Qualitative Risk Assessment Template

SUMMARY OF RISK ASSESSMENT

Risk Assessment on the risk of SARS-CoV-2	
Risk Question: In a situation where a companion animal has had household contact with a test positive SARS-CoV-2 person, what is the risk of the animal being exposed to the virus and what is the risk of onward spread of infection from the animal to other people or companion animals?	**Outcome of risk assessment**: Risk of exposure from infected humans HIGH (depending on the pathway); onward spread from animal to other animals or humans MEDIUM from fomite risk, VERY LOW from replicating virus in the companion animal (depending on the species); overall risk LOW from combining probabilities
	Key uncertainties: Infectious dose in people Presence, possible length and duration of infection in companion animals and humans Level of viral shedding in human asymptomatic cases and early stage symptomatic cases. Duration and viral load of pet fur as fomite
Type of risk assessment: Rapid Qualitative	**Level of uncertainty in the risk estimate given available evidence**: mostly high

Publication Information	
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Risk of a companion animal (cat or dog) causing onward spread of SARS-CoV-2 virus to people following contact with a person testing positive for SARS-CoV-2 virus?

1. Executive Summary

The current outbreak of the novel coronavirus, SARS-CoV-2, in the UK is now involving sustained human-to-human transmission in urban settings with increasing levels in other areas of the UK. This is changing on a daily basis. Human cases are expected to exceed several thousand and there is a case fatality rate of around 4% of hospitalised patients (based on limited testing of hospitalised patients only). The origin of SARS-CoV-2 is not yet known, although sequence data suggest the progenitor virus is likely to be found in bats, which are a common source of zoonotic coronaviruses, such as Middle East Respiratory Syndrome Coronavirus (MERS-CoV) and Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV). The pathway for emergence is not known and the role of intermediate contact hosts may have been important for local amplification and possible adaptation in a market system prior to human transmission, so it is not possible to rule out livestock as intermediate contact hosts (cattle, pigs, small ruminants and poultry). The first people reported to have contracted the novel coronavirus (SARS-CoV-2) allegedly were exposed at a “seafood” market in Wuhan, Hubei province, China. However, the wet market sold a variety of wildlife, game, various animal organs as well as fish and seafood.

The main risk to humans of SARS-CoV-2 is through contact with infected human body fluids, in particular respiratory fluids, urine and faeces. Following the recent decision to no longer test people unless they are in hospital and the unknown infectivity of asymptomatic cases, this risk assessment evaluates the likely pathways for pet companion animals to become infectious (ie capable of infecting others). There is no evidence to date that contact with companion animals is involved in transmission of SARS-CoV-2 to humans.

The consequence of a human case is variable and depends on the immune status of the person infected. Health care available in the UK is of an excellent standard and the earlier the diagnosis, the better the prognosis as supportive care can be given to reduce the impact of symptoms. Severe cases in humans are rare, with an estimated case fatality rate of ~4% (which should be caveated by not knowing the true denominator data for subclinical infection) and data to date indicate underlying health issues can severely complicate disease progression and result in death. It is important to recognise that in a household where another person is already infected, the risk to other people in household is far outweighed by direct contact with the infected human rather than any contamination risk, because the virus has a short survival time on many surfaces. If an animal is exposed to virus and the virus binds the host cells, this does not mean the animal is truly infected or would become

infectious. A search of the scientific literature does not suggest coronaviruses (which is a broad group of viruses) spread from companion animals to humans.

Therefore, until more information is available on the likely infection status of a companion animal in contact with an infected SARS-CoV-2 patient, we consider the likelihood of exposure to be at most, **medium, with a high level of uncertainty.** This is based on there now being sustained human-to-human transmission in the UK, and the close contact people have with their pet cats and dogs in the UK. In terms of the risk of onward transmission, there is high uncertainty as to whether an exposed companion animal would develop infection, become infectious and have close contact with a human (respiratory fluid in touch with mucus membranes) but based on current evidence, this is considered a **very low likelihood**; however, there is a strong possibility that the animal could act as a fomite for short periods of time, carrying virus on the fur, which could transfer virus to other members of the household or people in close contact. Therefore, we consider this risk of exposure also to be, at most, **medium likelihood**. This likelihood nevertheless is outweighed by that from other infected people in the household. The impact of infection for the majority of people is a mild short course, but in a small proportion of people the outcome is severe.

