

Canine Influenza (Flu)

Information for Dog Owners



Key Facts

Signs of disease can be:

- Mild, e.g. cough, sneeze, ocular (eye) and nose discharge, fever, lack of appetite, occasional vomiting
- Progressive, i.e. begin as mild signs that rapidly worsen
- Severe, such as pneumonia complicated with bacterial infection

Disease can spread rapidly to other dogs, and outbreaks can occur. This is a particular concern for dogs in group settings (e.g. dog shows, boarding, doggie daycare, dog parks) that have increased dog-to-dog contact.

Flu vaccines are available. These can lessen disease severity and reduce virus shedding.

Some strains (types) of flu can be spread to and cause disease in other species including people.

What is it?

Canine influenza is caused by infection with a specific type of influenza virus. Influenza viruses belong to a large group of RNA viruses classified as influenza A, B or C. These virus types are further divided by the numerical strain of the virus surface proteins, hemagglutinin (H) and neuraminidase (N). In North America, canine flu is most commonly caused by Influenza A (virus type) strains H3N8 and H3N2.

Veterinarians most commonly diagnose infection with canine influenza virus (CIV) after the dog's owner notes a sudden onset of cough, sneezing or acting sick (e.g. not eating, drinking, tired, trouble breathing). Canine flu may also be diagnosed after multiple dogs have a sudden onset of these signs after being together in a common area (i.e. outbreak).

Over recent years, dogs in North America have been diagnosed with H3N8 and H3N2 canine flu. There have also been outbreaks of canine flu in specific parts of the United States, where many dogs have become sick.

Influenza viruses receive great attention by healthcare professionals (including veterinarians) due to concern of rapid spread and the chance for animal to human transmission (zoonosis).

Who gets it?

Birds: All influenza A viruses originate in wild birds and waterfowl, e.g. ducks. Some of these viruses are able to infect other animals.

Dogs: In the early 2000s, a change in a horse influenza virus (equine H3N8 strain) in Florida resulted in a novel canine influenza virus (CIV) that was able to be easily transmitted between dogs. This canine influenza virus (H3N8) spread within the North American dog population resulting in numerous disease outbreaks. Other CIV's have been identified since that time, such as H3N2. Rarely, human-to-dog infections with human influenza (e.g. H1N1) have been reported.

Cats (domestic and wild): Cats are susceptible to many avian and human influenza viruses. Infections have included a range of avian (H3N2, H7N2, H5N1), canine (H3N2) and human (H1N1) influenza virus, and a large shelter outbreak with H7N2.



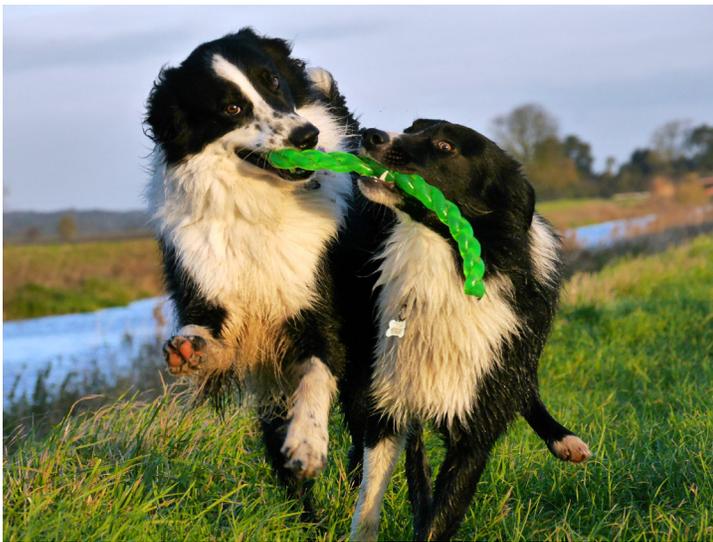
Can people get sick with canine influenza?

Unlikely. At this time, the risk of dogs and cats causing a human outbreak is considered very low, however it is not impossible.

How is it spread?

