

COVID-19 and Animals

FREQUENTLY ASKED QUESTIONS FOR VETERINARIANS

March 2021

This document was developed by a working group consisting of Canadian public health and animal health experts, with representation from federal and provincial/territorial governments, the Canadian Veterinary Medical Association, and academia. It takes into consideration past and current research on coronaviruses and COVID-19, as well as expert opinion. The findings and conclusions represent the consensual, but not necessarily unanimous, opinions of the working group participants, and do not necessarily represent the views of the participants' respective organizations.

This information will be updated with any significant findings that might inform a change of practice.

1) Can animals become infected with SARS-CoV-2 (the virus that causes COVID-19 illness in humans) and develop illness?

Companion animals:

- Cats, ferrets, and some species of hamsters and rabbits have been shown to be highly susceptible to infection with SARS-CoV-2 (1). Cats (2-9), ferrets (4,10-12), and hamsters (13-16) may develop illness, but it is usually mild. Rabbits do not appear to show any clinical signs (17).
- Dogs are considered to have low susceptibility (1). Dogs may develop illness in some cases (4,6,18).
- It appears to be relatively common for owners with COVID-19 to infect their pet dog or cat.

Livestock:

- Poultry (i.e. chickens, ducks, geese, quail, and turkeys) are not susceptible to infection with SARS-CoV-2 (1,4,12,19,20).
- Swine are considered to have extremely low susceptibility to infection with SARS-CoV-2, with no to very low susceptibility found in experimental studies (4,12,21-23). In an experimental setting, they may develop very mild clinical signs if infected using a very high dose of virus (22).
- Cattle are also considered to have an extremely low susceptibility to infection with SARS-CoV-2 and do not appear to develop illness (1,24).
- There are currently no experimental data available on the susceptibility of other livestock species, such as horses, sheep, and goats.
- To date, there have not been any reports of livestock being infected with SARS-CoV-2 outside of a laboratory environment.

Other animals:

- Mink are very susceptible to infection with SARS-CoV-2 (1,25-29). Hundreds of mink farms have been infected in several different countries, including Canada (30). Mink may not show any clinical signs or may develop respiratory illness or gastrointestinal signs ranging from mild to fatal. A wild mink trapped near an infected mink farm in Utah, USA, was also recently found to be infected (31).
- There have been several reports of animals in zoos developing illness after being exposed to an infected caretaker. Big cats (e.g. tigers, lions, pumas, and snow leopards) have been infected in several zoos in different countries (30). Gorillas at a zoo in San Diego, USA, developed respiratory signs after being infected (32).

Both big cats and gorillas (as well as other non-human primates) are considered to be highly susceptible to infection with SARS-CoV-2 (1).

- Several other animal species, including a number of wildlife species common in Canada, such as white-tailed deer (33), striped skunks (34), and some rodent species (34-36), have also been shown to be susceptible to infection with SARS-CoV-2 in experimental studies.

A summary of the current evidence for various animals is provided in the table below.

COVID-19 and Animals*

Animals species with reports of natural (and experimental where available) SARS-CoV-2 infection:

Species	Evidence ¹	Susceptibility ²	Clinical signs ³	Seroconversion	Transmission
Cats	C,E,O	high	yes (some cases)	yes	yes, to other cats
Big cats (tigers, lions, pumas, snow leopards)	C	high	yes (most cases)	yes	yes, to other big cats
Mink	C,E	high	yes (some cases)	yes	yes, to other mink and to people ⁴
Ferrets	C,E	high	yes (some cases)	yes	yes, to other ferrets
Gorillas	C	high	yes	unknown	yes, to other gorillas
Dogs	C,E,O	low	yes (some cases)	yes	no

Results of experimental studies on other animal species:

Species	Evidence ¹	Susceptibility ²	Clinical signs ³	Seroconversion	Transmission
Hamsters ⁹	E	high	yes (some cases)	yes	yes, to other hamsters
Deer mice ⁹	E	high	no	yes	yes, to other deer mice
Other non-human primates ⁵	E	high	varies by species	yes/unknown	varies by species
Tree shrews ⁶	E	high	yes (some cases)	unknown	unknown
New Zealand white rabbits	E	high	no	yes	unknown
Raccoon dogs ⁷	E	high	no	yes	yes, to other raccoon dogs
Egyptian fruit bats	E	high	no	unknown	yes, to other fruit bats
White-tailed deer	E	high	no	yes	yes, to other deer
Bank voles ⁹	E	medium to high ⁸	no	yes	no
Bushy-tailed woodrats ⁹	E	medium to high ⁸	no	yes	unknown
Striped skunks	E	medium ⁸	no	yes	unknown
Cattle	E	extremely low ¹⁰	no ¹⁰	yes ¹⁰	no
Swine	E	extremely low ¹¹	yes ¹¹	yes ¹¹	no

