Questions and Answers: SARS-CoV-2 Surveillance in Free-Ranging Deer and Other Cervids

Summary

In November 2021, the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) began sampling wild white-tailed deer (*Odocoileus virginianus*) for active infection of SARS-CoV-2 (SCV-2) virus and the presence of antibodies indicative of prior infection. In fall 2022, APHIS expanded disease surveillance efforts to investigate the presence of SCV-2 in other members of the deer family (cervids). This approach to monitoring and evaluation of cervid populations across the United States aligns with APHIS' American Rescue Plan Strategic Framework.

What did APHIS study?

Federal and academic researchers have documented that captive and wild WTD can be infected with SCV-2 and transmit the virus to other WTD. To better understand the susceptibility of wild WTD to SCV-2, APHIS' Wildlife Services (WS) Program conducted a pilot serological study in four States. WS collected blood samples from a total of 385 WTD between January and March 2021. Approximately 40 percent of those samples contained SCV-2 antibodies suggesting that the virus is

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circulating in wild WTD populations in the four States evaluated. In March 2022, APHIS' National Veterinary Services Laboratory (NVSL) confirmed the first detection of SCV-2 in a wild mule deer *(Odocoileus hemionus)* from Utah. Additional research suggests that other members of the cervid family are susceptible to infection by SCV-2.

Is the study ongoing?

Yes. Given the significant level of detectable SCV-2 antibodies found in previous studies and the extensive populations of cervids across diverse habitats throughout the country, APHIS is conducting ongoing surveillance to better understand the scale and scope of exposure to the virus in cervids. In November 2021, APHIS and its partners began a multi-year WTD monitoring and surveillance effort funded by the American Rescue Plan Act to understand the scope of SCV-2 infection in WTD and assess the potential human and animal health risks. In October 2022, APHIS expanded disease surveillance efforts to investigate the presence of SCV-2 in other members of the deer family, including free-ranging mule deer, elk, and moose.

This project is helping us understand if cervids are acting as a host or a "reservoir species," meaning an animal host in which the virus can survive in the wild and potentially mutate into new variants. We are also looking at which SCV-2 variants are circulating and potentially emerging in cervids, and the transmission pathways to and from cervids, or if pathways exist within other cervid populations. Additionally, this project allows APHIS and its partners to better understand the impacts of SCV-2 in cervid populations and how widespread it is in the United States.

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How is APHIS conducting this study?

WS is partnering with State and Tribal wildlife management agencies across the country to opportunistically collect samples from hunter-harvested cervids and/or cervids taken during WS wildlife damage management and State agency harvest activities. Samples consist of paired swabs, either nasal or oral, and whole blood collection on Nobuto filter strips. WS' disease diagnostic laboratory then tests swabs by qPCR for the presence of SCV-2 RNA and Nobuto strips by surrogate virus neutralization assay for SCV-2 antibodies. NVSL conducts confirmatory testing of qPCR-positive swab samples. SCV-2 is a reportable disease; APHIS reports the first confirmed case of SCV-2 in a new species to the World Organization for Animal Health.

What's next for this study?

After the project has been completed or as significant milestones are met, APHIS will share a summary on our One Health website.

APHIS will continue to coordinate the nationwide collection of samples from cervids through winter 2023. WS anticipates robust sampling to occur in future years, with additional State and Tribal partner participation. Future surveillance and analysis of the gathered data will be crucial in determining whether certain variants are persisting in cervid populations and in determining if cervids in the United States are a reservoir species for SCV-2. This work will help APHIS better understand possible SCV-2 transmission routes, and the potential risk these populations may pose to people, domestic animals, and wildlife.

Why did APHIS do this study?

Cervids regularly interact with humans, and human byproducts, such as wastewater. In urban-suburban environments, where both deer and humans may be abundant, there is the potential for human-to-deer transmission of SCV-2, although the frequency of these events is largely unknown. The project aims to build the Nation's capability to detect SCV-2 in cervids by strengthening and standardizing procedures and processes for sample collection.

Further, cervids are one of the most economically important game species in the United States. Big game hunting is a powerful economic contributor, generating more than $60 billion annually, much of which cascades to local and regional economies across the Nation. An estimated 6 million WTD are harvested annually by hunters. Beyond economics and hunting, recreation involving big game species provides cultural and social value that is immeasurable.

Can people get COVID-19 from deer and other cervids?

We are still learning about SCV-2 in animals, but there is currently no evidence that animals, including deer, play a significant role in spreading the virus to humans. Based on the limited information available to date, the risk of animals spreading SCV-2 to people is low. Further studies are needed to understand if and how different animals could be affected by the virus that causes COVID-19 and the role animals may play in the spread of the virus.

How are deer and other cervids exposed to the virus?

We do not know how the deer are exposed to SCV-2. It's possible they were exposed through people, the environment, other deer, or another animal species. Further studies are needed to better understand this issue.

Resources

USDA APHIS | Cases of SCV-2 in Animals in the United States

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