

Canine Influenza

Frequently Asked Questions by Veterinarians

Dr. Cynda Crawford, Clinical Assistant Professor in the Maddie's Shelter Medicine Program at the University of Florida College of Veterinary Medicine, prepared this fact sheet to answer the most often asked questions from veterinarians about canine influenza.

1. What is canine influenza?

Canine influenza is a highly contagious respiratory infection of dogs caused by a novel influenza A subtype H3N8 virus first discovered in 2004.

2. Where does canine influenza occur?

Canine influenza has been documented in 30 states and the District of Columbia. At this time, the canine influenza virus (CIV) is very prevalent in many communities in Colorado, Florida, New York, and Pennsylvania.

3. What type of infection does CIV cause?

Similar to influenza viruses that infect other mammals, CIV causes an acute respiratory infection in dogs. It is one of several viruses and bacteria that are associated with canine infectious respiratory disease, or what's commonly referred to as "kennel cough". CIV infection can cause respiratory disease by itself or in conjunction with other respiratory pathogens such as distemper virus, respiratory coronavirus, parainfluenza virus, *Bordetella bronchiseptica*, etc. It is important to note that influenza virus is not related to parainfluenza virus, and infection or vaccination for one does not induce cross-protective immunity against the other.

Unlike human influenza, canine influenza is not a "seasonal" infection. Infections can occur year round.

4. Who is susceptible to CIV infection?

Dogs of any breed, age or health status are susceptible to infection. Although studies have not verified, it is likely that dogs that have recovered from infection retain some immunity to re-infection for an undetermined time period.

Canine influenza is most likely to spread in facilities where dogs are housed together and where there is a high turnover of dogs in and out of the facility. Dogs in shelters, boarding and training facilities, day care centers, dog shows, veterinary clinics, pet stores and grooming parlors are at highest risk for exposure to CIV, especially if these facilities are located in communities where the virus is prevalent. Dogs that mostly stay at home and are confined to their yard or walk around the neighborhood are at low risk.

CIV does not infect people, and there is no documentation that other species have become infected by exposure to dogs with canine influenza.

5. How is canine influenza transmitted?

As with other respiratory pathogens, the most efficient transmission occurs by direct contact with infected dogs and by aerosols generated by coughing and sneezing. The virus can also contaminate kennel surfaces, food and water bowls, collars and leashes, and the hands and clothing of people who handle infected dogs. Influenza virus can remain viable on surfaces for up to 48 hours, on clothing for 24 hours, and on hands for 12 hours. Fortunately, the virus is easily inactivated by washing hands,

clothes and other items with soap and water. The quaternary ammonium disinfectants commonly used in kennels and veterinary clinics will kill influenza viruses.

6. What are the clinical signs of canine influenza?

Like influenza viruses for other species, CIV causes a transient fever, cough, sneezing, and nasal discharge. Virtually all exposed dogs become infected; about 80% develop flu-like illness, while another 20% do not become ill.

Influenza virus replicates in epithelial cells lining the airways from the nose to the terminal airways in the lungs. Viral replication results in epithelial cell necrosis and exposure of the basement membrane. This exposure predisposes to secondary infections by a variety of gram positive and gram negative commensal bacteria, including *Streptococcus spp*, *Staphylococcus spp*, *E. coli*, *Klebsiella*, *Pasteurella multocida*, and *Mycoplasma spp*. These bacteria contribute to development of purulent nasal discharge and productive cough. The viral and secondary bacterial infections initiate an intense inflammatory response resulting in rhinitis, tracheitis, bronchitis, and bronchiolitis.

Fortunately, most dogs recover within 2-3 weeks without any further health complications. However, some dogs progress to pneumonia, which is usually due to secondary bacterial infections. While the overall mortality rate for canine influenza is low, the secondary pneumonia can be life-threatening. There is no evidence for age or breed susceptibility for developing pneumonia during canine influenza.

7. What is the incubation time and how long are dogs contagious?

The incubation period is 2 to 4 days from exposure to onset of clinical signs. Peak viral shedding from the upper respiratory tract starts during the incubation period; therefore, dogs are most contagious prior to showing obvious clinical signs. Dogs with subclinical infection also shed virus. Virus shedding decreases substantially during the first 4 days of illness, but continues for up to 7 days in most dogs, and to 10 days in some dogs. Once virus shedding ceases, the dog is no longer contagious. Therefore, it is unlikely that dogs pose a significant infectious risk 10 to 14 days after onset of clinical signs. All dogs in a facility should be considered exposed and a potential infectious risk, whether or not they have clinical disease.

