Wildlife and SARS-CoV-2: FAQ

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Are there concerns that SARS-CoV-2, the virus that causes COVID-19, could spread to wildlife?

Canada and the United States have recently reported the presence of SARS-CoV-2 in wild white-tailed deer, providing the first evidence that the virus can circulate in wild animal populations. Studies in the United States revealed that the virus has spread from humans to deer on multiple occasions, with subsequent spread from deer to deer. While wild white-tailed deer testing positive for SARS-CoV-2 show no clinical signs of illness, it is unknown what impacts the virus will have in deer populations, other cervid species, or other potentially susceptible species that share their habitats. Further research and surveillance is necessary to understand how SARS-CoV-2 will affect or circulate in deer populations and whether white-tailed deer will become potential reservoirs for SARS-CoV-2.

Previously, the only other wild animal that has been shown to be infected with SARS-CoV-2 in North America was a single wild mink, found near the property of a commercial mink farm that was experiencing an outbreak in the caged mink in Utah, in December 2020. Unlike the findings in white-tailed deer, the mink had mild respiratory clinical signs and there was no further evidence of spread among wild mink or other species of wild animals sampled in the area.

Environment and Climate Change Canada has partnered with other federal agencies (Canadian Food Inspection Agency, Public Health Agency of Canada, and Parks Canada), the provinces, territories, academic institutions, and the Canadian Wildlife Health Cooperative in surveillance activities for SARS-CoV-2 in Canadian wildlife. This surveillance will help evaluate the potential for the virus to spread from humans to susceptible wildlife, assess the risk of establishment of the virus in wildlife populations, and determine the impacts on wildlife health and populations, should the virus spread further in wildlife. To do so, samples from across Canada are being submitted to Environment and Climate Change Canada and partnering laboratories to test for SARS-CoV-2 infection. As of February 2022, more than 3,000 samples from white-tailed deer and other cervids (e.g., mule deer, moose, and elk), as well as more than 2,400 samples from carnivores and peri-urban species, including mustelids (e.g., mink, marten, fisher, otter, and weasels), canids (e.g., wolves, coyotes, and foxes), felids (e.g., bobcats and lynx), bats, racoons, and rodents, are anticipated for submission for SARS-CoV-2 testing. For more information on detections of SARS-CoV-2 in animals in Canada, see the SARS-CoV-2 in Animals Dashboard.

What wild animals are most susceptible to being infected with COVID-19?

To date, numerous species have been shown to be susceptible to SARS-CoV-2 infection under natural or experimental conditions. As of November 30, 2021, several species across the world have been naturally infected in households (e.g., cats, dogs, ferrets); zoos, sanctuaries, and aquaria (e.g., multiple species of large cats, otters, gorillas, binturong, coatimundi, hyaenas); on

farms (e.g., commercial mink, captive white-tailed deer); and in the wild (free-ranging wildlife, e.g., wild mink, wild white-tailed deer). Numerous other species have been shown to be susceptible to experimental infection. The list of known susceptible species continues to evolve as new information becomes available. A list of potentially susceptible species based on natural and experimental infection can be found in the *Wildlife Surveillance Guidelines in Response to the Detection of SARS-CoV-2 in Farmed Mink in Canada* (see Table 1 in the document) and more information is available at Animals and COVID-19.

What does it mean for there to be a wildlife reservoir for SARS-CoV-2?

A wildlife reservoir is a wildlife population where an infectious pathogen naturally occurs, reproduces, and can evolve over time. Wildlife reservoirs play a significant role in the pathogen's ability to persist in the environment, develop mutations, and spillback to humans as a novel strain. In fact, wildlife reservoirs are known to contribute to the emergence and transmission of human infectious diseases.

There is increasing concern about the potential for large-scale human COVID-19 infections to result in viral spillovers and that wildlife, especially white-tailed deer, may become a reservoir for SARS-CoV-2. However, further research and surveillance is needed to determine the likelihood for SARS-CoV-2 variants to persist in wildlife populations, routes of transmission to and from wildlife, and the potential for spillover event(s) and subsequent transmission in human populations.

What is the risk to wildlife from mink farms?

