



COVID-19: FAQs FOR PET OWNERS

Animals and COVID-19

Q: CAN SARS-COV-2 INFECT PETS?

As of April 19, the only pets incidentally exposed to COVID-19 that have tested positive, with confirmation, for SARS-CoV-2 are two pet dogs and a pet cat in Hong Kong. Another pet cat in Belgium tested positive, but details around that case are less clear. In each case, the pet was in the care of and had close contact with a person who had been confirmed to have COVID-19. Only in the case of the cat in Belgium was there a suggestion of the animal showing clinical signs of disease and, in that case, other diseases and conditions that could have caused those same signs of illness were not ruled out and there are also questions about how samples demonstrating the presence of SARS-CoV-2 were collected and evaluated. That cat recovered.

In a French study, tests (RT-PCR and antibody evaluation via an immunoprecipitation assay) performed on 21 pets (12 dogs and 9 cats) living in close contact with their 20 French veterinary student owners (2 of whom were confirmed to have COVID-19 infection and 11 more of whom showed symptoms consistent with COVID-19) all yielded negative results.

Two commercial laboratories in the United States reported they have tested (RT-PCR) thousands of specimens from dogs and cats for SARS-CoV-2 and have obtained no positive results. These specimens have come from the United States, South Korea, Canada, and Europe, including regions concurrently experiencing human COVID-19 cases. While this is encouraging, the specimens tested were originally submitted for polymerase chain reaction (PCR) analysis of more common pathogens causing respiratory disease in dogs and cats and, as such, per-case information as to whether or not these dogs and cats had contact with confirmed COVID-19 positive people is not available.

As of April 19, the CDC had not received any National Veterinary Services Laboratories (NVSL)-confirmed reports of pets becoming sick with COVID-19 in the United States.

Preliminary findings from limited laboratory experimental studies indicate that, of species tested thus far, cats are the species most susceptible to infection with SARS-CoV-2. Some cats in these studies developed signs of clinical disease. Ferrets were also found to be susceptible to infection, but appeared less likely to develop disease. In the laboratory setting cats and ferrets were also able to transmit SARS-CoV-2 to other cats and ferrets, respectively. Dogs appeared to be susceptible to infection, but less so than cats or ferrets. Other preliminary laboratory findings indicate that poultry and pigs



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are not susceptible to infection with SARS-CoV-2. It is important to understand that experimentally induced infection does not mirror naturally induced infection. In other words, just because an animal can be experimentally infected via inoculation with high concentrations of purified tissue-cultured virus does not mean that it will be easily be infected with that same virus under natural conditions. The number of animals involved in these studies was also very small and conclusions were drawn based on data that, in some cases, were collected from as few as two animals.

There is no evidence to suggest that animals, including pets, that may be incidentally infected by humans are playing a role in the spread of COVID-19. Human outbreaks are driven by person-to-person transmission.

Pets have other types of coronaviruses that can cause them to become ill, but these are species-specific, meaning that they do not infect people and are not related to the current COVID-19 outbreak.

We will continue to provide you with information as we learn more about pets and SARS-COV-2. Because animals can spread other diseases to people and people can also spread diseases to animals, it's a good idea to always wash your hands before and after interacting with and caring for your pets, as well as before and after handling their food, supplies, and waste.

Q: CAN PETS SPREAD COVID-19?

Infectious disease experts, as well as the Centers for Disease Control and Prevention and World Organisation for Animal Health (OIE), indicate there is currently no evidence to suggest that animals incidentally infected by humans, including pets, play a role in the spread of COVID-19. Human outbreaks are driven by person-to-person contact.

COVID-19 appears to be primarily transmitted by contact with an infected person's bodily secretions, such as saliva or mucus droplets in a cough or sneeze. It appears that COVID-19 can also be transmitted by touching a contaminated surface or object (i.e., a fomite) and then touching the mouth, nose, or possibly eyes, but this appears to be a secondary route. Smooth (non-porous) surfaces (e.g., countertops, doorknobs) transmit viruses better than porous materials (e.g., paper money, pet fur).

Because animals can spread other diseases to people and people can also spread diseases to animals, it's always a good idea to wash your hands before and after interacting with animals; ensure your pet is kept clean and its fur combed to prevent mats; regularly clean your pet's food and water bowls and bedding material; and



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remove and replace soiled or damaged toys. Because we have no confirmed examples of where viruses have been transmitted by contact with pet hair or skin, the use of alcohol or hydrogen peroxide containing cleaning agents, hand sanitizers, or sanitizing wipes to clean your pet's fur or paws in an effort to prevent contracting COVID-19 is not recommended and may be harmful.