As such, any risk management measures when considering the presence of a companion animal in the household of an infected person should ensure that the animal is controlled to prevent contact with other humans who are at greater risk of contracting severe infection.

Until further information is made known about the likely infectivity of companion animals exposed to SARS-CoV-2, the precautionary approach must be used. In the event of more information being made available, this risk assessment will be re-evaluated.

Two dogs, a 17 year old Pomeranian and a German Shepherd living Hong Kong were removed to quarantine from households where their owners tested positive for SARS-CoV-2. The dogs were tested on several occasions and nasal swabs were positive for the virus across repeat time points. In the case of the Pomeranian, an unvalidated serology test was also positive suggesting there had been infection. Once the dog tested negative twice, it was released from quarantine; two days later it died of unknown causes, but suspected to be due to stress. The German Shepherd remains in quarantine at time of writing (OIE, 2020). In Belgium, a cat from a household where the owner had COVID-19, has tested positive for SARS-CoV-2. The cat was demonstrating clinical signs (diarrhoea, respiratory distress and vomiting) and the virus was detected in faecal samples (http://www.afsca.be/consumenten/dagelijksleven/andere/coronavirus/#huisdieren) .

2. Introduction

At this time, there are no confirmed reports of companion animals displaying clinical signs associated with SARS-CoV-2 infection or being able to spread SARS-CoV-2 to people or other animals. There is limited evidence that companion animals exposed to other coronaviruses are a risk to humans. While coronaviruses can jump species, the mode of transmission and how often this occurs is not understood. Bats are often considered a high risk contact animal in some countries/environments because of the proximity to human habitation in the wild, and that they often go into households unnoticed or that they have access to fruit which is eaten by humans. In the case of SARS CoV during the 2002/3 outbreak, other animals were tested positive, including masked palm civets, which were caged in restaurants and wet markets.

The paucity of evidence and lack of understanding of the transmission and clinical presentation of SARS-CoV-2 in not only humans but other mammals as well, dictates a precautionary approach, reinforced by multiple animal hosts having been present in the Wuhan market where infection is generally accepted as having originated.

There is now evidence of sustained human-to-human transmission of SARS-CoV-2 in the UK but many of these cases are urban areas, in London, the Midlands and South East predominantly. The European Centre for Disease Prevention and Control (ECDC) considers that Europe is moving towards sustained human to human transmission and that social distancing measures are necessary to reduce the rate of spread and lower the impact to the most vulnerable populations (ECDC, 2020).

This assessment considers:

1. The probability of a companion animal in the UK being exposed to and infected by SARS-CoV-2 virus by direct or indirect contact with an infected human case (‘Entry Assessment’).
2. The probability of onward transmission of infection to non-infected humans in the domestic setting through direct or indirect contact (‘Exposure Assessment’).

3. Risk question

In a situation where a companion animal has had contact with SARS-CoV-2, either in an affected region or from contact with an affected person, what is the risk of a companion animal being exposed to the virus and what is the risk of onward spread of infection from the companion animal to other people?

In order to answer this risk question, a hazard identification, risk assessment, and evaluation of risk management measures has been performed according to an OIE framework (OIE, 2004). According to the OIE framework, the four components of risk assessment are entry assessment, exposure assessment, consequence assessment and risk estimation.

This will be split into two steps: the risk of a companion animal in contact with a human case becoming infected with SARS-CoV-2 virus or in contact with a contaminated environment (entry assessment pathway) and the risk of a companion animal with SARS-CoV-2 virus being capable of transmitting it to an uninfected human through direct or indirect contact (release assessment).

4. Hazard identification

The hazard is identified as the novel SARS-CoV-2 virus, which is now considered to have caused a global pandemic of human illness. There is likely to be a level of under-reporting in the most countries, as testing facilities are focussed on those in hospitals. As a result of the potential for spread into countries with poor health care services, the International Health Regulations Committee of the World Health Organisation (WHO) agreed that the outbreak now meets the criteria for a Public Health Emergency of International Concern as of the 30 January 2020. The Director General of the World Health Organization declared COVID-19 a global pandemic on 11 March 2020.