Mink are highly susceptible to SARS-CoV-2. Farmed mink can rapidly spread the virus amongst each other, and have been shown to be capable of transmitting the virus back to humans. COVID-19 has been detected in domestic cats and dogs on the premises of infected mink farms.

Environment and Climate Change Canada has partnered with other federal agencies (Canadian Food Inspection Agency, Public Health Agency of Canada, and Parks Canada), the provinces, territories, academic institutions, and the Canadian Wildlife Health Cooperative in the surveillance for SARS-CoV-2 in Canadian wildlife around infected mink farms. This surveillance will help evaluate the potential for the virus to spread to susceptible wildlife from either mink, as farmed mink are known to escape, or humans, assess the risk of establishment of the virus in wildlife populations, and determine the impacts on wildlife health and populations, should the virus spread further in wildlife. More information is available in the *Wildlife Surveillance Guidelines in Response to the Detection of SARS-CoV-2 in Farmed Mink in Canada*.

What are the clinical signs that can be seen in wild animals infected with COVID-19?

Mild clinical signs of short duration have been reported in experimentally infected white-tailed deer, but there are currently no reports of clinical illness associated with SARS-CoV-2 in wild white-tailed deer populations. However, studies in domestic animals and captive wildlife in zoos, such as gorillas, mustelids (e.g., ferrets), canids (e.g., dogs), and felids (e.g., cats, tigers, lions), show that these animals may get sick and show signs of illness, such as fever, fatigue, sneezing, coughing, loss of appetite, difficulty breathing, vomiting, or diarrhea. There is currently limited information on COVID-19 and wildlife, and research is ongoing.

What will be done if a wild animal is found positive for SARS-CoV-2?

A suspected detection of SARS-CoV-2 in a wildlife sample will result in samples being submitted to the Canadian Food Inspection Agency's National Centre for Foreign Animal Disease and tested in their laboratories. If confirmed positive for SARS-CoV-2 in these laboratories, the result would be reported to the World Organisation for Animal Health (OIE). Relevant departments and agencies at the provincial/territorial and federal levels (e.g., Public Health Agency of Canada, Environment and Climate Change Canada, Canadian Food Inspection Agency) would coordinate the response with the authorities responsible for wildlife health management. While specific actions will depend on the species and location, monitoring and surveillance would likely occur to identify the degree of risk to other wildlife and to humans.

What variants have been found in wildlife?

Viruses are constantly changing through mutations. When one or more mutations occur it is called a variant of the original virus. While many variants of SARS-CoV-2 exist, the World Health Organization has identified variants of concern (VOCs). These are variants for which there is evidence of increased transmission, more severe disease, reduction in antibody production during infection, and/or reduced treatment effectiveness in human populations. As of February 2022, currently designated VOCs include the Alpha, Beta, Gamma, Delta, and Omicron lineages.

Some VOCs have also been found in wildlife populations in close proximity to humans. Any change in the virus could impact how the virus affects animals, as well as whether specific species are susceptible to infection. To date, the Alpha (Marques et al. 2022), Beta (Hale et al. 2021, Kuchipudi et al. 2021), Delta (Kotwa et al. 2022; Marques et al. 2022), and Omicron (Vandergrift et al. 2022) have all been detected in white-tailed deer internationally; however, deer appear to only have mild clinical signs of infection to all VOCs. Nonetheless, given the risk of human to deer transmission of the virus, Environment and Climate Change Canada and partners, along with provincial and territorial governments, continue to monitor SARS-CoV-2 in Canadian wildlife to better understand which VOCs are present in wildlife, whether novel mutations are occurring, and how animals may be affected by VOCs.

What precautions are necessary when handling wildlife?

While reports of animals infected with SARS-CoV-2 have been documented, we are still learning about which animals can become infected. It is important to remember that the greatest risk of exposure to SARS-CoV-2 is from other people. When it is necessary to be in contact with wildlife, for example for research or rehabilitation purposes, the following is recommended:

Measures to limit the transmission of SARS-CoV-2 from humans to wildlife:

- Encourage all workers to get vaccinated against SARS-CoV-2. Vaccination is one of the most effective ways to help protect yourself, your family, and your community against COVID-19, and may also help prevent the spread of COVID-19 from people to animals. More information on COVID-19 vaccines available in Canada can be found at Vaccines for COVID-19: How to Get Vaccinated.
- Encourage all workers to perform regular self-assessment for signs of COVID-19.
- Use proper personal protective equipment, including a well-fitting 3-layer mask, surgical mask, or respirator.
- Use nitrile or latex gloves and change gloves regularly or between each animal, if handling a susceptible species.
- Wash hands with soap and water or use hand sanitizer before and after handling and after removing gloves.
- Minimize activities that are directly in contact with wildlife (e.g., handling) and identify any potential risks.
- Avoid close proximity to wildlife for extended periods of time and prioritize non-invasive approaches to replace animal capture.
- Equipment and surfaces in contact with wildlife should be cleaned with an approved surface cleaner and disinfected between uses.

More information on handling wildlife, including specific recommendations for those working with deer, is available in the *Wildlife and SARS-CoV-2: Handling Guidelines*.

What is the risk of getting COVID-19 from animals during hunting or trapping?

There is recent evidence that wild white-tailed deer in North America have been infected with SARS-CoV-2. To date, there has been no known transmission of SARS-CoV-2 from white-tailed deer to humans. However, there is potential risk that those in contact with infected deer or carcasses could be exposed to the virus. More information on the potential risk from white-tailed deer can be found in the *Rapid Qualitative Risk Assessment for SARS-CoV-2 in White-Tailed Deer*.

Vaccination remains one of the most effective ways to help protect yourself, your family, and your community against COVID-19. However, until more is known and to reduce risk, the Public Health Agency of Canada is recommending the following precautions for those in close contact with deer:

- Wear a well-fitted mask when exposed to respiratory tissues and fluids from deer.
- When handling tissues such as lungs, trachea (windpipe), mouth, and nasal cavity:
    - Avoid splashing or spraying fluids from these tissues as much as possible.
    - Clean or change knives/equipment before handling the rest of the carcass.
- Do not hunt or consume animals that appear sick or are found dead and report any sick or dead animals to your local wildlife authority.
- When handling and dressing the carcass:
    - Wear gloves (e.g. rubber, latex, nitrile, vinyl) and eye protection (e.g. goggles, safety glasses, face shields).
    - Do not eat, drink or smoke and avoid touching your face.
    - Process carcasses outdoors or in a well-ventilated area.
- Keep pets/hunting dogs away from carcasses and discarded tissues.
- Check with your local provincial/territorial authority to determine if regulations exist for proper carcass disposal.
- After handling the carcass:
    - Wash knives and other equipment and surfaces and sanitize with a bleach solution.
    - Remove your gloves and wash your hands with soap and water or use hand sanitizer.
    - Change your clothing and footwear if possible.
- Cook meat to an internal temperature of 74°C (165°F) to kill any parasites, viruses or bacteria that may be present.

Trappers also have a higher risk of exposure to SARS-CoV-2 when handling the carcass directly for skinning, working in confined spaces, or when processing animals in large numbers. Therefore, it is recommended that precautions be taken, including wearing gloves, a well-fitted mask, and practicing good hand hygiene.

The above precautions are particularly important for those who are at higher risk of severe COVID-19 illness, as well as those who are not fully vaccinated. Whenever possible, have a fully vaccinated person handle and dress carcasses.

In addition to information provided by the Government of Canada, please consult with your provincial or territorial public health authority and follow all local orders and guidance.

What are Environment and Climate Change Canada and federal partners doing to address SARS-CoV-2 in wildlife?

Environment and Climate Change Canada and partner departments, along with provincial and territorial governments, adopted the One Health approach to form working groups that monitor SARS-CoV-2 in Canadian wildlife. The purpose of these groups is to better understand how animals may be affected, carry, and transmit SARS-CoV-2, the virus that causes COVID-19. Working alongside its partners, provincial/territorial counterparts and academia, Environment and Climate Change Canada continues to assess the potential implications of the virus on

Canadian wildlife and has developed *Wildlife Surveillance Guidelines in Response to the Detection of SARS-CoV-2 in Farmed Mink in Canada* and *Wildlife and SARS-CoV-2: Handling Guidelines*. In addition, surveillance for SARS-CoV-2 and other novel coronaviruses in Canadian wildlife is underway to address critical gaps in our understanding of COVID-19 at the intersection of humans, animals, and the environment.