Q: CAN PETS' FUR, COLLARS, LEASHES, AND CARRIERS SERVE AS FOMITES FOR SARS-COV-2?

COVID-19 appears to be primarily transmitted by contact with an infected person's bodily secretions, such as saliva or mucus droplets in a cough or sneeze. It appears that COVID-19 can also be transmitted by touching a contaminated surface or object (i.e., a fomite) and then touching the mouth, nose, or possibly eyes, but this seems to be a secondary route. Smooth (non-porous) surfaces (e.g., countertops, doorknobs) transmit viruses better than porous materials (e.g., paper money, pet fur). Because your pet's hair is porous, and fibrous, it is unlikely that you would contract COVID-19 by petting or playing with your pet. And, while we know that certain bacteria and fungi can be carried on fur and hair, we have no examples of where viruses have been transmitted by contact with pet hair or skin, including SARS-CoV-2. However, because pets can spread other diseases to people and people can also spread diseases to animals, it's always a good idea to wash your hands before and after interacting with pets. There is no evidence to suggest that animals, including pets, that may be incidentally infected by humans are playing a role in the spread of COVID-19. Human outbreaks are driven by person-to-person transmission.

While risk of transfer of SARS-CoV-2 from collars, leashes, and carriers also appears to be limited, it's always a good idea to keep pet collars, leashes, and carriers clean and, fortunately, the SARS-CoV-2 virus is susceptible to [routine cleaning](#). The Environmental Protection Agency has [published](#) a list of wipes, ready-to-use, and dilutable products for use against SARS-CoV-2.

Q: IS IT SAFE TO WALK MY DOG? WHAT SHOULD I DO/NOT DO DURING THAT WALK?

Taking a walk helps support you and your dog's good health, and can contribute to wellbeing for both of you. To observe social distancing, keep space of at least 6 feet between yourself and others who do not live in your home, do not gather in groups, and stay out of crowded areas. Dogs should be walked in the neighborhood in a way that allows for social distancing and keeps them safe. Avoid dog parks (many are currently closed) and other public places where groups of people and dogs may gather. To help



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maintain social distancing, do not let other people pet your dog when you are out for a walk.

Q: WHAT SHOULD I DO TO PREPARE FOR MY PET'S CARE IN THE EVENT I BECOME ILL?

Identify another person in your household who is willing and able to care for your pet in your home should you contract COVID-19. Make sure you have an emergency kit prepared, with at least two weeks' worth of your pet's food and any needed medications. Usually we think about emergency kits like this in terms of what might be needed for an evacuation in the case of a disaster, but it's also good to have one prepared in the case of quarantine or self-isolation when you cannot leave your home.

Q: MY PET OR SERVICE ANIMAL IS NOT ILL BUT HAS A SCHEDULED APPOINTMENT AT THE VETERINARIAN AND I AM NOT ILL WITH COVID-19—WHAT SHOULD I DO?

If you are not ill with COVID-19 or another communicable disease (e.g., cold, flu) and your pet is not ill, call your veterinarian to discuss whether and when an in-person visit is best conducted. Given current efforts to reduce the potential for human exposure to COVID-19, including recommendations for social distancing, your veterinarian may recommend postponing non-urgent visits or procedures. If you would prefer to remain in your home and you have an established relationship with the veterinarian (i.e., they have seen your pet/service animal in the recent past), telemedicine might be an excellent way to conduct your visit, depending on what services are required. If this is your first visit to the veterinarian, it may also be possible to conduct your appointment via telemedicine, depending on what services are needed and any discretion that is being applied by regulatory officials under the COVID-19 emergency for the practice of veterinary medicine in your state.

Your veterinarian can help you determine what kind of appointment might work best for you and your pet/service animal in your situation.

Q: WHAT SHOULD I DO IF MY PET OR SERVICE ANIMAL BECOMES ILL AFTER BEING AROUND SOMEONE WHO HAS BEEN SICK WITH COVID-19?

Contact your veterinarian before you bring your pet or service animal to the veterinary clinic/hospital. You should tell them why you are concerned about your animal being ill (e.g., what clinical signs of illness you are seeing) and also that the animal has been exposed to someone who has been sick with COVID-19. Advance notice will help your veterinarian determine whether your animal needs to be seen immediately and, if so, will support the veterinary clinic/hospital in preparing for the proper admittance of that



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animal, including the preparation of an isolation area as needed. Do not take the animal to a veterinary clinic/hospital until you have consulted with your veterinarian, especially if you are personally ill with COVID-19. And, of course, a telemedicine consultation should be considered as an option as well.

