

Canine Infectious Respiratory Disease Complex (CIRDC)

Information for Dog Owners



Key Facts

Canine Infectious Respiratory Disease Complex (CIRDC) is very common and can be due to one or more bacterial and viral organisms.

Signs of disease can be:

- Mild, e.g. cough, sneeze, discharge from the eyes or nose, fever
- Progressive, i.e. begin as mild signs that rapidly worsen
- Severe, such as pneumonia complicated with bacterial infection

In most dogs, signs of disease are mild and self-limiting (i.e. resolve on their own) in 7-10 days.

Outbreaks can occur as disease spreads rapidly from dog-to-dog. This is a particular concern for dogs in group settings (e.g. dog shows, boarding, doggie daycare, dog parks), which have high dog-to-dog contact.

Vaccines that lessen disease severity and reduce organism shedding are available for some of the infectious bacteria and viruses involved in CIRDC.

What is it?

Canine Infectious Respiratory Disease Complex (CIRDC), sometimes referred to as 'kennel cough' or 'canine cough,' is a clinical syndrome. At least nine different bacteria and viruses have been linked as causes of CIRDC. Co-infections (i.e. infection with more than one bacterial or viral agent) are common.

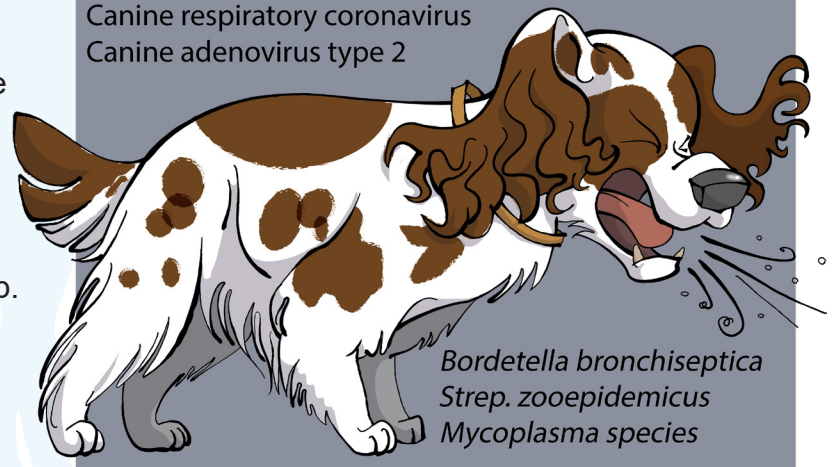
Common viral causes of CIRDC include canine adenovirus 2, canine distemper virus, canine influenza viruses, canine herpesvirus, and canine parainfluenza virus (see *Resources* for links to individual factsheets).

Common bacterial causes of CIRDC include *Bordetella bronchiseptica*, *Streptococcus equi* subspecies *zooepidemicus*, and *Mycoplasma* spp.

Veterinarians most commonly diagnose CIRDC after a dog's owner notes a sudden onset of coughing, sneezing, or discharge from the nose and/or eyes. Disease may be diagnosed after multiple dogs have a sudden onset of these signs shortly after being together in a common area (e.g. outbreak).

In most dogs, signs of disease are self-limiting (i.e. resolve on their own) in 7-10 days with nursing care, e.g. cough suppressant.

Canine influenza virus
Canine parainfluenza virus
Canine distemper virus
Canine herpesvirus
Canine respiratory coronavirus
Canine adenovirus type 2



Bordetella bronchiseptica
Strep. zooepidemicus
Mycoplasma species

Used with permission (*Infectious Diseases of the Dog and Cat*, P. Boutilier (Cat in a Box Studio).

Who gets it?

Dogs of any breed or age may be affected.

Cats and wildlife can be infected and become sick with some of the CIRDC organisms (e.g. distemper virus, canine influenza viruses).

Can people get sick with CIRDC?

This is very unlikely. Of the CIRDC organisms, *Bordetella bronchiseptica* is the only agent known to cause illness in people and this is extremely rare.

How is it spread?

(Transmission & Infection risk)

Most often, dogs that are shedding CIRDC organisms (i.e. are infectious) have signs of illness. However, for some of the diseases dogs can shed the organism before signs of illness are obvious and some dogs are infectious but never show signs of illness.

Infection is spread through direct contact (dog-to-dog), inhalation of cough or sneeze droplets, and licking objects contaminated with the CIRDC bacteria/viruses (e.g. bedding, people's hands, toys, floors). Since dogs can spread disease without having signs of illness, it can be very difficult to stop disease spread in canine group settings.

CIRDC is common, with infections occurring as sporadic disease in a single dog, in small groups of dogs, or in large regional or national outbreaks.



Close contact with other infected or shedding dogs, particularly for extended periods of time, increases risk of disease. Risk of exposure and

spread of CIRDC organisms are further increased with high-density housing and large canine groups or events. Boarding facilities, dog daycare, dog shows/sporting events, animal shelters, veterinary practices, dog parks, pet stores, and kennels are all canine group settings that have the greatest risk for CIRDC outbreaks.