The novel coronavirus SARS-CoV-2 is member of the B lineage of the genus betacoronavirus (Order Nidovirales, Family Coronavirales). Betacoronaviruses are an enveloped virus with a positive sense single-stranded ((+)-ssRNA) genome. Under electron microscopy these coronaviruses resemble being surrounded by a crown (“corona”). In humans they can cause respiratory infections including the common cold. Betacoronaviruses are commonly divided into four lineages A (subgenus Embecovirus), B (subgenus Sarbecovirus), C (subgenus Merbecovirus) and D (subgenus Nobecovirus), each lineage contains multiple viral strains, of which some are host species-specific while others can be zoonotic. Two other betacoronaviruses have emerged as important zoonotic human pathogens in the last twenty years. In 2003 Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) (a B lineage betacoronavirus) was identified in China. In 2012 Middle East Respiratory Syndrome Coronavirus (MERS-CoV) (a C lineage betacoronavirus) was identified in Saudi Arabia. Both SARS-CoV and MERS-CoV appeared to have originated in bats (cave dwelling horseshoe bats in the case of SARS). Both viruses first made a jump into an intermediate species: palm civets, raccoon, companion animals and Chinese ferret badgers in China for SARS-CoV and dromedary camels in KSA for MERS-CoV, and it was through contact with these species by which humans became infected.

The most important mechanism of cross-species transmission is the ability of a virus to bind to a receptor in the novel host, which for CoVs, is determined by the receptor specificity of the viral spike (S) entry protein. The CoV S protein is composed of an N-terminal S1 subunit and a C-terminal S2 subunit, responsible for receptor binding and membrane fusion, respectively. There are four cell surface host glycoproteins reported to be used as receptors by CoVs; the peptidase angiotensin converting enzyme 2 (ACE2) is used as a receptor by the (lineage B) betacoronavirus SARS-

CoV (Li et al. 2018). In addition to proteinaceous host molecules, (acetylated) sialic acid carbohydrates may be used as primary receptors or as attachment factors. Recent work has demonstrated the importance of the TMPRSS2 serine protease for spike protein cleavage which allows cell entry of the virus (Hoffmann, et al., 2020) and this type of interaction between cellular proteins and the virus are likely to be crucial in determining the outcome of exposure in different species.

The SARS-CoV receptor theory suggests that the virus binds the bat ACE2 receptor, which is structurally similar to the human ACE2 receptor, leading to cross-species transmission (Demogines et al. 2012). Although another intermediate host may help to drive that transmission, it was probably not important in the evolution of the virus.

Once more information is understood about the SARS-CoV-2, there may be better insight into the receptor binding sites and how closely they correspond structurally to other species. Current understanding is that ACE2 is involved and that several point mutations in the virus S protein have made receptor binding to human ACE2 more efficient than for SARS CoV 2003 lineage, but not the 2002 lineage (Wan et al. 2020). However, these initial studies also suggest binding would happen with the ACE2 receptor of other species of mammal, according to *in silico* experiments, based on the structure of the receptor binding domains. This would suggest the SARS-CoV-2 could interact with ACE2 proteins of civets, pigs, cats, ferrets, non-human primates, but not rodents. However, there are levels of uncertainty so wider threat to other hosts should be kept under continuous review. These data are based on the *Rhinolophus sinicus* (Chinese horseshoe bat) ACE2 receptors. It should be noted, however, that bats are a diverse family and not all have a suitable ACE2 receptor for SARS-CoV. The sequence of the SARS-CoV-2 also suggests that if a palm civet were the intermediate host, the virus did not adapt to the civet before it passed to humans. Nevertheless, there are certainly other factors that affect the infectivity and pathogenesis of SARS-CoV-2 and these will need to be investigated (Wan et al. 2020).

