

# COVID-19 in felines, their role in human health and possible implications for their guardians and health surveillance

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SARS-CoV-2, the causative agent of COVID-19, as well as other human betacoronaviruses, emerged from a virus that exists in animals. Its evolution involves a probable genetic source in bats, but there may also have been involvement of a still unknown intermediate animal host before it was transmitted to humans. This means that animals played a critical role at the beginning and in the evolution of this outbreak, similarly to what has already been observed in the case of MERS-CoV and SARS-CoV-1.<sup>1,2</sup>

It is important to elucidate routes that result in spillover events, which correspond to an increase in hosts when viruses break through the interspecies barrier, generally as a result of high mutation rates. Due to its global extent and the high number of infected people, frequently associated with high viral loads, SARS-CoV-2 is capable of producing further episodes of “jumps” between species and, as such, it must be monitored intensely. For this reason, well-designed scientific studies need to enlighten the epidemiological role of animals in the COVID-19 pandemic.

The novel coronavirus uses angiotensin-converting enzyme 2 (ACE2) as a receptor, the same entry route as SARS-CoV-1, the cause of SARS which emerged in 2003. Pet animals, particularly dogs, cats and ferrets, have gained a great deal of visibility in this context due to close contact with people and because their ACE2 receptor has high human ACE2 amino acid sequence identity.<sup>3,4</sup>

The literature is still scarce, but indicates that some animals species, especially felines, can occasionally be infected by SARS-CoV-2,<sup>5-10</sup> although man–cat transmission appears to be an event unlikely to occur in natural conditions. The reports refer to isolated cases and statistically inform us that thus far there are no signs that pet animals, especially dogs and cats, are a source of infection for human beings. The evidence only leads us to cases in which human beings infected by COVID-19 (guardians and handlers) transmitted virus particles to animals naturally or cases in which the virus was experimentally inoculated.

There is also a possibility that animals infected by the virus can become ill, but the clinical picture appears to be mild and self-limiting. The primary source of infection for cats is related to contact with infected people, but there is no evidence as yet that suggests transmissibility to humans.<sup>5-10</sup> Previous studies of SARS-CoV-1 have already demonstrated with regard to cats precisely what is being discovered now in relation to SARS-CoV-2.<sup>11</sup>

Given the magnitude of COVID-19 in humans, the lack of any case documenting COVID-19 being transmitted from cats to humans should provide the necessary comfort that our feline friends are not virus propagation factors for humans. As there is no epidemiological support that justifies cats being included in the virus transmission chain, risk at the moment is deemed to be nil.

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We need more in-depth and better designed studies in order to prove the hypothesis that pet animals, such as dogs and cats, may be important sources of infection for human beings. However, if on the one hand the need for new studies is becoming paramount, on the other hand we must take care with publicizing the results of these studies in non-scientific communication channels, as the impacts of publicizing the results to an audience that is not qualified to assess them from a scientific viewpoint can cause unnecessary panic and result in very serious consequences for animals and public health.

Incomplete and inconclusive studies, with small sample sizes, may cause more uncertainty at a delicate time and threaten even more the well-being of pet animals and public health. Statements by international nongovernmental organizations (NGOs) that work with animal protection and well-being indicate that cases of abandonment and ill treatment of dogs and cats have increased since the onset of the pandemic, especially in Latin America and Asia.<sup>12-14</sup>

It can therefore be seen that misinterpreted results can lead to more abandonment and ill treatment of animals capable of impacting public health, while the number of stray animals will also rise, leading to an increase in harmful conditions, animals being run over and the emergence of possible outbreaks of zoonoses such as rabies, leishmaniasis and sporotrichosis, in vulnerable regions.

As such it is crucial that scientists continue to conduct research into novel coronavirus in pets, and publicizing results at the right time is a question of ethics. Gaining understanding of the dynamics of the virus can mean great progress with what we know about the ability of coronavirus to spread between humans and animals. Testing animals for SARS-CoV-2 is however an issue that requires certain prior guidelines.

