

Considerations for the Management of Non-Domestic Species in Human Care During COVID-19

These considerations are a result of a collaborative effort, engaging the American Association of Zoo Veterinarians, the Zoological Association of America, the Association of Zoos and Aquariums, the European Association of Zoo and Wildlife Veterinarians and their respective Committees and Advisory Groups, as well as governmental partners. These individuals and organizations represent the best of the ZAHP partnership!

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As the COVID 19 crisis continues, the understanding of how the virus affects various animal species is still largely unknown. As of January 11, 2021, cases of SARS-CoV-2 infection have been confirmed in tigers, lions, puma, snow leopards, domestic cats, mink, and dogs after contact with infected humans or animals. Earlier this month, gorilla exhibiting mild symptoms were confirmed positive for SARS-CoV-2 via fecal testing. While the risk of transmission of SARS-COV-2 virus from infected animals to humans remains low, investigations have confirmed that spill-over of the virus from infected mink to humans is possible. For additional information please see the [OIE statement on COVID-19 and mink](#).

A recent surveillance survey of wild animals around mink farms in Utah with confirmed infection did detect one infected wild mink. This was not a feral mink, but a wild one. At this time, the virus does not seem to be circulating in wild populations; seral animals from other wild species were sampled and all others tested negative. A list of confirmed cases of SARS-CoV-2 in animals within the US is available on the [USDA website](#); additional information on cases worldwide is available from the [OIE](#).

There are hundreds of research papers being generated during this crisis. Many have not yet undergone strict peer review to determine validity of results, therefore they must be interpreted with caution.

The following represents general considerations for the management of non-domestic species in human care. These considerations have been collated from various associations, subject matter experts, and taxon advisory groups. **This information is not intended to replace specific guidance provided by subject matter experts, but rather, reinforce the similar guidance that is being provided across management groups when caring for animals at a time when so little is known about this pathogen. Links to taxon specific considerations are provided in references.**

Please Note: These are only considerations. The actions taken by your facility or institution should be based on a thorough risk assessment of

your collections, protocols, location and other factors that increase or decrease the risk of disease.

For more information on risk assessment, see [Secure Zoo Strategy](#).

Generally Accepted Facts About COVID-19, the Disease Caused by the SARS-CoV-2 Virus

- This is a human health pandemic that likely originated from animal reservoirs in Wuhan China in 2019.
- Humans can be infected with the virus, shed virus, and may never show clinical signs of disease, or may have delayed on-set of a myriad of symptoms. Because of the highly variable presentation of disease, this makes it difficult to determine if the individuals most closely working with non-domestic species may or not be a risk to collections at a given time.
- Most common transmission of the virus from human to human remains the spread via respiratory secretions.
- The ability of the COVID virus to attach to mammalian cells and potentially cause infection seems to be dictated by the make-up of cellular receptors known as ACE2. A recent manuscript¹ in the Journal of Virology states "[the virus] likely recognizes ACE2 from pigs, ferrets, cats, orangutans, monkeys, and humans with similar efficiencies, because these ACE2 molecules are identical or similar in the critical virus binding residues." The presence of ACE2 receptors is likely necessary to allow infection, but current studies have so far not explained the dose of viral units necessary to cause disease in many species.
- Due to the genetic similarity between humans and non-human primates (NHP) other great apes in addition to orangutans, are likely susceptible to this virus. This hypothesis appears to be valid, given the confirmed infection in gorilla in early January 2021..
- A manuscript² by Shi et al, found that in experimental conditions, the SARS-CoV-2 virus replicates poorly in dogs, pigs, chickens and ducks, but ferrets and cats are permissive of infection (under experimental conditions).
- It is the opinion of animal experts that related species may share similar receptor biology, and are presuming that all non-domestic animals of certain taxa **may** be susceptible. Additional research is needed.
- Bat species are known to be the host of many coronaviruses, and they have been implicated in one of many steps that likely resulted in the current virus circulating in the human population. This novel coronavirus may be able to circulate in certain bat species, therefore may pose a risk to bats in human care.
- Scientists are closely watching a mutated strain detected in the mink in Denmark. At this time, studies are ongoing to determine if this strain changes vaccine efficacy in the human population. For more information, see: <https://www.who.int/csr/don/06-november-2020-mink-associated-sars-cov2-denmark/en/>

General Considerations to Protect Non-Domestic Animals in Human Care

Human health is the priority, however, steps that will keep humans safer during this time also protect animals in human care. **Again, we reiterate: considerations and protocol changes should be**

¹ Wan Y, Shang J, Graham R, Baric RS, Li F. 2020. Receptor recognition by the novel coronavirus from Wuhan: an analysis based on decade-long structural studies of SARS coronavirus. J Virology 94: e00127-20. <https://doi.org/10.1128/JVI.00127-20>.