8. How is canine influenza diagnosed?

Canine influenza cannot be diagnosed by clinical signs because all of the other respiratory pathogens cause similar signs of coughing, sneezing, and nasal discharge. The best approach for diagnosis of canine influenza is collection of nasal swabs and serum samples. The swabs are used for detection of virus in acutely infected dogs, and serum samples for detection of CIV-specific antibodies as a confirmatory test. For dogs that have been ill for less than 4 days, veterinarians can collect nasal and pharyngeal swabs for submission to a diagnostic laboratory that offers a validated PCR test for CIV [Animal Health Diagnostic Laboratory at Cornell University, <http://www.diaglab.vet.cornell.edu/labsect/virol.asp>; IDEXX RealPCR™ CRD Panel, <http://www.idexx.com/animalhealth/laboratory/realpcr/tests/crd.jsp>]. These tests are very sensitive, and are more likely to yield positive results when lower amounts of virus are present. Positive PCR results are most likely correct, but negative results may be “falsely negative” due to the necessity for timing of swab collection with peak virus shedding. After 4 days of clinical signs, virus shedding has significantly decreased and may not be detectable by PCR.

Serology is the most accurate and reliable diagnostic test for confirmation of CIV infection, especially in cases where the PCR test is negative but the index of suspicion is high. Paired acute (sick for <7 days) and convalescent (10 to 14 days later) serum samples are necessary for diagnosis of recent active infection based on seroconversion. Seroconversion is defined as a ≥ 4 -fold increase in antibody

titer between the acute and convalescent sample. Serology should be performed to confirm PCR test results, especially since these tests have a high rate of false negative results. The paired serum samples can be submitted to the Animal Health Diagnostic Laboratory at Cornell University [<http://www.diaglab.vet.cornell.edu/labsect/virol.asp>], or the University of Florida College of Veterinary Medicine, crawfordc@vetmed.ufl.edu].

9. How is canine influenza treated?

Since canine influenza is a viral infection, treatment consists mainly of supportive care based on clinical signs and laboratory tests. Although there is no specific antiviral treatment for canine influenza at this time, a variety of secondary bacterial infections may play a significant role, and antibiotics are indicated for dogs with fever, productive cough, and purulent nasal discharge. Nasal discharge usually responds within days to treatment with a broad spectrum bactericidal antibiotic, but cough may persist for 10 to 30 days. Antitussives are not very effective in reducing frequency and duration of coughing, and should not be used on dogs with productive cough.

Dogs that develop pneumonia usually require hospitalization for intravenous fluids and parenteral antibiotics. Ideally, a transtracheal or endotracheal wash for bacterial culture and antibiotic sensitivity testing should be performed to target the choice of antibiotic. For dogs in which cultures are not performed, empirical treatment with a broad spectrum combination of bactericidal antibiotics to provide 4-quadrant (gram positive, gram negative, aerobic, anaerobic) coverage has worked well. For more severe cases of pneumonia, oxygen supplementation and nebulization with coupage have been very beneficial.

10. How can a canine influenza outbreak be managed?

Important management strategies for reducing spread of canine influenza within a premise include isolation of sick and exposed dogs, biosecurity measures such as changing of clothes and hand washing after handling affected dogs, and effective sanitation. All exposed dogs with and without clinical signs should be quarantined for a minimum of 14 days starting with the first day of clinical signs. The quarantined population should be separated from other populations by a physical barrier and managed with strict biosecurity procedures, including the use of PPE (gown, gloves, booties). Influenza viruses usually do not persist in the environment for more than 48 hours and are inactivated by commonly used disinfectants.

11. Is there a vaccine for canine influenza?

Influenza viral disease is best prevented by vaccination of susceptible dogs coupled with quarantine/isolation of infected dogs. In May 2009, the USDA approved the licensure of the first influenza vaccine for dogs developed by Intervet/Schering Plough Animal Health Corporation [<http://www.aphis.usda.gov/newsroom/content/2009/06/caninevacc.shtml>]. The canine influenza H3N8 vaccine contains inactivated whole virus with adjuvant, and is intended as an aid in the control of disease associated with CIV infection [<http://www.intervet.com/news/2009-06-23-new-vaccine-from-intervet-schering-plough-animal-health-is-first-for-canine-influenza-virus.aspx>].

During tests to evaluate vaccine performance, there were no side effects or safety issues in a field trial including more than 700 dogs ranging in age from six weeks to 10 years and representing 30 breeds. Although the vaccine may not prevent infection, efficacy trials have shown that vaccination significantly reduces the severity and duration of clinical illness, including the incidence and severity of damage to the lungs. In addition, the vaccine reduces the amount of virus shed and shortens the shedding interval. This means that vaccinated dogs that become infected have less illness and are not as contagious to other dogs. It is administered to dogs 6 weeks of age and older by subcutaneous injection in 2 initial doses given 2 to 4 weeks apart, followed by an annual booster.

The canine influenza vaccine is a “lifestyle” vaccine, in that it is intended for dogs at risk for exposure to CIV, including those that participate in activities with many other dogs or are housed in communal facilities, particularly in communities where the virus is prevalent. Dogs that may benefit from canine influenza vaccination include those that are already receiving the kennel cough vaccine (*Bordetella* and parainfluenza virus) because the risk groups are the same.