

COVID-19, from animals to humans and back again

While there are differences of opinion on various issues surrounding COVID-19, the one thing we all hope for is an end to the pandemic and getting life back to normal, though it is unclear what normal will look like after all we have been through.

Imagine our surprise when we ran across a preprint journal article, “Multiple spillovers and onward transmission of SARS-Cov-2 in free-living and captive White-tailed deer (*Odocoileus virginianus*)” by Suresh V. Kuchipudi et. al. (<https://tinyurl.com/ewf24mce>), undergoing the peer review process that said, “SARS-CoV-2 [the virus itself—COVID-19 is the disease] was detected in one-third of sampled White-tailed deer in Iowa between September 2020 and January of 2021 that likely resulted from multiple human to-deer spillover events and deer-to-deer transmission.”

Not only do we have the 7-day average number of infections creeping back up after a welcome decline, we have the anthroponotic (human) transmission of a zoonotic (animal) disease to non-human free-living animals. Prior to this study most confirmed anthroponotic transmission has been to production animals like mink, some zoo animals like lions and tigers, and companion animals like cats and dogs.

The mink industry in Denmark was shut down in an abundance of caution to minimize any potential risks.

While some people have abandoned their dogs and cats, there is no evidence that they pose any significant risk to their owners. While they get infected with SARS-CoV-2 and shed the virus in the days immediately after infection, they do not develop COVID-19 and need no medical intervention. In all likelihood they caught the virus from their owners and thus pose no additional risk to those they are around.

But finding the virus in white-tailed deer in Iowa and reading about it in the middle of deer hunting season in Iowa and much of the agricultural Midwest caught us flatfooted. What is the risk to uninfected-unimmunized hunters when they field dress a deer carcass? The answer at this time is that no one knows.

But the anthroponotic transmission of the virus to multiple other species increases the risk to humans. As Kuchipudi et. al. write “When pathogens infect a single host species, the population dynamics are intrinsically unstable, and an outbreak spreads rapidly through a population and then fades out as hosts either develop immunity or die from the infection”—that is what happened in the 1918 pandemic. But, when multiple species serve as host to the virus, the virus can spread and mutate. That increases the risk of the zoonotic transmission of a more virulent form of SARS-CoV-2 back to humans.

In the agricultural communities where we either grew up or worked, seeing deer was a common event, especially in late winter. When driving at night one had to watch for deer licking salt on the edge of the roadway. In the fall deer are in the fields trying to harvest the crop ahead of the farmer. And, a significant portion of the farmers we know hunt deer.

The article shows a correlation between the hunting season in Iowa in 2020 and the appearance of SARS-CoV-2 in the deer population. The Iowa DNR regularly takes retropharyngeal lymph node (RPLN) samples of the deer population to monitor the presence of chronic wasting disease, so the study authors had access to samples taken before and after the

beginning of the 2020 deer hunting season. The RPLN samples “collected during April through August 2020 period were negative for the presence of SARS-CoV-2 RNA.”

Coinciding with the beginning of deer hunting season in Iowa, the number of samples testing positive for SARS-CoV-2 began to increase. By December, 61 of 75 samples (81.3 percent) were positive. In addition, the SARS-CoV-2 lineages found in deer matched those circulating among people in Iowa at the time.

The article does not identify the vector by which the virus was transmitted from humans to the deer; presumably they were not close enough for the transmission to be through water droplets in the air.

So what does all this mean for farmers and rural residents around the country (and their city cousins) who hunt deer each fall, or feed them when most everything is frozen under a foot of snow?

Attention needs to be paid to both anthroponotic and zoonotic transmission of the disease, in order to protect human health; the deer do not get sick from the disease but they are carriers.

We would suggest that the first thing hunters need to do is get vaccinated with one of the approved vaccines.

The second thing is to exercise care in the harvest, gutting, and butchering of the animal.

Thirdly, hunters who might use various means to attract deer as well as those providing winter feeding stations need to exercise care so that they do not transmit the disease to the deer. This could include being tested for COVID-19 before they put out deer attractants and winter feed.

The study authors conclude their study writing, “the discovery of sylvatic and enzootic transmission in a substantial fraction of free-living deer has important implications for the natural ecology and long-term persistence of the SARS-CoV-2 pandemic, including through spillover to other free-living or captive animals and potential for spillback to human hosts, and highlights an urgent need for expanded active surveillance of potential wildlife reservoirs.”

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