

Association of Fish & Wildlife Agencies

Guidance on SARS-CoV-2 and Free-Ranging White-Tailed Deer



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This guidance document is intended to be adaptable as new information becomes available. It was developed for AFWA members and is not meant to be prescriptive or to mandate programs at the state, provincial, federal, tribal, or territorial level; the guidance and supporting evaluations should be regarded as recommendations for agencies to consider as they make policy involving wildlife and SARS-CoV-2.

Based on results from recent studies, white-tailed deer (WTD) are susceptible to experimental infections with SARS-CoV-2 (Palmer et al. 2021). This recent experimental study demonstrated that virus can also be transmitted for a short-time interval between WTD housed or comingled indoors. Infected WTD do not become ill (as reported thus far), and they shed infective virus for a relatively short duration (<7days). Given potential for infection by other cervids and ungulates due to the presence of the ACE2 cellular receptor and amino acids important for the binding between receptor and virus (Damas et al. 2020), and the biological considerations and transmission mechanisms of SARS-CoV-2, similar outcomes could be expected in other cervid species although confirmatory research is needed. Most recently, WTD testing positive for SARS-CoV-2 *antibodies* were reported from deer sampled in Michigan, Illinois, Pennsylvania, and New York (Chandler et al., preprint). This simply means that these deer had been exposed to SARS-CoV-2 at some point in time and mounted an immune response. Further, another recent study by USDA-Wildlife Services confirmed infection of wild WTD in Ohio through PCR testing and RNA detection. Sampling for these deer occurred between January and March 2021 as part of ongoing deer damage management work and indicates these deer had been infected with SARS-CoV-2. Susceptibility, transmission, and surveillance results such as these are important first steps to better understand a new disease, but as of now, the risk of WTD spreading the virus to humans is still considered to be low. Furthermore, the status of WTD populations over most of the US is still unknown.

There are two potential transmission risk scenarios that may be of concern to stakeholders and biologists: 1) humans acting as a source of infection to WTD and 2) SARS-CoV-2 infected WTD acting as a source for human infection. Humans currently represent the major reservoir for SARS-CoV-2, but evidence of SARS-CoV-2 RNA and antibodies in wild WTD indicate that the risk of transmission from a wild WTD to humans needs to be at least considered. The potential for reverse zoonosis from humans to WTD, based on these same results appears valid but the mechanisms of such transmission are unknown. Direct contact between infected humans and deer, particularly in contexts such as rehabilitation, wildlife exhibition, and captive animal research where humans and WTD may interact in close proximity for extended periods of time, should be considered as a transmission risk. Resources referenced at the end of this document provide additional guidance on risk mitigation strategies for such situations where humans will be in close contact with live WTD for extended periods of time. However, it appears that indirect transmission mechanisms also may exist and potential routes, such as environmental contamination, need to be identified and considered.

The high prevalence of antibodies observed in some of the surveyed deer populations and the confirmation of SARS-CoV-2 RNA in wild WTD suggests that deer to deer transmission in the field is a possibility. At present, risk factors that may enhance such deer-to-deer transmission are not defined.

Humans, not animals, are currently the most important and only known reservoir for SARS-CoV-2. The risk factors and mechanisms enabling human to WTD transmission also need to be defined. It may be possible that such risks are localized and preventable and may be dependent on continued human to WTD transmission. The potential for close direct contact and transmission between an infected human and a living free-ranging WTD can be reduced using the standard precautions (masks, hygiene) that are effective in lowering risk of SARS-CoV-2 transmission between humans. Frequent human/WTD contacts in rehabilitation, captive/farmed, zoo, or research settings are examples where close direct contact can occur and represent areas where preventive measures should be emphasized. See the hierarchy of controls model in CDC guidelines referenced at the end of the document for further risk reduction measures in rehabilitation and research settings.

We do not currently understand how wild deer were exposed to SARS-CoV-2 nor do we know how variants of concern may impact transmissibility among species. With this in mind, we recommend keeping domestic animals away from wildlife and wildlife carcasses as a precautionary measure. With both direct and indirect transmission pathways possible, reduction of the SARS-CoV-2 infection in the human population through preventive measures including vaccination is the best defense against human to deer transmission. Note vaccination may not be recommended for immunocompromised people.

Considerations for hunters:

- There is evidence that *wild* WTD have been or are infected with SARS-CoV-2 based on detection of antibodies for SARS-CoV-2 and detection of SARS-CoV-2 RNA.
- Current information on SARS-CoV-2 antibodies or RNA in WTD is extremely limited and the current status of WTD populations exposed to SARS-CoV-2 in the United States is unknown.
- Based on experimental data and confirmation of SARS-CoV-2 in wild WTD, SARS-CoV-2 infected deer may be considered as a potential source for human infection; however, there currently are no documented cases of humans becoming infected from WTD and risk is likely low.
- When handling a WTD carcass, you could be in contact with an animal of unknown SARS-CoV-2 infection status. Take care while handling organs of the respiratory tract (lungs, trachea, mouth/nasal cavity).
- The risk of COVID-19 infection from handling a potentially infected harvested deer can be reduced by following the same guidelines recommended to reduce human to human infection (i.e., wearing gloves and masks when handling the deer, and hand washing after handling the deer).
- Likewise, the risk of severe or fatal COVID-19 infection can be greatly reduced, if not eliminated, through personal vaccination.
- If vaccination is not a possibility, such as in the case of immunocompromised people, having assistance with carcass handling may be considered.
- Currently, there is no evidence that you can get COVID-19 by eating food, including wild hunted game meat. (See <https://www.cdc.gov/coronavirus/2019-ncov/your-health/wildlife.html> and <https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/food-and-COVID-19.html>)

Relevant Resources:

- Link to CDC guidelines for reducing the risk of SARS-CoV-2 spread between people and wildlife: <https://www.cdc.gov/coronavirus/2019-ncov/your-health/wildlife.html>

Literature Cited:

Chandler, J.C., Bevins, S.N., Ellis, J.W, Linder T.J., Tell, R.M. , Jenkins-Moore, M. , Root, J.J. , Lench, J.B., Robbe-Austerman, S., DeLiberto, T.J., Gidlewski, T., Torchetti, M.K., and Shriner, S.A., SARS-CoV-2 exposure in wild white-tailed deer (*Odocoileus virginianus*) bioRxiv preprint doi: <https://doi.org/10.1101/2021.07.29.454326>; this version posted July 29, 2021

Damas, J., Hughes, G.M., Keough, K.C., Painter, C.A., Persky, N.S., Corbo, M., Hiller, M., Koepfli, K.P., Pfenning, A.R., Zhao, H. and Genereux, D.P., 2020. Broad host range of SARS-CoV-2 predicted by comparative and structural analysis of ACE2 in vertebrates. *Proceedings of the National Academy of Sciences*, 117(36), pp.22311-22322.

Palmer, M.V., Martins, M., Falkenberg, S., Buckley, A., Caserta, L.C., Mitchell, P.K., Cassmann, E.D., Rollins, A., Zyllich, N.C., Renshaw, R.W. and Guarino, C., 2021. Susceptibility of white-tailed deer (*Odocoileus virginianus*) to SARS-CoV-2. *Journal of virology*, 95(11), pp.e00083-21.