Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is the etiological agent of coronavirus disease 2019 (COVID-19). SARS-CoV-2 is a positive-sense single-stranded RNA virus with epithelial cell and respiratory system proclivity. Both humans and animals are susceptible to coronaviruses, thus the COVID-19 pandemic has both human and veterinary significance.

Based on the limited information available to date, the risk of animals spreading COVID-19 to people is low. While more research needs to be performed, there is evidence that human-to-animal transmission is possible in certain situations. So far, companion animals, including cats, dogs, and ferrets, along with other animals, such as lions, tigers, white-tail deer, gorillas, and minks, have all tested positive for SARS-CoV-2.

Veterinarians are encouraged to consider more common causes of illness in animals and should use their clinical judgement when deciding whether to test animals for SARS-CoV-2. To discuss testing an animal for SARS-CoV-2, veterinarians should email the director of the UTCVM virology laboratory, Dr. Mohamed Abouelkhair, for approval of the diagnostic plan at mabouelk@utk.edu.

If Dr. Abouelkhair is unavailable, please email the Diagnostic Laboratory Services Director, Dr. Bente Flatland at bflatlan@utk.edu.
Testing protocol

1. The PrimeStore media/tubes (test kit) needed for sampling will be provided by the UTCVM Virology Diagnostic Lab (A239) for an additional fee of $5 each. Please contact Dr. Mohamed Abouelkhair, lab director, to request the test kit.

   • Referral veterinarians have the option of ordering the media/tubes directly from UTCVM Virology Diagnostic Lab or can order directly from Fisher Scientific (https://www.fishersci.com/us/en/home.html; Catalog No.23-100-400).

2. Preferred samples for virus nucleic acid testing include nasal swab, oropharyngeal swab, and/or rectal swab. Samples may also be taken from internal organs collected post-mortem.

3. To reduce the risk of contamination, personal protection equipment (PPE) must be used when collecting the sample from the patient. After collecting the sample, insert the swab in the supplied tube which contains a PrimeStore MTM medium that will totally inactivate the virus.

4. Samples from laboratory animals (i.e., mice, rats) are batched into pools of five animals for PCR testing.

5. Seal the tube with the supplied cap and wipe externally with disinfectant before placing in the labeled bag that comes with the kit and identify the sample.

6. Double bag the sample and label as a SARS-CoV-2 diagnostic sample.

   • For local clinics or UTCVM clinical personnel, store the SARS samples in the biohazard sample storage refrigerator located in the hallway behind the large animal window access to the pharmacy.

   • If your clinic is shipping the sample to the UTCVM Veterinary Medical Center, you can use the same shipping box that the media/tube came in. A refrigerant pack must be included. For discount FedEx Express shipping labels for next day delivery, login or register for a VOLVet Portal account at tiny.utk.edu/VOLVetPortal.

7. The UTCVM Virology Lab will provide the PrimeStore MTM media for sample collection for an additional cost of $5. Call the lab for test pricing. Shipping is not included.

8. Expected turn-around time is 2-4 days after lab receives the sample.

9. Negative results will be reported directly to the submitting veterinarian. All positive results will be reported as presumptive and then sent to the USDA for confirmation per current USDA guidelines. Final positive results will be reported by the USDA.

10. All testing will be documented in the Health and Human Services public data platform (HHS Protect) for authentication, amalgamation, and sharing of healthcare information.

For positive results, the following will be shared with the State Veterinarian’s Office and the Tennessee Department of Health:

   • the owner’s name and contact information

   • submitting veterinarian’s name and contact information

   • the owner’s name and contact information

   • the owner’s name and contact information

   • the owner’s name and contact information

It is important that veterinarians who submit samples utilize CDC’s criteria to guide evaluation and laboratory testing for SARS-CoV-2 in Animals (Table 1) to help with decision making regarding testing. Animals without a known epidemiological risk will not be tested.

Table 1: Criteria to Guide Evaluation and Laboratory Testing for SARS-CoV-2 in Animals

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EPIDEMIOLOGICAL RISK</th>
<th>CLINICAL FEATURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Animal with history of exposure1 to a person or animal suspected or confirmed to be infected with SARS-CoV-2.</td>
<td>Animal is asymptomatic; OR Animal has clinical signs suspicious of SARS-CoV-2 infection.1</td>
</tr>
<tr>
<td>B</td>
<td>Animal with exposure to a known high-risk environment (i.e., where human cases or animal cases have occurred), such as a residence, facility, or vessel (e.g. nursing home, prison, cruise ship).</td>
<td>Animal is asymptomatic; OR Animal has clinical signs suspicious of SARS-CoV-2 infection.1</td>
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<tr>
<td>C</td>
<td>Threatened, endangered or otherwise imperiled/rare animal2 in a rehabilitation, sanctuary or zoological facility with possible exposure to SARS-CoV-2 through an infected person or animal.</td>
<td>A cluster of animals show clinical signs suspicious of SARS-CoV-2 infection.1</td>
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<tr>
<td>D</td>
<td>Animals in a mass care or group setting (e.g., farm, animal feeding operation, animal shelter, boarding facility, zoo, or other animal holding) including companion animals, livestock, and other species, where their exposure history to people with COVID-19 is unknown.</td>
<td>Animals are asymptomatic; OR One or more animals have clinical signs suspicious of SARS-CoV-2 infection.1</td>
</tr>
<tr>
<td>E</td>
<td>Farmed mink (Neovison vison). Farmed mink refers to mink bred or raised in captivity for their fur and other by-products.</td>
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</tbody>
</table>

1 Exposure is defined as:

   • Being within approximately 6 feet (2 meters) of a person with suspected or confirmed COVID-19 starting from 2 days before the person’s illness onset (or, for asymptomatic human patients, 2 days before positive specimen collection) until 10 days after the date infection is identified. Direct contact could include an animal being coughed, sneezed, or spit on by an infected person or sharing food or consuming something that was recently contaminated with an infected person’s mucus or saliva.

   • Having direct contact with infectious secretions from a person with suspected or confirmed COVID-19 starting from 2 days before the person’s illness onset (or, for asymptomatic human patients, 2 days before positive specimen collection) until 10 days after the date infection is identified. Direct contact could include an animal being coughed, sneezed, or spit on by an infected person or sharing food or consuming something that was recently contaminated with an infected person’s mucus or saliva.