There is suspicion that the SARS-CoV-2 may have had an animal source, but further investigations are required to confirm this (OIE, 2020). It is not uncommon, however, for animal beta-coronaviruses to show moderately close relationships to strains from humans or other animal species indicating the potential for cross species transmission. SARS viruses were shown to be able to infect cats so this sets potential for companion animals to be susceptible to SARS-CoV-2. Nevertheless, the predominant route of subsequent transmission is now from human to human, with no evidence of further animal to human introductions, although this possibility cannot be completely discounted.

Ongoing investigations are important for identifying the animal source (including species) and establishing the potential role of an animal reservoir in this disease.

Assumptions

- The initial contact case is a human infected with SARS-CoV-2 virus or an environment contaminated with SARS-CoV-2. Infection is likely to have occurred as a result of contact with another infected person;
- The companion animal is residing in the household of the infected person;
- The infected person may not be showing symptoms but is still infectious;
- Virus persists for several days on certain surfaces;

Companion animals for the purpose of this risk assessment are defined as dogs and cats as these are most common animal kept in households (estimates of ~8 million each), but pet ferrets should also be included in this assessment.

5. Risk assessment

5.1 Risk assessment terminology

The terminology used to define the qualitative probabilities is based on those by EFSA (2006) and OIE (2004). The OIE guidelines on qualitative import risk assessment have been used and adapted to format this risk assessment.

5.2 Entry Assessment

The risk question concerns the eventuality where a companion animal which has been in contact with a person infected with or an environment contaminated with SARS-CoV-2 becomes exposed.

For the purpose of this assessment, the import process itself it not considered. The assessment is considering the likelihood of a companion animal becoming infected following exposure to the virus in the UK.

- There is now sustained human-to-human transmission in certain regions of the UK, primarily in London, the South East and the Midlands;
- Asymptomatic humans are assumed to represent a non-negligible risk as they may be infectious for several days prior to developing symptoms;
- The latest data suggest an incubation period of 2-5 days and people exhibiting symptoms are expected to self-isolate for 7 days (14 days in a household);
- Cats and dogs are equally susceptible to the virus attaching to host cells, because of the structural similarity of the receptor protein, ACE2, to the human receptor.

This virus is, in all likelihood, now established as one which is transmitted primarily from human-to-human. The level of zoonotic transmissions has reduced and it is possible the original jump across species entailed a mutation which made human-to-human transmission easier. Therefore, as the virus becomes self-sustaining in humans it is less likely it will jump back into other mammals again but there is still a high level of uncertainty.