(Transmission & Infection risk)

Canine influenza is transmitted (spread) through direct contact (dog-to-dog), inhalation (of cough droplets), and contact with articles contaminated with the virus (e.g. bedding, people's hands). The virus can be shed to other dogs through oral (mouth), ocular (eye), nasal (nose) and fecal routes. Shedding of the influenza virus may occur prior to obvious signs of disease, making it difficult to stop transmission in large group canine settings. Different canine influenza viruses can be shed for varying periods of time. For instance, duration of viral shedding is estimated to be longer with H3N2 (21 days) than H3N8 (7-10 days). The virus can remain infectious in the environment (e.g. contaminated surfaces such as kennels) for up to 48 hours and for extended periods (12-24 hours) on clothing and people's hands. After transmission, the virus spreads to the lungs (lower respiratory tract).



Infection risk is difficult to determine. Overall, CIV seems to be an uncommon infection in dogs that do not have specific lifestyle and housing factors. Outbreaks have been identified in some areas (see Additional Resources, Canine Influenza Surveillance Network website, for up-to-date maps). Most outbreaks appear to be associated with specific housing environments with close dog-to-dog contact and increased stress (e.g. shelters,

dog shows, veterinary hospitals, boarding facilities, dog daycares).

Any breed or age of dog may be affected. However, severe disease and death due to pneumonia mainly occur in older dogs with concurrent health problems. There may be an increased risk for severe disease (i.e. pneumonia) in greyhounds, which may relate to simultaneous bacterial infections.

What should I look for? (Signs of disease)

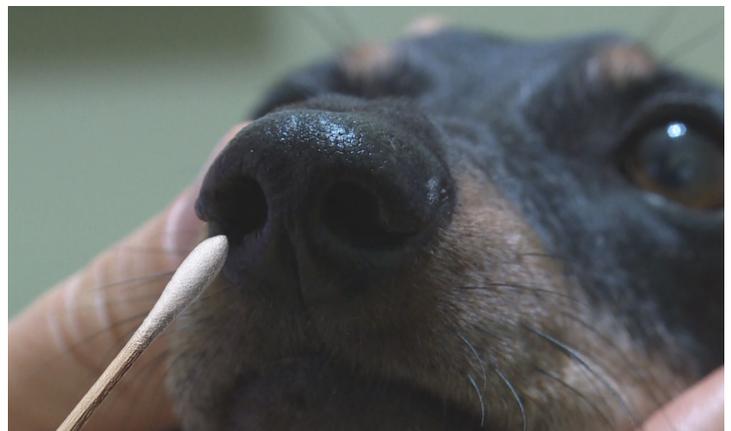
Most dogs with canine influenza that act sick will have respiratory (cough, sneeze), nasal (nose) and ocular (eye) discharge. Some dogs will also have fever and occasional vomiting. Many dogs will appear completely healthy (i.e. no clinical signs), although these dogs may still be infectious and transmit the virus to other dogs.

Pneumonia can occur when disease due to CIV worsens, typically after complications due to secondary bacterial infection.

How is it diagnosed?

Your veterinarian will diagnose canine influenza based on clinical signs (e.g. sudden onset of cough), history of time spent in a canine group setting or multiple sick dogs in a single household, and potentially knowledge of an outbreak occurring in an area.

Specific blood tests (antibody titers) and oral or nose swabs (most frequently PCR-based tests) can be performed to help confirm infection in dogs with suggestive clinical signs. Sometimes the results of these tests can be difficult to interpret, particularly if your dog has been recently vaccinated. Be sure to let your veterinarian know if your dog has been recently vaccinated for CIV and for which strain (e.g. H3N2, H3N8).



What is the treatment? Will my dog recover?

Contact your veterinarian to discuss whether your dog may have canine influenza. As this virus is very contagious, it is important to call BEFORE bringing your dog into the clinic and let them know your concerns and describe your dog's illness. They will advise you on how to proceed to ensure other dogs do not get infected.