If your pet gets sick, it is unlikely that it is because it has COVID-19; there is most likely a different cause for its illness. There is also no evidence to suggest that animals, including pets, that may be incidentally infected by humans are playing a role in the spread of COVID-19.

Q: SHOULD I AVOID CONTACT WITH ANIMALS, INCLUDING PETS, IF I AM SICK WITH COVID-19?

You should restrict contact with pets and other animals while you are sick with COVID-19, just like you would restrict contact with other people. Although there have not been reports of pets becoming sick with COVID-19 in the United States, it is still recommended that people sick with COVID-19 limit contact with animals until more information is known about the virus.

Have another member of your household care for your animals, if possible. If you have a service animal or you must care for your animals, then wear a cloth face covering; don't share food, kiss, or hug them; and wash your hands before and after any contact with them. You should not share dishes, drinking glasses, cups, eating utensils, towels, or bedding with other people or pets in your home. Cats should also be kept indoors as much as possible.

While we are recommending these as good practices, there is no evidence to suggest that animals, including pets, that may be incidentally infected by humans are playing a role in the spread of COVID-19.

Q: IF I AM ILL WITH COVID-19 ARE THERE SPECIAL PRECAUTIONS I SHOULD TAKE TO PREVENT SPREADING DISEASE, INCLUDING WHEN CARING FOR MY PET?

If you are [sick with COVID-19](#) you need to be careful to [avoid transmitting it to other people](#). Applying some [common-sense measures can help prevent](#) that from happening. Stay at home except to get medical care and call ahead before visiting your doctor. Minimize your contact with other people, including separating yourself from other members of your household who are not ill; use a different bathroom, if available; and wear a cloth face mask when you are around other people or pets and before you enter a healthcare provider's office. [Wash your hands](#) often, especially before touching your



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face, and use hand sanitizer. Use a tissue if you need to cough or sneeze and dispose of that tissue in the trash. When coughing or sneezing, do so into your elbow or sleeve.

The AVMA recommends you take the same common-sense approach when interacting with your pets or other animals in your home, including service animals. You should tell your physician and public health official that you have a pet or other animal in your home. As a precaution, it is recommended that people sick with COVID-19 limit contact with animals until more information is known about the virus. So, if you are ill with COVID-19, have another member of your household take care of walking, feeding, and playing with your pet. If you have a service animal or you must care for your pet, then wear a cloth face covering; don't share food, kiss, or hug them; and wash your hands before and after any contact with your pet or service animal. You should not share dishes, drinking glasses, cups, eating utensils, towels, or bedding with other people or pets in your home. Cats belonging to owners infected with COVID-19 should also be kept indoors as much as possible.

While we are recommending these as good practices, there is no evidence to suggest that animals, including pets, that may be incidentally infected by humans are playing a role in the spread of COVID-19.

Q: MY PET OR SERVICE ANIMAL NEEDS TO GO TO THE VETERINARIAN AND I AM ILL WITH COVID-19—WHAT SHOULD I DO?

If you are sick with COVID-19 or another communicable disease, you should stay at home, minimizing contact with other people, until you are well. Accordingly, if this is a non-urgent appointment for your pet or service animal consider rescheduling that appointment until your physician and/or your public health official believe you no longer present a risk of transmitting your infection to other people you may encounter during such a visit, including owners of pets or other animals and veterinary clinic staff.

If you are sick with COVID-19, and you believe your pet or service animal is ill, you should seek assistance from your veterinarian to determine how to best ensure your pet or service animal can be appropriately cared for while minimizing risks of transmitting COVID-19 to other people.

Don't forget—if you have an established relationship with your veterinarian (i.e., they have seen your pet/service animal in the recent past), telemedicine can be an excellent way to connect you, your pet/service animal, and your veterinarian. It can be used to help determine the urgency with which an animal needs to be seen, whether the animal needs to be seen in-person, and can also be used to conduct rechecks of certain types



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of ongoing medical problems. If this is your first visit to the veterinarian, it may also be possible to conduct your appointment via telemedicine, depending on what services are needed and any discretion that is being applied by regulatory officials under the COVID-19 emergency for the practice of veterinary medicine in your state.

Be sure to contact your veterinarian before heading to the veterinary clinic/hospital to see what they recommend for your situation.