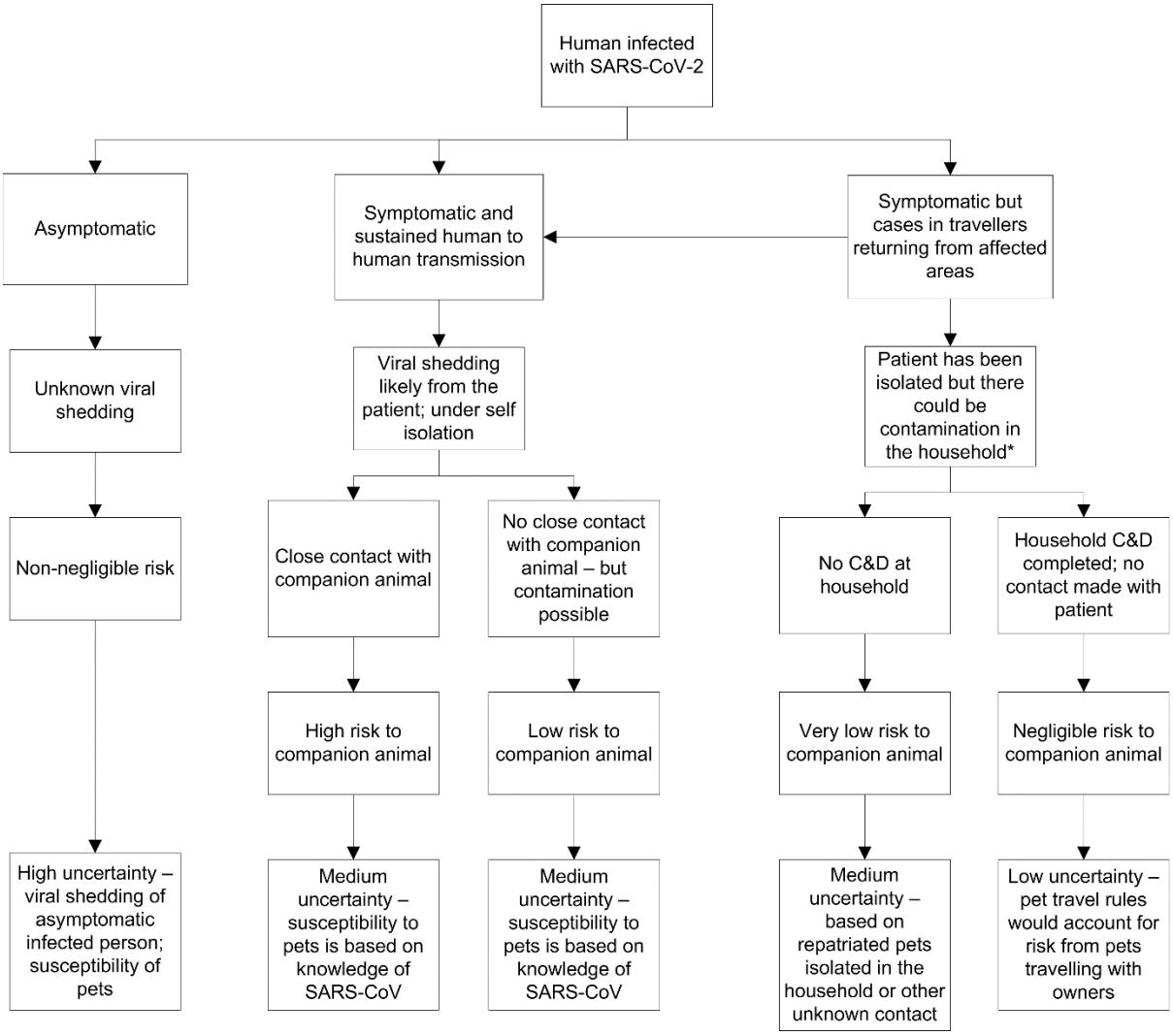
The pathway for infection of the companion animal depends on the infectious dose required to initiate an infection, route of infection, the level of contamination of the object / environment, the clinical status of the human and their likelihood of shedding virus. While symptomatic patients are likely to produce more virus, asymptomatic patients may be infectious for several days before symptoms show, and as COVID-19 has become more prevalent there is more data supporting this.

There is potential for contact with the companion animal on two levels – direct contact or indirect contact, In the case of direct contact, the infected human is the primary handler, walking, grooming, feeding and cleaning up after the companion animal. Where there is indirect contact, the companion animal is exposed to a contaminated environment.

The probability of viral infection of a companion animal from contact with an infected human case will therefore depend upon:

- Frequency, duration and type of contact to body fluids and viral load in different body fluids;
- Level of viral shedding in the SARS-CoV-2 positive person and persistence of virus in the environment;
- Probability that exposure via human contact gives rise to infection in companion animals.

Figure 1: Steps in the exposure assessment pathways and likely risk levels and uncertainty



5.2.1 Infection of humans with the SARS-CoV-2 virus:

SARS-CoV-2 is transmitted from humans to humans through direct contact with body / respiratory fluids such as sputum, saliva with mucus membranes, while urine and faeces were also important in other zoonotic coronavirus cases and cannot be ruled out for SARS-CoV-2; the virus is mainly found in the respiratory and enteric tract and is not believed to cause a widespread viraemia. Contact with infected animals, such as fruit bats, insectivorous bats or small mammals including rodents and carnivores may have been the initial infection point in a population, but the consequent human-to-human transmission is responsible for the large number of cases. There is limited hypothetical risk that humans may have been infected by consuming forest fruits which are contaminated with faeces and saliva from infected fruit bats or insectivorous bats residing near households, based on other zoonotic viruses, but the epidemiological evidence for that route for SARS-CoV-2 is poor.