Sporadic clinical tests can sometimes be useful, but may also mean loss of time and effort and cause even more problems, if the context is not addressed appropriately. It is fundamental for a clear communication plan to be put in place beforehand. Before being tested for SARS-CoV2, animals must be assessed for other more common causes of their clinical picture. Positive animals must be monitored. Their guardians need to be duly informed about the meaning of a positive result, to avoid excessive fear or a panic reaction that may result in euthanasia or abandonment.

As for studies underway in Brazil, a study is known to be being conducted with household and community cats to investigate for SARS-CoV2 using RT-qPCR, but with no data published so far. The study, which is being conducted by a veterinary diagnosis laboratory (TECSA Laboratórios), began on February 26<sup>th</sup> and after 50 days of collection, 56 samples had been obtained from 10 Brazilian states (Amazonas, Bahia, Minas Gerais, Pernambuco, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, São Paulo and Tocantins). The animals assessed had respiratory and/or intestinal conditions, and the group considered cats exposed and not exposed to people with COVID-19. No SARS-CoV-2 positive animal has been detected so far.

In view of the possibility of SARS-Cov-2 infection in cats, we need to consider this scenario with great caution. In short, tests in animals should only be performed for the purposes of surveillance, scientific cooperation and, should the occasion arise, to minimize risk of undue behaviors.

Scientific agencies and international bodies must continue with their research in relation to the SARS-CoV-2 virus, its forms of transmission, its main fomites, its main hosts, potential transmissibility via more common domestic animals (dogs, cats, birds); and news agencies should only disseminate scientific information to the public at large when such information is well consolidated and proven, and when it is publicized in the form of public health authority statements.

The quantity of information about infection in cats is still minimal, but the situation is unfolding rapidly. For this reason it is recommended that veterinary surgeons frequently monitor official and scientific communications in order to keep up to date.

Thus far it is known that the virus' main transmission route continues to be via contact between people. Even so, people suspected or confirmed as having COVID-19 must minimize direct contact with their pets to avoid any potential transmission. The main reason for this is that the virus can be indirectly carried by the animal to an uninfected person. In this sense, dogs and cats can act as fomites, i.e. they can act like a handkerchief, a glass or an object contaminated with the virus. It is an unlikely but not impossible episode.

It is therefore the responsibility of veterinary surgeons to advise guardians with suspected or diagnosed COVID-19 to keep themselves isolated from their animals or to

have minimal contact with them, ensuring all hygiene measures when having contact with them. If we get infected, we must take all protective measures with regard to our family members and animals.

We must also safeguard the health of all people, and, if it is proven that there is a real risk of animals being able to contract COVID-19 and disseminate it among humans, acting as a real and relevant source of infection, protective measures must be publicized immediately, given that dogs and cats form part of many Brazilian families. Prevention measures and isolation measures for these animals must also be put in place to protect their well-being and the health of their guardians, those who have contact with them and professionals who deal with these animals on a daily basis, such as pet sitters, handlers, veterinary surgeons, veterinary nurses etc.

We reiterate that there is still little evidence of this greater risk, and the recommendations of international health authorities and medical and veterinary associations – such as the World Health Organization/Pan American

Health Organization (WHO/PAHO),<sup>15</sup> the World Organisation for Animal Health (OIE),<sup>16</sup> the Centers for Disease Control and Prevention (CDC)<sup>17</sup> and the World Small Animal Veterinary Association (WSAVA)<sup>18</sup> – follow the same editorial line in their official communications: scientific findings are still insufficient to demonstrate the infectious impact of the virus on cats, but rather indicate, so far, that these animals do not characterize an important source of SARS-CoV-2 transmission to humans. Moreover, there is still no official position of these organizations regarding testing animals.

It is the duty of veterinary surgeons to keep themselves constantly up to date about the subject and to inform animal guardians and other professionals in this area about possible risks of transmission, forms of prevention and about the need to carry on caring for their animals in a responsible manner, and to stress that under no circumstances whatsoever can domestic animals be blamed or held responsible for a disease that emerged and is spreading among human beings.

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