Q: WHAT PRECAUTIONS SHOULD BE TAKEN FOR ANIMALS THAT HAVE RECENTLY BEEN IMPORTED FROM OUTSIDE THE UNITED STATES (E.G., BY SHELTERS, RESCUES OR AS PERSONAL PETS)?

Animals imported into the United States will need to meet [CDC](#) and [USDA](#) requirements for entering the United States.

At this time, there is no evidence to suggest that animals, including pets, that may be incidentally infected by humans are playing a role in the spread of COVID-19. However, as should be done for any animal introduced into a new environment, recently imported animals should be observed daily for signs of illness. If an animal becomes ill, the animal should be examined by a veterinarian. Call your veterinarian before bringing the animal into the clinic/hospital and let them know that the animal was recently imported from another country.

Q: IS IT SAFE TO ADOPT AN ANIMAL FROM A SHELTER?

There is currently no reason to think that shelter pets in the United States might be a source of COVID-19. During this pandemic emergency, pets and people each need the support of the other and veterinarians are there to support the good health of both.

Q: IS TESTING FOR SARS-COV-2 AVAILABLE FOR ANIMALS IN THE UNITED STATES?

As of April 19, the CDC had not received any National Veterinary Service Laboratories (NVSL)-confirmed reports of pets or other domestic animals becoming sick with COVID-19 in the United States. In addition, there is no evidence to suggest that animals, including pets, that may be incidentally infected by humans are playing a role in the spread of COVID-19. As such, routine testing of animals for COVID-19 is not recommended by the AVMA, CDC, USDA, American Association of Veterinary Laboratory Diagnosticians (AAVLD), or National Association of State Public Health Veterinarians (NASPHV).



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If an animal becomes ill with respiratory or gastrointestinal signs, veterinarians should first test for common pathogens and conditions that are more likely to have caused such clinical signs. Animal testing for SARS-CoV-2 is available if the attending veterinarian and local, state, and/or federal public health and animal health officials agree an animal merits testing. Different states may have different requirements for testing and collaborating with and reporting to public health and animal health officials.

Answers to frequently asked questions about animal testing are available from USDA ([state public and animal health officials](#) and [public](#)), [CDC](#), and AVMA ([veterinarians](#) and [public](#)).

Of note is that [COVID-19 is an World Organisation for Animal Health \(OIE\) notifiable disease](#) and presumptive positive results of testing require confirmation by the USDA National Veterinary Services Laboratories (NVSL).

Q: WHAT SHOULD I DO IF I THINK MY ANIMAL HAS THE VIRUS?

Call your veterinarian with any questions about your animal's health. You should tell them why you are concerned about your animal being ill (e.g., what clinical signs of illness you are seeing) and whether the animal has had close contact with someone who has been sick with COVID-19.

Calling your veterinarian in advance will help your veterinarian determine whether your animal needs to be seen immediately and, if so, will support the veterinary clinic/hospital in preparing for the proper admittance of that animal, including the preparation of an isolation area as needed. Do not take the animal to a veterinary clinic/hospital until you have consulted with your veterinarian. A telemedicine consultation should be considered as an option as well.

After an examination and evaluation of the animal to rule out more likely causes for the animal's illness, veterinarians who believe an animal should be tested for SARS-CoV-2 will contact local, state, or federal public health or animal health officials, who will work with them to determine next steps.

Q: WHAT ARE THE CRITERIA FOR TESTING ANIMALS OWNED BY, OR IN CLOSE CONTACT WITH, PEOPLE ILL WITH COVID-19 IN THE UNITED STATES?

If a domestic animal becomes ill with respiratory or gastrointestinal signs, veterinarians will first test for common pathogens and conditions that are more likely to have caused such clinical signs. If the results of tests for any of these common pathogens or



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conditions are positive, then the veterinarian will recommend treatment and care for that animal accordingly.

If the results of tests for more common pathogens and conditions are negative, the veterinarian should contact a local, state, or federal public health or animal health official for information about how to proceed. Any decision to test an animal for SARS-CoV-2 will be made collaboratively with these officials and testing will generally only be done if there has been close contact between the animal and a COVID-19 positive person or if there is exposure of the animal to a high-risk environment where a human outbreak occurred, such as residence, facility (e.g., nursing home, prison), or cruise ship. Different states may also have different requirements for testing and collaborating with and reporting to public health and animal health officials.

Q: SHOULD ANY ANIMAL SHOWING SIGNS OF RESPIRATORY OR GASTROINTESTINAL ILLNESS BE TESTED?