Species	Evidence ¹	Susceptibility ²	Clinical signs ³	Seroconversion	Transmission
Poultry (chickens, ducks, geese, quail, turkeys)	E,O	none	n/a	n/a	n/a
House mice	E	none	n/a	n/a	n/a
Big brown bats	E	none	n/a	n/a	n/a
Cottontail rabbits	E	none	n/a	n/a	n/a
Raccoons	E	none	n/a	n/a	n/a
Fox squirrels	E	none	n/a	n/a	n/a
Wyoming ground squirrels	E	none	n/a	n/a	n/a
Black-tailed prairie dogs	E	none	n/a	n/a	n/a

*Based on limited information available as of March 4, 2021. Animal species not listed do not yet have any evidence available.

¹C-Case report; E-Experimental finding; O-Observational study

²Based on January 2021 update of [OIE technical factsheet](#)

³Clinical signs may include non-specific signs (e.g. fever, lethargy) and/or respiratory signs with or without gastrointestinal signs

⁴Zoonotic transmission has been reported in the Netherlands, Denmark, and Poland

⁵Includes several species (e.g. macaques, marmosets, baboons, African green monkeys) and information may differ by species where noted

⁶Closely related to primates

⁷Member of *Canid* family

⁸Expert opinion based on limited information to date

⁹Member of *Cricetidae* family

¹⁰Very low-level susceptibility in experimental setting with no clinical signs but seroconversion and low-level viral shedding

¹¹Very low-level susceptibility in experimental setting with mild clinical signs and low-levels of antibodies but no viral shedding

2) If an animal becomes infected, what is the evidence that it can transmit the virus to other animals?

Mink-to-mink transmission has occurred on infected mink farms in several countries (1,25,27-29). In most cases, mink are initially infected by infected workers on the farm, but once on the farm the virus can spread rapidly between the mink. It is suspected that transmission from infected mink to other animals on the farm, such as cats and dogs, has occurred in several instances (25,29,37,38).

Big cats living in zoos have transmitted the infection to other big cats living in the same enclosure (1,39,40).

Additionally, there is evidence that ferrets (4,10-12,41), cats (3-5,18), hamsters (13,14), fruit bats (12), deer mice (35,36), raccoon dogs (42) and white-tailed deer (33) can spread SARS-CoV-2 to other animals of the same species, under experimental conditions.

3) If an animal becomes infected, what is the evidence that it can transmit the virus to people?

Zoonotic transmission of SARS-CoV-2 from farmed mink to workers on the farm has been documented in the Netherlands and Denmark (27-29). Large numbers of infected mink shedding virus in a confined area pose a significant health risk to mink farm workers, especially to those at higher risk of severe disease. Significant environmental contamination, including viral RNA being detected in air samples within the barns, has been found on infected farms (43).

There have **not** been any reports of transmission of SARS-CoV-2 from a companion animal to a person, despite the widespread pandemic. The probability of transmission by an infected companion animal to a person is currently considered very low to low in most cases, because of infrequent contact between pets and non-household members, though this might be higher for cats in some circumstances. The likelihood of pets being infected by a household member, and then infecting other household members, is presumably much lower than transmission between humans in the household. The main concern is when animals may bridge infected and uninfected environments. The probability of transmission may be higher for people (e.g. veterinarians or veterinary technicians) who have close contact with highly susceptible animals (e.g. cats or ferrets) from COVID-19-affected households. There is a high level of uncertainty regarding whether or not these animals shed a sufficient amount of virus to result in transmission to people under natural conditions. However, since cat-to-cat transmission is possible, cat-to-human transmission is plausible. There is less concern about dog-to-human transmission; however, it cannot currently be said that there is no risk.

4) What is the evidence that animals can act as fomites to mechanically transmit SARS-CoV-2, after contamination by a human case, to another person?

Although there is a potential risk of exposure to SARS-CoV-2 through contact with contaminated hair/fur, there is only a theoretical risk of transmission of the virus to a person through this route. It is considered unlikely that a sufficient amount of virus would remain on an animal's hair/fur long enough to transmit infection in most cases. A study on pets from COVID-19-affected households in the USA found some fur samples positive for viral RNA, but live virus could not be isolated. Similar results were found in an experimental study on ferrets, where RNA from SARS-CoV (a closely related virus) was found on the fur but infectious virus could not be isolated (41). SARS-CoV-2 is thought to

spread less commonly through contaminated surfaces. Practicing proper hygiene such as handwashing further reduces any possible risk. However, there may be certain situations where this potential risk is higher, such as the handling/processing of mink pelts from infected farms. The World Organisation for Animal Health (OIE) has currently assessed the risk of transmission of SARS-CoV-2 through unprocessed products from infected mink (such as fur/pelts) as medium, however further research in this area is required (44).