5.2.2 Viral shedding of SARS-CoV-2 virus in human cases:

The incubation period for SARS-CoV-2 is considered to 2-5 days. SARS-CoV-2 infection presents in humans as respiratory illness, the severity of clinical presentation to date has been variable with the most severe clinical outcomes frequently linked with those with underlying medical issues. Common symptoms reported in SARS-CoV-2 positive patients include at onset of illness fever, cough, and myalgia or fatigue; less common symptoms were sputum production, headache, haemoptysis, and diarrhoea [Huang et al (2020)]

5.2.3 Infection of animals with the SARS-CoV-2 virus

The OIE recommendations are that when visiting live animal markets, wet markets or animal product markets, general hygiene measures should be applied, including regular hand washing with soap and potable water after touching animals and animal products, avoiding touching eyes, nose or mouth with hands, and avoiding contact with sick animals or spoiled animal products. Any contact with other animals possibly living in the market (e.g., stray cats and dogs, rodents, birds, bats) should be strictly avoided. Attention should also be taken to avoid contact with potentially contaminated animal waste or fluids on the soil or structures of shops and market facilities (OIE, 2020). The same advice has been widely provided by other veterinary societies and by the WSAVA.

There are no surveillance data to support the advice to avoid cats, dogs or birds, while the advice for bats and rodents relates to previous coronavirus outbreaks and the sequence data of the SARS-CoV-2 which places this virus in the same group as SARS-CoV and therefore presents the possibility of the same transmission pathways.

With SARS-CoV, experimental infection of civet cats was carried out and showed virus could be isolated at 3 days post infection from oral and anal swabs, but only very low levels of virus in blood samples (viraemia) which is likely to be a consequence of the infection rather than important enough for further transmission. Clinical signs such as febrile events and lethargy were observed in all experimental animals and diarrhoea and conjunctivitis in a percentage of them (Wu et al, 2005). Experimental infection has also been observed in monkeys, cats, mice, pigs and ferrets.

The lack of significant viraemia detected in infected animals with SARS, if applied to the SARS-CoV-2, would also suggest that infected meat is an unlikely consequence of infection, but contact with contamination from infected animals is a possible route for transmission.

Initial work during the SARS outbreaks in 2003 identified masked palm civets and a racoon dog testing positive in a wet market in Shenzhen (Shi and Hu, 2008), while a limited number of Chinese ferret badgers, beavers, hog-badgers, domestic cats,