The AVMA, USDA, CDC, American Association of Veterinary Laboratory Diagnosticians (AAVLD), and National Association of State Public Health Veterinarians (NASPHV) do not recommend routine testing of animals for this virus. If a domestic animal becomes ill with respiratory or gastrointestinal signs, veterinarians are strongly encouraged to first test for common pathogens and conditions that are more likely to have caused such clinical signs.

Discussion among key regulatory authorities and animal health experts (USDA, CDC, FDA, NASPHV, National Assembly of State Animal Health Officials [NASAHO], AVMA) indicates that testing may be justified for certain animals in the following situations:

- Animal has clinical signs consistent with SARS-CoV-2, more common causes of the patient's clinical signs have been ruled out, and the animal has a history of
 - Close contact with a person with suspected or confirmed COVID-19, or
 - Exposure to a known high-risk environment where a human outbreak occurred, such as a residence, facility (e.g., nursing home, prison), or cruise ship
- Atypical patterns of disease suggesting a novel pathogen in a mass care situation (e.g., animal shelter, boarding facility, animal feeding operation, zoo) where exposure history is not known (appropriate diagnostics should be undertaken first to rule out more common causes of illness)
- Threatened, endangered, or otherwise imperiled/rare animals in rehabilitation or zoological settings that have clinical signs or are asymptomatic and have possible exposure to SARS-CoV-2 through an infected person or animal
- Atypical pattern of disease suggesting infection with SARS-CoV-2 in recently imported animals (appropriate diagnostics should be undertaken first to rule out more common causes of illness)



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- Testing is part of an approved research project gathering scientific information to better understand if and how animals might be affected by SARS-CoV-2 and help clarify the role, if any, of pets in human COVID-19. Approved animal care and use and biosafety protocols are required.

Because the situation is ever-evolving, animal and public health officials may decide to test certain animals meeting the above criteria. The decision to test will be made collaboratively between the attending veterinarian and local, state, and federal public health and animal and health officials, and your veterinarian will contact one of those officials for information about how to proceed. If samples are sent to state animal health, university, or private laboratories for initial testing, all samples should be collected by a licensed, and preferably USDA-accredited, veterinarian in duplicate because positive samples must be confirmed through additional testing by the USDA National Veterinary Services Laboratories (NVSL). Different states may also have different requirements for testing and collaborating with and reporting to public health and animal health officials.

Q: WHY ARE ANIMALS BEING TESTED WHEN MANY PEOPLE CAN'T GET TESTED?

Animals are only being tested in rare circumstances and on a case-by-case basis after consultation with public health and animal health officials to determine if testing is needed. Routine testing of animals is not being recommended at this time.

Q: HAVE ANY DOMESTIC SPECIES BECOME INFECTED WITH SARS-COV-2 AS A RESULT OF EXPOSURE TO COVID-19 POSITIVE OWNERS OR CLOSE CONTACTS?

As of April 17, two commercial laboratories in the United States reported they had tested thousands of specimens from dogs and cats for SARS-CoV-2 and had obtained no positive results. These specimens have come from the United States, South Korea, Canada, and Europe, including regions concurrently experiencing human COVID-19 cases. While this is encouraging, the specimens tested were originally submitted for polymerase chain reaction (PCR) analysis of more common pathogens causing respiratory disease in dogs and cats and, as such, per-case information as to whether or not these dogs and cats had contact with confirmed COVID-19 positive people is not available.

Only a few animals with a known history of exposure to people with confirmed COVID-19 have been tested. With that in mind, the only pets incidentally exposed to COVID-19 that have tested positive, with confirmation, for SARS-CoV-2 are two pet dogs and a pet cat in Hong Kong. Another pet cat in Belgium tested positive, but details around that case are less clear. In each case, the pet was in the care of and had close contact with a person who had been confirmed to have COVID-19. Only in the case of the cat in



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Belgium was there a suggestion of the animal showing clinical signs of disease and, in that case, other diseases and conditions that could have caused those same signs of illness were not ruled out and there are also questions about how samples demonstrating the presence of SARS-CoV-2 were collected and evaluated. That cat recovered. As of March 31, 27 dogs and 15 cats from Hong Kong households in which one or more people were sick with COVID-19 had been held in quarantine. Only the 2 dogs and 1 cat mentioned above had positive results of testing for SARS-CoV-2 and none of the animals in quarantine had developed clinical signs of respiratory disease.

To date, the CDC has not received any National Veterinary Service Laboratories (NVSL)-confirmed reports of pets or other animals becoming sick with COVID-19 in the United States, and there is no evidence to suggest that animals, including pets, that may be incidentally infected by humans are playing a role in the spread of COVID-19.