² Shi, J., Wen, Z., Zhong, G., 2020. Susceptibility of ferrets, cats, dogs and other domesticated animals to SARS-coronavirus 2. Science 08 April 2020.

made after a risk assessment of your facility, protocols, practices and animal species. Not all considerations will be necessary or appropriate based upon risk assessment.

Links to taxonomic specific statements:

- [Guidance for Working Around Felid Species During the SARS CoV-2 Pandemic](#) (12/14/2020) - Prepared by AZA Felid TAG veterinary advisors
- [Science-based Facts & Knowledge About Wild Animals, Zoos, and SARS-CoV-2 Virus](#) (updated 4/28/2020) - Produced by the European Association of Zoo and Wildlife Veterinarians (EAWZV) Infectious Diseases Working Group
- [SARS-CoV-2 Considerations and Precautions](#) (updated 4/29/2020) - Prepared by AZA Small Carnivore TAG
- [Animal Care Considerations to Prevent the Spread of Severe Acute Respiratory Syndrome Coronavirus 2 \(SARS-CoV-2\)](#) - Prepared by Wild Pig, Peccary and Hippo TAG veterinary advisors
- [Corona virus disease \(COVID-19\) and Bats in Human Care:](#) (updated 7/10/2020)- Prepared by AZA Bat TAG veterinary advisors.
- [Corona virus disease \(COVID-19\): considerations for Great Apes in human care \(updated 1/11/2021\)](#) - Prepared by veterinary advisors for the AZA Gorilla Species Survival Plan and Ape Taxon Advisory Group
- [Ape Emerging Disease Management Hub](#) - This site is being designed in real time as a resource for those working at the interface of humans and non human primates. The goal is to pool relevant facts, experts and resources from several professional communities (human health, captive, sanctuary, and in situ) to assist with response and management of the 2020 SARS CoV2 outbreak.
- [SARS-CoV-2 Advisory Resources for Handling Bears](#) - Considerations on the potential reverse zoonotic transmission of SARS-CoV-2 and research and management involving handling of free-ranging and captive bears during COVID-19 pandemic from The International Association for Bear Research and Management.
- [Guidelines for Working with Free-Ranging Mammals in the Era of the COVID-19 Pandemic](#) – Recommendations to minimize the risk of SARS-CoV-2 transmission from people to free-ranging, wild mammals; created by the IUCN Species Survival Commission Wildlife Health Specialist Group and OIE.

Assessing Fitness of Staff Caring for Animals

- Facilities should know where to find the most recent recommendations from the CDC and local public health to keep essential workers safe. NOTE: The case definition for humans is changing rapidly. It is the facility's responsibility to remain current on guidelines that determine a confirmed, suspect, asymptomatic or recovered individual, and how that relates to their fitness to work around animals, and with what restrictions³.
- Institute or reinforce all personal hygiene actions among staff to limit the spread of respiratory disease (handwashing, avoid touching one's face, PPE use to be discussed below) not just when 'on the job' but also in their off hours.

³ <https://www.cdc.gov/coronavirus/2019-ncov/community/critical-workers/implementing-safety-practices.html>

- Institute a mechanism for caretakers to promptly report any symptoms they may experience. Other 'screening' tools should be considered as they are developed. Consider a policy that allows staff to report clinical signs of their own disease without negative repercussions for reporting.
- Consider implementing self-surveillance by taking body temperatures twice daily. (This is being recommended by the National State Public Health Veterinarians for all essential workers)
- Establish facility-specific guidelines for the management of asymptomatic workers who may have been exposed to COVID 19. It is recommended to follow CDC guidance as it may change.
- Ensure that staff are properly trained for working with the species under their care, and are trained to any new protocols implemented at this time.
- Reinforce the importance of reporting any unusual symptoms in both themselves, and animals they care for.

“Social Distancing”

- Determine who needs to be with the animals, and for what reasons
- Consider developing staggered work schedules to reduce the number of employees on site at any one time
- Reassess the need to be closer than 6 feet to any animal during any training, shifting, hand-feeding. This aligns with CDC guidance for human distancing. Consider temporarily discontinuing non-essential interactions such as hand feeding, training
- Reinforce the practice of social distancing with animal care staff **outside** of work as well.

