

Novel Coronavirus disease (COVID-19)

Fact sheet

Preamble

This document will be updated periodically as new information becomes available. Please check the **WHA website** www.wildlifehealthaustralia.com.au for the current version.

Key points

- there is **no** evidence of SARS-CoV-2 or SARS-CoV-2-like viruses in Australian wildlife
- there is **no** evidence to suggest that any animals in Australia might be a source of COVID-19
- human to animal transmission of SARS-CoV-2 is very rare
- it is safest to assume that any mammal wildlife species **may** have the potential to be infected with SARS-CoV-2 from close exposure to an infected human (similar situations to those described as risky for human to human transmission)
- appropriate precautions are always recommended before, during and after contact with animals (see [National Wildlife Biosecurity Guidelines](#))
- people diagnosed with COVID-19 should not have any contact with Australian wildlife
- if you care for wildlife, you should have a plan in place for the animals in your care in the event you become sick or have to self-isolate
- further information on COVID-19 and animals can be found at the Australian Veterinary Association (www.ava.com.au/coronavirus) and OIE (www.oie.int/en/scientific-expertise/specific-information-and-recommendations/questions-and-answers-on-2019novel-coronavirus/).

Introductory statement

Coronaviruses are the cause of recently emerged diseases which cause significant respiratory symptoms in humans, including Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS) and COVID-19. Evidence suggests bats are the maintenance hosts for both SARS and MERS viruses. None of these viruses have been found in Australian wildlife (see WHA fact sheet “Coronaviruses in Australian Bats”).

In December 2019 a novel coronavirus disease, named COVID-19, emerged in humans in Wuhan, China, and spread progressively through the global human population. WHO declared 2019-nCoV a "Public Health Emergency of International Concern" in late January 2020 (WHO 2020b). Evidence is emerging that a range of animal species may be susceptible to infection acquired from humans who are shedding the virus.

Public health concerns

COVID-19 disease is spread by human to human transmission. See the WHO website (www.who.int/emergencies/diseases/novel-coronavirus-2019) and the Australian government Department of Health for information on COVID-19 in humans (www.health.gov.au/news/health-alerts/novel-coronavirus-2019-ncov-health-alert).

Potential involvement of Australian animals

There is no evidence that Australian animals carry the SARS-CoV-2 virus and no evidence that they can be a source of infection for humans.

There are several reports globally of human-to-animal transmission of SARS-CoV-2, but it is believed that human-to-animal transmission of the virus is very rare..

In late March 2020, a pet cat in Belgium tested positive for SARS-CoV-2 after close daily contact with the owner, who had COVID-19 symptoms for a week before the cat developed clinical signs of diarrhoea, vomiting and breathing difficulties. The virus was found in the cat's faeces (Chini 2020). A cat in Hong Kong tested positive to virus in oral, nasal and rectal samples but did not become sick, after close contact with an infected owner (Government of Hong Kong 2020a).

A tiger at Bronx Zoo tested positive for SARS-CoV-2 in early April 2020 after several tigers and lions at the zoo showed signs of respiratory illness. It is believed a zoo keeper may have been asymptotically infected and passed on the infection. The big cats had a dry cough, wheezing and some loss of appetite but were not severely affected (USDA 2020; WCS 2020).

In March 2020, two separate dogs in Hong Kong tested positive to SARS-CoV-2 following close exposure to their owners who were sick with COVID-19. PCR showed the presence of genetic material from the virus but the dogs did not show any clinical signs of disease (Government of Hong Kong 2020c; OIE 2020). One dog subsequently showed a positive antibody response from a serological test, indicating it had developed an immune response to the viral infection (Government of Hong Kong 2020b).

Results from laboratory-based infection trials with SARS-CoV-2 suggest ferrets and cats are more susceptible to infection than dogs, and that pigs and poultry are not susceptible. Cats may be able to pass the infection on to other cats. These studies do not necessarily reflect the situation outside a laboratory setting (PROMED 2020; Shi et al. 2020). Another study found that cats in Wuhan showed signs of previous infection (antibodies) after the start of the Wuhan outbreak in humans, whereas no cats sampled before the outbreak had antibodies, indicating cats had been infected during the outbreak (Zhang et al. 2020).

A laboratory study with intranasal inoculation of Egyptian fruit bats (*Rousettus aegyptiacus*) (n=9) resulted in a transient respiratory infection and virus replication. Infectious virus was isolated from one animal 4 days after inoculation. Infected animals did not show any clinical signs. Virus was also detected in one contact bat which was not directly inoculated (FLI 2020; PROMED 2020).

In late March 2020, IDEXX laboratories reported that more than 4,000 canine, feline, and equine specimens were screened with their SARS-CoV-2 (COVID-19) RealPCR Test. Samples were submitted over a four-week period from mid-February 2020, from the USA and South Korea including regions with high rates of human COVID-19 cases. All PCR tests were negative (IDEXX 2020). Tests conducted on 17 dogs and 8 cats from households with confirmed COVID-19 cases (or close contact) in Hong Kong found no positive cases other than the two dogs mentioned above (Government of Hong Kong 2020b).