Treatment is based on disease severity (i.e. mild signs vs. pneumonia), how long your dog has been sick, and whether your dog is getting worse. Some dogs may need advanced care at an intensive care facility that can provide oxygen support. A facility that is able to separate (isolate and quarantine) infectious dogs from other dogs to prevent further spread of the virus is required.

Whether your dog improves will depend on:

1. Severity of illness. Mild illness is common and most dogs improve quickly and completely. However, dogs that become very sick in a short period of time (and appear to worsen rapidly) may do poorly and death can occur.
2. In severe illness, whether referral for supportive care is an option.

How can I stop this from happening to my dog and other dogs?

Be informed. Know which areas have had an outbreak of canine influenza or are higher risk, so that you (and your dog) can avoid them as practical. Delay travel or avoid canine group settings and events in regions where an active outbreak is occurring. Commercial laboratories and veterinary schools have established reporting systems to identify cases and map outbreaks (see Additional Resources). Dog owners are encouraged to use these and other sources to remain aware of current risks.

Vaccination with one of the available inactivated vaccines (H3N8, H3N2, both strains) may reduce development of illness, severity and shedding of virus. This can be especially helpful for higher risk dogs (e.g. canine group events, such as doggie daycares, boarding or dog shows). Similar to human flu vaccines, CIV vaccines may not completely prevent infection in dogs but will make it less likely to occur and reduce severity of signs. Vaccines are strain-specific, meaning they only

work for the strain(s) contained in the vaccine. If vaccinating your dog, be sure a product is used that prevents the strain(s) your dog is most likely to encounter. Like any vaccine, adverse reactions are possible, but considered to be rare (specific numbers are not available due to limited published studies).

Reducing stress, high levels of dog-to-dog contact and crowding will also lower risk of infection and disease.



Outbreak Management

Dogs suspected or known to have CIV should immediately be isolated (kept separated from other dogs) to prevent risk of infection to other dogs. As CIV is extremely contagious and dogs may begin to shed virus before they show signs of illness, immediate action by canine group event coordinators is critical (e.g. dog shows, boarding facilities, daycares). It is recommended to immediately contact someone with experience in veterinary infectious disease risk assessment and outbreak management. Event coordinators are encouraged to put in place protocols to reduce canine flu introduction and spread within an event/facility and develop plans for management. See Additional Resources for further information.

Zoonotic (Human Infection) Alert

To-date canine H3N2 and H3N8 have not been shown to infect and cause disease in people. However, as flu viruses can change and new influenza viruses arise it is recommended to contact your healthcare provider if you develop signs of flu at the same time as your dog or one in your care. Given the ability for people to move the flu virus between dogs through contaminated hands, clothing, and the environment (e.g. bedding, kennels), dog owners and staff in canine group setting facilities should take care to reduce these risks (e.g. frequently wash hands, change clothes, clean and disinfect surfaces). See Additional Resources for further information.

Additional Resources

Canine Influenza Surveillance Network. H3N2 test results from March 2015 to present. Available at: ahdc.vet.cornell.edu/news/civchicago.cfm

Day, M. J., et al. (2016), WSAVA Guidelines for the vaccination of dogs and cats. *J Small Anim Pract*, 57: E1–E45. Available at: onlinelibrary.wiley.com/doi/10.1111/jsap.2_12431/full

Lappin, M. R., et al. (2017), Antimicrobial use guidelines for treatment of respiratory tract disease in dogs and cats: antimicrobial guidelines working group of the International Society for Companion Animal Infectious Diseases. *J Vet Intern Med* 31.2: 279-294. Available at: onlinelibrary.wiley.com/doi/10.1111/jvim.14627/full

Stull, JW, et al. (2016), Disease prevention at canine group settings. Available at: vet.osu.edu/preventive-medicine/vpm-research/disease-prevention-canine-group-settings

Yoon, Kyoung-Jin, et al. (2005), Influenza virus infection in racing greyhounds. *Emerg Infect Dis* 11.12: 1974. Available at: <https://ncbi.nlm.nih.gov/pmc/articles/PMC3367648/>

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