Q: I'VE HEARD ABOUT RESEARCH REPORTS OF CATS, FERRETS, AND DOGS BEING INFECTED WITH SARS-COV-2 AND, IN SOME CASES, SPREADING IT TO OTHER ANIMALS OF THE SAME SPECIES. WHAT CAN YOU TELL ME ABOUT THOSE REPORTS?

Preliminary findings from limited laboratory experimental studies indicate that, of species tested thus far, cats are the species most susceptible to infection with SARS-CoV-2. Some cats in these studies developed signs of clinical disease. Ferrets were also found to be susceptible to infection, but appeared less likely to develop disease. In the laboratory setting cats and ferrets were also able to transmit SARS-CoV-2 to other cats and ferrets, respectively. Golden Syrian hamsters were also able to be experimentally infected and were able to spread the infection to other hamsters. Dogs appeared to be susceptible to infection, but less so than cats or ferrets. Other preliminary laboratory findings indicate that poultry and pigs are not susceptible to infection with SARS-CoV-2.

It is important to understand that experimentally induced infection does not mirror naturally induced infection. In other words, just because an animal can be experimentally infected via inoculation with high concentrations of purified tissue-cultured virus does not mean that it will be easily be infected with that same virus under natural conditions. The number of animals involved in these studies was also very small and conclusions were drawn based on data that, in some cases, were collected from as few as two animals.

There is no evidence to suggest that animals, including pets, that may be incidentally infected by humans are playing a role in the spread of COVID-19. Human outbreaks are driven by person-to-person transmission.



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Q: WHAT DO WE KNOW ABOUT THE ZOO TIGER SICK WITH COVID-19 DISEASE?

On April 5, the US Department of Agriculture's National Veterinary Services Laboratories [announced](#) a positive finding of SARS-CoV-2 in samples from one tiger at the Bronx Zoo in New York City. This appears to be the first instance of a tiger being infected with COVID-19.

On April 3, quantitative PCR testing for SARS-Coronavirus-2 (SARS-CoV-2) on duplicate respiratory tract samples from a four-year-old female Malayan tiger with respiratory signs that was living at the Wildlife Conservation Society's (WCS) Bronx Zoo was performed at the Animal Health Diagnostic Center and New York State Veterinary Diagnostic Laboratory at Cornell University College of Veterinary Medicine and the University of Illinois College of Veterinary Medicine Veterinary Diagnostic Laboratory. Presumptive positive results of that testing were confirmed by the USDA National Veterinary Services Laboratory on April 4. The tiger was one of two Malayan tigers, two Amur tigers, and three African lions that developed respiratory signs over the course of a week; respiratory signs included a dry cough and, in some cases, wheezing, but no dyspnea or nasal or ocular discharge. Mild anorexia was also noted in some animals. All of the large cats are long-term residents of the zoo, do not have chronic medical conditions, and there have been no new animals introduced to the groups for several years. All other Amur and Malayan tigers, a snow leopard, cheetah, clouded leopard, Amur leopard, puma (*Puma concolor*), and serval at the zoo still appear healthy. The source of infection was presumed to be transmission from a zookeeper, who at the time of exposure had not yet developed symptoms of COVID-19. The zoo has been closed to the public since mid-March, and the first tiger began showing signs of being ill on March 27. All of these large cats are expected to recover. Other animals in other parts of the zoo have shown no clinical signs of disease. Enhanced biosecurity protocols have been implemented for staff caring for all nondomestic felids in the four zoos overseen by the WCS.

Because infection of animals with SARS-CoV-2 meets the criteria of an [emerging disease](#), such cases are reported to the World Organisation for Animal Health (OIE).

Q: IF MULTIPLE GREAT CATS AT THE BRONX ZOO WERE SHOWING CLINICAL SIGNS, WHY WAS ONLY ONE TESTED?

Only one tiger was tested because the collection of diagnostic samples in big cats requires general anesthesia. Since all tigers and lions were exhibiting similar clinical signs of respiratory disease, the attending veterinarian believed it was in the best



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interest of the animals to limit the potential risks of general anesthesia to one tiger for diagnostics.

Q: HOW DID THE TIGER CONTRACT COVID-19?

Presumably, the tiger contracted SARS-CoV-2 from a zookeeper, who at the time of exposure had not yet developed symptoms of COVID-19.

Q: WILL THIS FINDING PROMPT ADDITIONAL TESTING OF ANIMALS?