There are published studies of other coronaviruses in Australian animals, with a focus on bats (see WHA fact sheet “Coronaviruses in Australian Bats”). Although some coronaviruses have been found in a variety of Australian bat species, there is NO evidence of SARS-like, MERS-like, or SARS-CoV-2-like viruses in Australian wildlife (including bats). SARS-CoV-2 is not closely related to any known Australian bat coronaviruses and there is no suggestion that SARS-CoV-2 is present in Australian wildlife, although further surveillance and studies are recommended.

Further studies are underway to understand if and how different animals could be affected by SARS-CoV-2. It remains extremely unlikely that animals play any role in transmission of this virus during the current outbreak.

There is no evidence to support restrictions to movement or trade of animals (OIE 2020).

Precautions when in contact with Australian wildlife

There is no evidence to suggest that any animals (livestock, pets or wildlife) in Australia might be a source of infection of SARS-CoV-2.

Until more is known, it is safest to assume that any mammal wildlife species may have the potential to be infected with SARS-CoV-2, from close exposure to an infected human (similar situations to those described as risky for human to human transmission). Appropriate precautions are always recommended before, during and after contact with animals (including wildlife) and their food, supplies and excreta. This includes, for example washing hands and cleaning of equipment, clothing and boots and maintaining “social distance” (1.5 m) wherever possible (see [National Wildlife Biosecurity Guidelines](#)).

People who are unwell, including those with COVID-19 like symptoms, should avoid contact with wildlife, wherever possible. People diagnosed with COVID-19 should not have any contact with wildlife. If you care for wildlife, you should have a plan in place for the animals in your care in the event you become sick or have to self-isolate.

Australia’s Animal Health Committee (www.agriculture.gov.au/animal/health/committees/ahc) advises that diagnostic testing and surveillance in Australian animals for COVID-19 is not recommended, unless on the advice of human and animal health authorities. If testing is required, it should be undertaken at the CSIRO Australian Centre for Disease Preparedness (the former Australian Animal Health Laboratory) (Animal Health Committee 2020).

There is no justification in taking measures against animals which may compromise their welfare (OIE 2020).

Aetiology and possible origin

Coronaviruses are single stranded, enveloped RNA viruses, 75-160 nm in diameter in the family *Coronaviridae*. The subfamily *Coronavirinae* is further divided into four genera Alpha-, Beta-, Gamma-, and

Deltacoronavirus. SARS and MERS coronaviruses belong to the betacoronavirus genus and all coronaviruses detected in bats are either Alpha- or Betacoronaviruses (Drexler et al. 2014). Coronaviruses have been shown to have the potential for cross-species transmission and an ability to evolve relatively rapidly, which makes them of interest as potential emerging infectious diseases.

Only some coronaviruses are considered to be zoonotic (passed from animals to humans) (WHO 2020a). While coronaviruses infect a wide range of bird and mammal species, bats appear to be the natural hosts of many coronaviruses. There is evidence to suggest that all coronaviruses recognised in other species originally derived from bats (Vijaykrishna et al. 2007), although others suggest that Alpha- and Betacoronaviruses originated in bats and Gamma- and Deltacoronaviruses originate in birds (Wong et al. 2019). Previous emerging Betacoronaviruses causing respiratory disease in humans (SARS, MERS) have been shown to have recently moved from a bat host, via an intermediate animal host, to humans.

The virus responsible for COVID-19 (now termed SARS-CoV-2) is also a Betacoronavirus and is presumed to have transferred to humans from an (as yet) unidentified animal host.

Many experts consider bats to be the most plausible and probable original host of SARS-CoV-2. SARS-CoV-2 is closely related to a known bat coronavirus (96% genome homology) and is less closely related to SARS virus (~80% homology) (Lu et al. 2020; Zhou et al. 2020). A possible snake origin based on viral genetics was quickly refuted by other virologists (Ji et al. 2020; Lu et al. 2020; Luan et al. 2020; Robertson 2020; Zhou et al. 2020). Many scientists believe an intermediate host has likely been involved in the original movement of the virus from bats into humans. Pangolins were proposed as a possible intermediate host from bats to humans (Cyranoski 2020). Others suggest that Bovidae and Cricetidae (New World rodents) should be considered as possible intermediate hosts for SARS-CoV-2, based on genetic studies (Luan et al. 2020). Rodents in Australia, including introduced house mice, black and brown rats, and native rodents fall in the Old World rodent group, and are not Cricetidae.

Routes of transmission between bats, and from bats to other hosts, including humans, are yet to be confirmed for coronaviruses (Smith et al. 2016).

Epidemiology

Although coronaviruses appear to have a relatively narrow host range, one bat species may be infected with multiple different coronaviruses. This potential mixing of viral species, along with their high mutation rate, permits significant genetic recombination allowing coronaviruses to change and evolve relatively rapidly (Woo et al. 2007).

There is no clear evidence of how SARS-CoV-2 moved from bats into humans and whether an intermediate host species was involved in transmission of the emergent disease in humans, as was shown to be the case for both SARS (civets) and MERS (camels).

Conclusion

SARS-CoV-2 has most likely moved from a natural bat host into humans, possibly via an unidentified intermediate animal host. There is no evidence of SARS-CoV-2 or similar virus in Australian wildlife although there is evidence from overseas that animals can become infected when exposed to an infected human. Good hygiene and infection control practices are always recommended when interacting with animals. This fact sheet will be updated as new information becomes available.

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