5) As a veterinarian or animal health professional, I am concerned about working with animals (pets/livestock) that have been exposed to people with COVID-19. Are there any extra precautions I should be taking?

This pandemic is being driven by person-to-person transmission. Therefore, the first priority within a veterinary clinic or other workplace should be to [decrease the risk](#) of transmission of COVID-19 between people (e.g. clients and staff).

Professional judgement should be utilized to assess and identify high-risk situations and determine the appropriate precautionary measures.

- Animals presenting from households with a history of recent (within the last 14 days) confirmed or suspected COVID-19 exposure or illness with no strict measures to minimize contact would be considered higher risk for being infected.
- The probability of transmission from an infected animal to a person is currently assessed as low in most cases, but this assessment has high uncertainty, given the limited information. Cats, ferrets, and hamsters in particular have been shown to be more susceptible to infection and able to transmit the virus to other animals, raising the possibility that they may be able to pass the infection back to people.
- Farmed mink are particularly susceptible and have been shown to transmit the virus back to people working on a farm. Special precautions are warranted in this circumstance, and veterinarians or others working in close proximity to farmed mink should follow the recommendations outlined in “Guidance for the management of SARS-CoV-2 in farmed mink in Canada”.

If an animal from a high-risk household requires urgent care, follow basic public health guidance for preventing zoonotic disease transmission, as well as additional precautions, if necessary:

- wear protective outerwear (e.g. lab coat, gown, coveralls) to prevent contamination of your clothes

- wear gloves (if possible) and wash your hands before and after touching a high-risk animal or their food/water/supplies, and after cleaning up after them; do not touch your face with unwashed hands
- frequently clean and disinfect any surfaces or objects the animal touches or may have contaminated with respiratory droplets or feces; see Health Canada's approved list of disinfectants [here](#)
- minimize the animal's contact with people and other animals
- if you need to be in close proximity of the animal, especially if close contact is required (e.g. restraint, or any procedure that brings a person's face close to the animal's face or hair/fur), additional personal protective equipment (PPE) (e.g. mask, eye protection) should be utilized to further reduce risk, especially to protect from facial contact (eyes, nose, mouth) with the animal directly (hair/fur) or with respiratory droplets/aerosols

Follow any further COVID-19 related recommendations from your veterinary licencing authority or associations, and public health authority. Detailed guidance has been developed by the Ontario Veterinary Medical Association (OVMA) and is available [here](#).

6) My clients heard about animals testing positive for COVID-19 (SARS-CoV-2), and are worried about their health and the health of their families. What advice should I be providing?

This pandemic is being driven by person-to-person transmission. It is considered very unlikely that an animal would be a source of infection for the household. To date, reports of animals becoming infected with SARS-CoV-2 are typically cases of human-to-animal transmission, usually from an infected owner to their pet cat or dog.

Advise your clients that if they have COVID-19 [symptoms](#) or are [self-isolating](#) due to contact with a COVID-19 case, they should follow similar recommendations around their animals, as they would around people in these circumstances:

- avoid close contact (petting, snuggling, being kissed or licked, sharing food) with their animals during their illness
 - practice good handwashing and avoid coughing and sneezing on animals
- if possible, have another member of their household care for their animals
 - if this is not possible, they should wear a non-medical mask and always wash their hands before and after touching their animals, their food and supplies
- restrict their animal's contact with other people and animals outside the household for at least 14 days after the animal's last exposure to the human case

- cats should remain indoors at all times
- dogs should be kept on a leash or within a private fenced area when taken outside for elimination activities, and kept away from other animals and people

Some additional considerations include:

- The greatest risk of infection by far for both people and animals is still from contact with infected people.
- Animals can be a great comfort and help make us happy during times of stress, and there are many health benefits to owning a pet, particularly during periods when physical distancing or self-isolation are required.
- There is no reason at this time to think that surrendering an animal will significantly decrease a pet owner's risk.
- The probability of a person getting infected from contact with an infected companion animal is currently considered low in most cases. The probability may differ depending on the animal species, the type of contact the animal has with a person, any precautions taken and several other potential risk factors (e.g. age and health status of the person).
- Generally speaking, precautions should be taken for 14 days after the animal's last exposure to the human case after which the animal can be safely out in the community.