No. This is an evolving situation, however, routine testing of zoo or domestic animals is not recommended at this time. Animal and public health officials may decide to test certain animals that are showing signs of illness consistent with those identified for COVID-19, but only in cases where more common causes for respiratory and/or gastrointestinal illness in those animals have been ruled out and when the affected animals have possible exposure to SARS-CoV-2 through an infected person or animal.

Q: IF ANIMALS CAN CATCH THE VIRUS, CAN THEY INFECT PEOPLE?

At this time, there is no evidence to suggest that pets, livestock, or zoo animals that may be incidentally infected by humans are playing a role in the spread of COVID-19. Human outbreaks are driven by person-to-person transmission.

Q: IS IT TRUE THAT SARS-COV-2 ORIGINATED IN BATS?

This is a hypothesis. The RNA sequence of SARS-CoV-2 is closely related to that of other coronaviruses circulating in bats in Southeast Asia. Taxonomically, SARS-CoV-2 virus is a betacoronavirus. Using molecular clock analysis, betacoronaviruses are [reported to have originated about 3,300 BC](#). Bats are considered to be ideal hosts for alphacoronaviruses and betacoronaviruses.

Sars-CoV-2 viruses isolated from different human COVID-19 patients are reported to have almost identical sequences and the sequences are reported to be [88%](#) and [89.1%](#) analogous with bat-SL-CoVZC45, and [96%](#) analogous with BatCoV RaTG13. BatCoV RaTG13 was previously detected in the [horseshoe bat](#), which is found in South and Southeast Asia and southern and central China.

Q: HOW DID SARS-COV-2 GET FROM BATS TO PEOPLE? WAS THERE AN INTERMEDIATE HOST?



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The precise [mechanism of evolution](#) of SARS-CoV-2 from bats (if that is where SARS-CoV-2 came from) to people is not presently known. At least two scenarios have been proposed. The first has the virus evolving to its current pathogenicity through natural selection in a non-human host (e.g., bat) and jumping to humans. There are no documented cases of bat to human transmission of a coronavirus; previous coronaviruses have passed through an intermediate mammal host before human infection. The identity of the SARS-CoV-2 intermediate host (if there is one) is also currently unknown, but several have been suggested including [pangolins](#) and [stray dogs](#).

In an alternative scenario, a nonpathogenic version of the virus would have jumped from an animal host to humans and then evolved within humans to its current pathogenic state.

These are all hypotheses based on comparative analysis of RNA coronaviral sequences and none have been confirmed to date.

People and COVID-19

Q: HOW ARE HUMANS MOST COMMONLY EXPOSED TO THE SARS-COV-2 VIRUS?

SARS-CoV-2 is [thought to spread](#) mainly from person-to-person, including between people who are in close contact with one another (within about 6 feet [2 meters]), through respiratory droplets produced when an infected person coughs, sneezes or talks. Some recent studies have suggested that COVID-19 may be spread by people who are not showing symptoms of the disease, so maintaining social distance (about 6 feet) is important to preventing the spread of COVID-19.

It may be possible to contract COVID-19 by touching a surface or object that has the virus on it and then touching your mouth, nose, or possibly your eyes. While this is not thought to be the main way the virus spreads, CDC recommends people practice frequent hand hygiene, which is either [washing hands with soap](#) or water or using an alcohol-based hand rub. CDC also recommends [routine cleaning of frequently touched surfaces](#).



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Q: HOW ARE RESPIRATORY DROPLETS AND CONTACT WITH THEM RELATED TO SARS-COV-2 EXPOSURE?

Transmission of SARS-CoV-2 most often occurs when a person infected with the virus releases droplets by coughing, sneezing, speaking, singing, or exhaling. These droplets are generally too heavy to hang in the air, and quickly fall onto floors or other surfaces. All else being equal, the stronger the exhale (coughing or sneezing as compared with normal exhalation) the more droplets are released and the farther the droplets may be dispersed. Taking this into account, many states have now adopted [social distancing](#) of 6 feet because virtually all sizes of droplets disperse short of that radius.

Exhaled droplets eventually land somewhere; for example, on hands, shirt sleeves, countertops, and floors. Droplets can also land on or be transferred by touch to other often-touched surfaces, such as door handles, silver and dinnerware, keys, and steering wheels. Coronaviruses, including SARS-CoV-2, have been shown to survive in the environment from a [few hours to a few days](#), depending on the type of surface, temperature, humidity, and contact with ultraviolet light. Touching one's mouth, nose, or eyes with SARS-CoV-2-contaminated hands after touching contaminated surfaces is a secondary route of exposure.