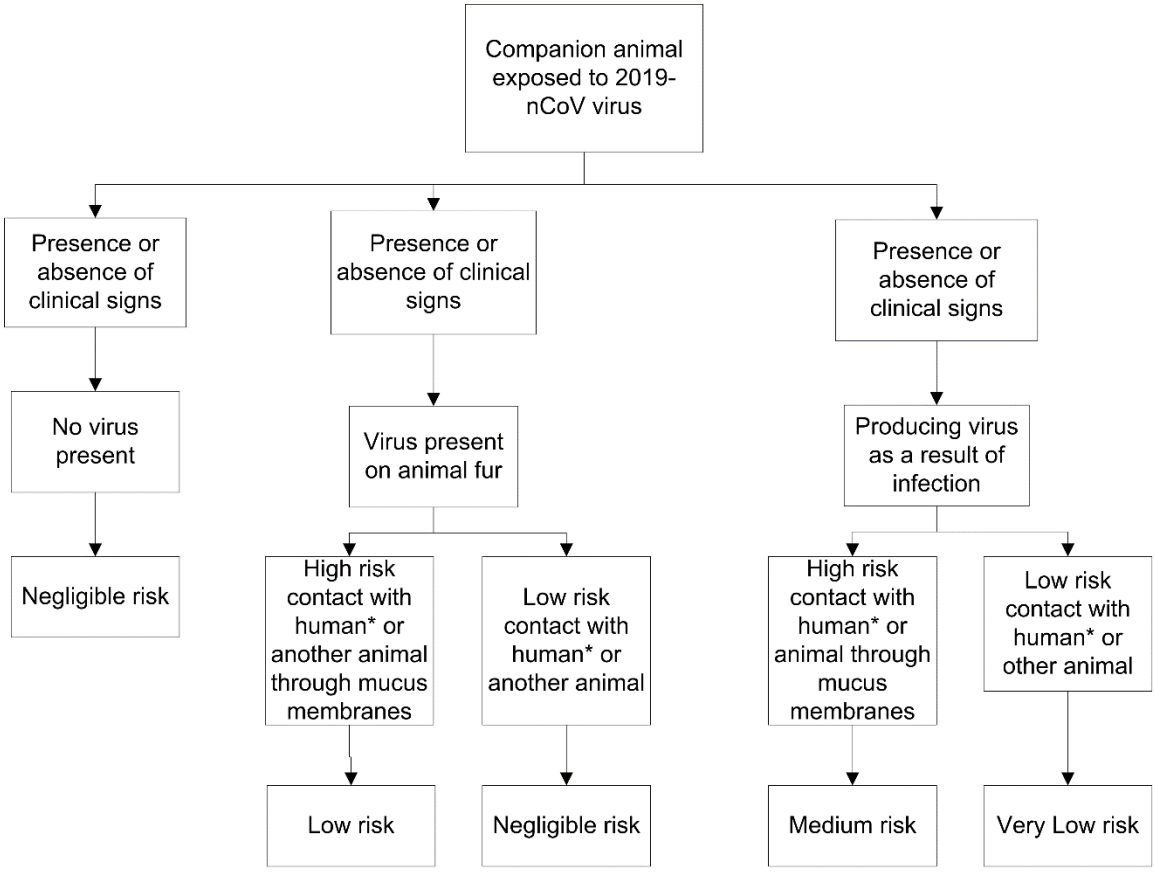
hares and muntjac deer were all negative. The Chinese ferret badger also had neutralising antibody against the virus isolated from the masked palm civet. Further work showed similar viruses were isolated from several horseshoe bat species of the genus *Rhinolophus*, from Hong Kong, Guangxi and Tianjin regions. Aside from bats and masked palm civets (*Paguma larvata*), seven other species have also tested positive in farmed populations: raccoon dogs (*Nyctereutes procyonides*), **domestic dogs (*Canis canis*), domestic cats (*Felis catus*)** red fox (*Vulpes vulpes*), wild boar and domestic pigs (*Sus scrofa & S.scrofa domesticus*), mink (*Mustela vison*), the Sikkim rat (*Rattus sikkimensis*) and the Greylag goose (*Anser anser*) (Shi and Hu, 2008). However, these data suggest that exposure occurred in people who had close contact with the caged animals in a restaurant (Wang et al, 2005). In all these cases, the positive results are from rectal or oral swabs and virus or PCR positive results were derived from these swabs. Antibodies to SARS-CoV were also detected in 2 pigs and virus isolated from one of them, possibly due to garbage feeding (Chen et al. 2005). In the same experiments, all six inoculated domestic cats were sub-clinically infected, and they were also able to transmit infection to uninfected animals. During outbreak investigations, infection was also found in domestic cats in an apartment block in Hong Kong with more than 100 infected residents (Martina et al., 2003). Early experimental studies with SARS-CoV-2 in ferrets suggests they are capable of being infected and viral replication takes place (https://www.csiro.au/en/Research/Health/Infectious-dieases-coronavirus/Latest-updates), however experimental data does not always translate into the natural environment. In addition, experimentally infected rhesus macaques and human ACE2-receptor mice have also developed mild clinical signs. Trials are underway with other species.

5.3 Release Assessment

For the second step, the risk to the human or another animal is again about the level of contact with the infected companion animal and the likelihood of the companion animal being infected and passing virus in respiratory fluids and possibly urine or faeces. Contact with mucus membranes is the most likely transmission route.

With this in mind, the companion animals are considered to be: subclinical and not excreting virus; to produce either low levels or; to produce high levels of virus. This uncertainty means the final risk step is difficult to estimate but is non-negligible.

Figure 2: Steps in the release assessment pathways and likely risk levels



*Susceptibility of the human to SARS-CoV-2 will depend on their immune status which in turn influences the transmission rate and outcome

A further option is that the animal acts as a fomite between the infected and the non-infected person in the household. There are no experimental data for persistence on the virus on animal fur.