General information on COVID-19 and animals that can be shared with your clients is available at:

<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/prevention-risks/animals-covid-19.html>

7) I have clients requesting testing for their animals for COVID-19 (SARS-CoV-2 virus). Is there a test and if so, what are the procedures for testing?

Testing of animals is generally not recommended, as the virus is primarily transmitted person-to-person and not through animal contact.

If you have a client with an animal that has signs of illness (see Q. 8 below) and the animal has been in contact with a suspected or confirmed COVID-19 case:

- 1) Confirm the epidemiologic link: verify that the pet was in close contact with a person suspected or confirmed to have COVID-19 within 14 days prior to the animal's illness.
- 2) Assess (over the phone) the severity of the illness. Using your professional judgement, determine if the animal can remain in the care of their owner or guardian. Discuss other possible pathogens or conditions that could be causing illness, and whether any of these differentials can be addressed via telemedicine (as per applicable local veterinary laws and guidance).

If the animal's signs are severe and they need direct veterinary care, manage the pet as a possible contagious case. Try to rule out other pathogens or conditions.

- 3) If you suspect SARS-CoV-2 infection in an animal and have concerns for animal or public health, follow the recommendations for testing in the [Council of Chief Veterinary Officers Position Statement: Testing of Animals for SARS-CoV-2](#) and contact the office of your provincial or territorial chief veterinarian. Some laboratories in Canada are now offering SARS-CoV-2 testing for animals. If the decision is made to test an animal, follow the [Canadian Food Inspection Agency's Interim Guidance for Laboratories Testing Animals](#).

Note: As an emerging disease, animals that test positive for SARS-CoV-2 must be reported to the World Organisation for Animal Health (OIE) through the Canadian Food Inspection Agency (CFIA). Non-negative test results must be confirmed by the National Centre for Foreign Animal Diseases, CFIA, before being considered a positive result.

8) What are the clinical signs in animals infected with SARS-CoV-2?

Limited information is currently available on clinical signs of SARS-CoV-2 infection in animals. Animals known to be infected with SARS-CoV-2 have shown a range of clinical signs, but in general, appear to either not show any signs of illness or develop mild respiratory signs with or without gastrointestinal signs (1,6). However, some animals such as mink, may develop severe illness and death.

9) I followed the recommended testing procedure and have a patient that was confirmed positive. What precautions should be taken when caring for this animal and for how long?

If possible, animals that test positive for SARS-CoV-2 should be managed at home, in order to minimize contact with any new people, animals, or environments. Although precautions should still be taken, it is important to remember that human-to-human transmission within a household presents the greatest risk.

Instruct owners caring for SARS-CoV-2-positive animals **at home** to:

- ensure individuals at [high risk](#) for severe COVID-19 illness avoid caring for, or having contact with, SARS-CoV-2-positive animals
- confine the animal to one area in order to minimize contact with other people and animals
- avoid close contact with the animal
 - **do not:**
 - let them lick you
 - snuggle or kiss them
 - share food with them
 - let them sit on your lap
 - carry them in your arms
 - let them sleep in your bed
- practise good hygiene
 - [wash your hands often](#), especially before and after touching the animal, their food/water/supplies, and after cleaning up after them (if you wear gloves make sure to wash your hands well after removing them)
 - avoid touching your face with unwashed hands
- frequently [clean and disinfect](#) any surfaces or objects the animal touches or may have contaminated with respiratory droplets or feces
- restrict the animal's contact with other people and animals outside the household
 - keep cats indoors at all times
 - keep dogs on a leash or within a private fenced area when you take them outside to go to the bathroom
- if you need to be within 2 metres of the animal, follow precautions similar to those recommended for caring for a person with COVID-19:
 - wear a medical mask (non-medical if medical not available)
 - wear eye protection

If a SARS-CoV-2-positive animal needs to be cared for **in a veterinary clinic**:

- Follow the recommendations for caring for an animal at home as well as general [infection prevention and control](#) recommendations for veterinary clinics

- Professional judgement should be used in determining when additional personal protective equipment (PPE) (e.g. medical mask, eye protection, gown, N95 respirator) should be used, such as if close contact with the animal is required or aerosol generating procedures need to be performed (more detailed guidance has been developed by the OVMA and is available [here](#))
- These are similar to the recommendations for handling an animal from a high-risk household (see Q. 5 above)

In general, it is recommended to take precautions for 14 days from when the animal's clinical signs first appeared (as long as clinical signs have resolved) or the animal first tested positive (if subclinical infection).

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