Results of an [experimental laboratory study](#) suggest that detectable amounts of SARS-CoV-2 virus remain in the air, and on copper, cardboard, stainless steel, and plastic during favorable conditions for the virus (71 to 73°F) for three, four, 24, 72, and 72 hours, respectively. This study, however, involved a much larger viral load than might be expected after normal exposures so the retention times reported may be a worse-case scenario. Virus was also [detected](#) in a hospital room of a COVID-19 patient prior to routine cleaning, but no virus was detected after routine cleaning of that patient's room.

Q: CAN I GET COVID-19 FROM A PERSON NOT SHOWING ANY CLINICAL SIGNS?

Onset and duration of viral shedding and the period of infectiousness for COVID-19 are not yet known. There are reports of asymptomatic infections (detection of virus with no development of corresponding symptoms) and pre-symptomatic infections (detection of virus prior to development of symptoms) with SARS-CoV-2, but their role in transmission is not yet known. Based on existing literature, the [incubation period](#) (detection of virus prior to development of symptoms) ranges from two to 14 days.

Q: HOW ARE PEOPLE WITH COVID-19 TREATED?



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Current clinical management includes the application of infection prevention and control measures, such as [separating the patient from other people and pets in the home and aggressive hygiene and disinfection](#) and supportive care, including [supplemental oxygen and mechanical ventilatory support](#) when indicated. While researchers are studying new drugs and drugs that are already approved for other health conditions as possible treatments for COVID-19 (e.g., Remdesivir, hydroxychloroquine and chloroquine, investigational antivirals, immunotherapeutics, host-directed therapies), currently there are no drugs that are specifically FDA-approved for treatment of this disease. The [FDA](#) is working with drug manufacturers, researchers, and other partners to accelerate the development and approval process for COVID-19 treatments. Information on registered clinical trials for COVID-19 in the United States is available at [ClinicalTrials.gov](#).

Interest has emerged regarding ivermectin as a potential treatment after Australian scientists demonstrated that a single dose eradicated all genetic material of SARS-CoV-2 growing in cell culture within 48 hours. Additional testing in animals and people is required to determine whether these *in vitro* results are mirrored *in vivo* and what dose might be effective in treating the virus, while still being safe to administer to people.

There has been similar interest around the use of chloroquine phosphate after a [publication](#) was released suggesting some efficacy for its use in treating COVID-19-associated pneumonia in clinical studies. While used to treat malaria and certain other conditions in people, chloroquine phosphate is also available in a different formulation to treat disease in aquarium fish and [at least one person has died from ingesting chloroquine phosphate in that formulation](#). Because ivermectin is also readily available in formulations used to treat animals, similar concerns exist around the misuse of this drug and FDA has issued a [warning](#) accordingly.

While we are all anxious to find a treatment for COVID-19, it is very important that people not self-medicate with prescription medications or over-the-counter drugs that are not prescribed or recommended for them by their doctor for their particular health condition(s) and veterinarians should advise clients accordingly.

Q: WHAT RESEARCH STUDIES ARE BEING CONDUCTED TO SUPPORT TREATMENTS FOR COVID-19 IN PEOPLE?

Researchers are studying new drugs, and drugs that are already approved for other health conditions, as possible treatments for COVID-19. The [US National Library of Medicine Clinical Trials](#) database lists more than 380 drug (including [convalescent plasma](#)), device, biologic, and other [trials for COVID-19](#). The FDA is posting



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frequent [updates](#) on therapeutic trials and enforcement actions against fraudulent claims.

Scientists around the world are participating in a platform, [Randomised Evaluation of COVID-19 Therapy \(RECOVERY\)](#), that is examining approximately 30 treatments believed to have potential.

Animal models of SARS-CoV-2 infection are being explored, using high doses of virus. Bats, ferrets, and cats show some initial potential for serving as models, but dogs, pigs, chickens, and ducks do not. As clarification, [domestic cats](#) are a species distinct from [civet cats](#).

Q: CAN BIOLOGICS USED TO PREVENT CORONAVIRUS INFECTIONS IN DOMESTIC ANIMALS BE USED TO PREVENT COVID-19 IN PEOPLE?

No. The [United States Department of Agriculture Center for Veterinary Biologics](#) licenses biologics for use in dogs, cats, cattle, swine and chickens, but those coronaviruses are different from SARS-COV-2. Biologics developed for use in non-human animals should not be given to humans.