of pathogens that cause respiratory and gastrointestinal diseases in the species they infect.

There are four types of coronaviruses. Two illnesses known for life-threatening regional outbreaks, [severe acute respiratory syndrome](#) (SARS) and Middle East respiratory syndrome (MERS), were caused by betacoronaviruses. The current respiratory disease outbreak associated with a live animal market in China is also attributed to a betacoronavirus. Deltacoronaviruses historically have been linked to birds, and scientists suspect that this porcine virus originated in an avian species.

In this study, researchers worked with 14-day-old chickens and turkeys. In each group, they directly gave 10 birds the virus obtained from an infected pig. Two days later, the researchers allowed uninfected "sentinel" chickens and turkeys to live among the infected birds.

Most infected birds developed diarrhea at various time points, and the sentinels had mild to moderate diarrhea after joining the infected flock. Based on the length and severity of symptoms, the study showed that turkeys are more susceptible to the virus than chickens.

Other signs of disease in the birds included distended intestinal tracts containing gas and yellow liquid, high levels of the virus RNA in swabs of their tracheas and digestive tracts, and increased antibody levels in the directly infected birds and some sentinels, said Patricia Boley, first author of the study and a research associate in Kenney's lab.

"Both chickens and turkeys were still shedding the virus at 14 days, when the study ended. We don't know how long either species would continue shedding the virus," Boley said.

Despite the presence of virus RNA in the trachea, the birds showed no signs of respiratory symptoms, which would make this virus more dangerous than enteric—intestinal—symptoms. The virus also did not kill the birds, but it can lead to death in piglets.

"We want to figure out why the virus is enteric versus respiratory, and how the hosts respond differently," Kenney said. "With piglets we see mortality. We don't have chickens dying, but we have piglets dying from the virus, so what makes the chickens different in their response to the virus? Maybe we can learn something from chickens and apply it to the pigs so they get less sick from the virus."

Though there is no screening in place to detect this deltacoronavirus in humans, Kenney said it is feasible that humans have been exposed and infected and even had symptoms.

"People who get gastroenteritis may write it off as food poisoning. Deltacoronaviruses may be in some cases causing human disease, but we don't know that aspect of it yet," he said.

The [virus](#) cannot be transmitted to humans by consumption if the meat is properly cooked, he noted.

**More information:** Patricia A. Boley et al, Porcine Deltacoronavirus Infection and Transmission in Poultry, United States<sup>1</sup>, *Emerging Infectious Diseases* (2020). [DOI: 10.3201/eid2602.190346](https://doi.org/10.3201/eid2602.190346)

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