Personal Protective Equipment

- Evaluate current PPE protocols and determine if they are sufficient to protect workers from each other, and the animals from the staff. Consider PPE protocols for staff that interact with multiple areas of the institution (vet staff, animal diet preparation and delivery areas, horticulture, facilities maintenance, etc.)
- Recognize that as different species of animals may be identified as susceptible, protocols will need to be re-evaluated and updated as needed.
- Consider the use of eye protection (to minimize splash between workers).
- Current CDC recommendations⁴ support the use of cloth face coverings to minimize the risk of infective droplets from humans being released into the air to infect others (or animals). Proper washing and care of cloth face coverings is important to prevent them from becoming fomites.
- With the tremendous shortage of PPE for front line human healthcare workers, the use of N95 masks or surgical masks should be carefully considered and used sparingly. This may be based on potential species susceptibility to SARS-CoV-2 or other human pathogens, as well as the type of procedure being conducted.
- Consider the feasibility of changing clothes or using designated work clothing, and options for doing laundry on site. (This minimizes clothing as a fomite for disease transmission)

⁴ <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html>

- The use of gloves (if available) should be evaluated. Ensure that proper ‘donning and doffing’ (removal) of gloves and any other PPE ensures that the PPE is removed carefully to prevent worker contamination.
- Evaluate the need for additional use of coveralls, foot coverings, or footbaths.

Cleaning and Disinfecting

- All staff should adhere to CDC Guidelines on Handwashing: Regular handwashing with soap and water for at least 20 seconds, especially after being in a public place, blowing nose, coughing, sneezing, and before eating. Staff should also wash hands before entering an animal area, and before and after handling animal food and food dishes or working in an animal’s enclosure. Avoid touching eyes, nose and mouth with unwashed hands.⁵
- Evaluate “common touchpoints” both inside and outside animal housing such as commissary equipment, etc.
- Evaluate normal protocols for cleaning and disinfection, and consider what changes are necessary. SARS-CoV-2 virus is inactivated by many disinfectants commonly used in facilities housing animals⁶.
- Regularly disinfect all surfaces that commonly come into human contact

What to Do if You are Suspicious of a Case of Disease in a Non-Domestic Animal

- Currently, routine testing of non-domestic species is not recommended. If there is suspicion of a possible SARS-CoV-2 infection in an animal:
 - Per regulatory authorities⁷, the decision to test an animal (including zoo animals) should be agreed upon using a One Health approach between appropriate local, state and/or federal public health and animal health officials. Veterinarians should first contact their State Animal Health Officials to obtain permission to send samples and these officials may suggest a specific state lab. In some states, specially trained veterinarians may be required to obtain samples.
 - [USDA list of State Animal Health Officials](#)
 - [NASPHV list of designated and acting State Public Health Veterinarians](#)
 - Your state animal health official will designate the laboratory for sample submission. The laboratory should be contacted prior to collection or shipment of any samples to determine any specific protocols. Oral/nasal swabs, tracheal wash or other respiratory samples, and fecal samples may be requested.
 - Samples from zoo species can be screened at a number of-veterinary diagnostic laboratories. Confirmation must occur at the National Veterinary Services Laboratory in Ames, IA
 - COVID 19 is an OIE reportable disease and there are penalties for those who do not report. As such, any positive sample will be automatically sent to NVSL (National Veterinary Services Laboratory) for confirmation. If confirmed, NVSL is required to report results to state and federal officials. Therefore, the decision to test needs to be made with caution and the understanding that results will be communicated to authorities. Prior to approval to submit samples by your State Animal Health Official, make sure that local and State Public Health officials and jurisdictional state wildlife

⁵ <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>

⁶ https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/emergency-management/ct_disinfectants

⁷ <https://www.cdc.gov/coronavirus/2019-ncov/php/animal-testing.html>

agencies are aware that there is a suspicious case in an animal. This allows everyone to be prepared if a case of disease is confirmed in a non-domestic species.

- Consider advising the appropriate SSP/TAG veterinary advisor of any testing so that they can track / help in dissemination of information when needed.
- **NOTE:** Laboratories running any animal tests at this time are animal specific labs, and are not diverting testing capacity from human health laboratories.

Emerging Research on Species Susceptibility to SARS-CoV-2

New research on SARS-CoV-2 is being released rapidly. For a searchable database of the most recent scientific publications visit [Lit COVID](#), which is updated daily. Those searching for COVID literature should recognize that knowledge about this virus is changing rapidly. Also be aware that some studies are being released to the public before the peer review process is complete.

This is a PDF version of a page on the ZAHP website. For the most current version of this information visit: <https://zahp.aza.org/covid-19-animal-care/>.