Data on SARS-CoV suggested that virus would only survive for a few days at most on surfaces, in urine or faeces, and that it is readily killed by common disinfectants. There is no evidence to suggest SARS-CoV-2 would behave differently. Recent experimental evidence for SARS-CoV-2 showed virus was detectable in aerosols for up to three hours, up to four hours on copper, up to 24 hours on cardboard and up to two to three days on plastic and stainless steel (Van Doremalen et al, 2020). The authors also suggest the reason SARS-CoV-2 is causing more cases than SARS-CoV is that people are acquiring the virus through the air and after touching contaminated objects, and that people infected with SARS-CoV-2 might be spreading virus without recognizing, or prior to recognizing, symptoms.

Therefore, there is a plausible pathway that the animal may act as a fomite for at least a few hours and could transfer virus to others in the household. Close contact such as cuddling, grooming, feeding and allowing animals to share food could all allow the transfer of virus from pet dander and saliva. Further data from experiments of animal fur would confirm or negate this risk pathway.

5.4 Consequence Assessment

Given there is now sustained human to human transmission in certain regions of the UK, it is clear there will be some exposure to companion animals in a household setting. While for most people the consequence of infection is mild, in some people the consequence is severe and these vulnerable people will need to be careful around not only an infected person but also anything which could act as a fomite, including the animal itself. It is not likely to present a higher risk than having direct contact with the infected human.

Until further information is made known about the likely infectivity of companion animals exposed to virus, the precautionary approach must be used. In the event of more information being made available, this risk assessment will be re-evaluated.

5.5 Final Risk Estimation

As there is some limited anecdotal evidence that asymptomatic humans may become infectious, it is difficult to estimate the risk to any companion animals in the household, whether from direct or indirect contact. For a virus with strong human affinity, the likelihood of jumping species to other mammals is less likely, nevertheless, experimental infections with SARS-CoV resulted in infection of cats, ferrets and pigs and SARS-CoV-2 is understood to use the same cell receptors to bind using the viral S protein.

Given that an infected human may shed virus for even a short period of time before recognising clinical signs and given the likely close contact between the human and the companion animal, the risk of the companion animal being exposed to SARS-CoV-2 virus in such a situation is considered to be **high**.

Given the uncertainty around the shedding of virus by an infected companion animal and duration of this shedding, or the potential for the animal to act as a fomite, the risk of the companion animal to other uninfected people is considered **medium** as a precautionary approach.

Therefore, until more information is available on the likely infection status of a household pet in contact with an infected SARS-CoV-2 patient or the persistence of virus in animal fur, we consider the overall risk of such an animal being present in the household to be **high, where there are people with underlying health problems or poor immune systems, but otherwise would be medium.**

As such, any risk management procedures when considering the presence of a pet companion animal in the household should ensure that the companion animal remains controlled to prevent contact with susceptible humans, particularly taking account of underlying health problems, such as diabetes, heart conditions,

respiratory conditions, cancer or anyone with a poor immune system, unless safety measures are taken. If other members of the family remain in the household then the pet will also remain in situ and would only be removed if there were welfare issues or the animal was not being cared for.

6. Summary of key uncertainties

- Whether 209-N-CoV can jump species again to other mammals from humans
- Whether companion animals can be infected and shed virus in body fluids even for a short period of time.
- The proportion of infected people who never develop symptoms or have only mild symptoms and recover quickly but how infectious asymptomatic people are is not fully understood.

7. Summary of key assumptions

- The initial contact case is a human infected with SARS-CoV-2 virus or an environment contaminated with the virus.
- Infection of the companion animals may have occurred as a result of direct or indirect contact;
- The companion animal is residing in the household of the infected person;

8. Conclusions

There is still a considerable level of uncertainty about the role if any of companion animals in SARS-CoV-2 transmission. There are no surveillance data and any risk level relies on previous observations of seropositive animals in previous outbreaks, the precautionary advice from the OIE and the two cases in dogs in Hong Kong. Companion animals can have very close contact with their owners which could lead to exchange of respiratory fluid; therefore, they may be exposed. Nevertheless, exposure may not lead to infectivity and infection in animals and the SARS-CoV-2 appears to be predominantly transmitted from human to human. Until more surveillance data are available, a precautionary risk level has been given.

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