The potential for each of the CIRDC bacteria/viruses to spread and cause outbreaks depends, in part, on the ability for the organism to remain infectious in the environment and immunity in the local dog population. The CIRDC bacteria/viruses vary in the how long they can remain infectious in the environment (e.g. on contaminated surfaces such as kennels, people's hands). This ranges from hours to days (e.g. canine influenza virus), to weeks or months (canine adenovirus 2). There are vaccines for some of the bacteria/viruses (see *Resources*).

Severe disease and death from CIRDC mainly occur in puppies, older dogs with concurrent health problems, or related to infection with the organism canine distemper virus. Co-infection with multiple viruses or bacteria is common and might worsen disease severity.

What should I look for? (Signs of disease)

Many dogs infected with CIRDC organisms will appear completely healthy (i.e. no signs), although these dogs may still be infectious and transmit infection to other dogs.

The hallmark of CIRDC is a sudden onset of harsh cough, which is classically described as 'goose honk'. Nose or eye discharges are often present, along with mild fever. Dog-owners may note gagging (or retching) with mucous froth produced that can look like vomit.

Pneumonia (lung infection) can occur when disease worsens, typically after complications due to secondary bacterial infection. These dogs may have difficulty breathing (labored breathing, increased rate of breathing).

Dogs with distemper virus may have eye, skin, footpad, and gastrointestinal signs (e.g. diarrhea), in addition to respiratory signs. Dogs with herpesvirus or adenovirus infection may have eye discharge and eye lesions (keratitis).

How is it diagnosed?

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

Your veterinarian will suspect CIRDC 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 the area.

Diagnostic tests (specific blood tests and oral (mouth) or nose swabs) can be performed to help confirm infection and identify the specific organism(s) involved. In mild cases of disease, diagnostic testing is rarely performed due to the rapid and self-limiting nature of disease. However, diagnostic tests are indicated when multiple dogs are infected and for dogs with progressive and/or severe signs that are not responding to typical therapy. Sometimes the results of these tests (PCR, serology to look for antibodies to infection) can be difficult to interpret, particularly if your dog has been recently vaccinated against one of the CIRDC organisms. Be sure to let your veterinarian know if your dog has been recently vaccinated as this will help with interpretation of these test results.

What is the treatment? Will my dog recover?

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. Antibiotics are rarely needed for dogs with CIRDC (generally reserved for dogs with eye/nose discharge containing mucus or pus along with one or more of fever, lack of energy, or lack of appetite; or illness longer than 10 days). Only using antibiotics when indicated is important to protect the health of your pet and the public (see *Resources*).

As infected dogs can quickly spread disease, it is important to immediately separate dogs with signs of CIRDC from other dogs – this is true for the veterinary clinic and home environments. In rare cases, dogs may need advanced care at an intensive care facility that can provide oxygen support.

Whether your dog improves (and how quickly) will depend on:

- 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.
- Access to advanced supportive care for severe illness.



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

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

Use prevention. Vaccines are available for some of the CIRDC organisms, including canine influenza viruses (H3N2 and H3N8), canine adenovirus 2, canine distemper virus, canine parainfluenza virus and *Bordetella bronchiseptica* (see *Resources*). These vaccines reduce development of illness, severity of illness, and shedding of the virus/bacteria. Vaccination is especially important for higher risk dogs, such as those in canine group settings, e.g. doggie daycares, boarding, dog shows. Not all dogs are routinely vaccinated against CIRDC organisms (i.e. some vaccines considered 'core' and others 'lifestyle'), so speak to your veterinarian about the need for these vaccines for your dog.

Outbreak management:

Dogs suspected to be sick or likely infectious with CIRDC organisms should immediately be isolated (kept physically separated from other dogs) to prevent disease spread. As CIRDC is extremely contagious and dogs may begin to shed infectious organisms before they show signs of illness, immediate action by canine group coordinators is critical. It is recommended to immediately contact someone with experience in veterinary infectious disease risk assessment and outbreak management. Event coordinators are encouraged to proactively put in place protocols to reduce disease and spread within an event/facility and develop plans for management should disease occur (see *Resources* for further information).

Zoonotic (Human Infection) Alert:

Of the current CIRDC organisms, only *Bordetella bronchiseptica* is known to spread from dogs to people. Spread of *B. bronchiseptica* to people is very uncommon and most likely to occur in immunocompromised people. As a precaution, people who are immunocompromised should take additional precautions with sick animals, including dogs with CIRDC (e.g. avoid contact). In rare cases, immunocompromised people have been infected and become sick with *B. bronchiseptica* during vaccination of household dogs with the modified live *B. bronchiseptica* vaccine. Dogs of immunocompromised people should receive the killed *B. bronchiseptica* vaccine. See *Resources* for further information.



Additional Resources

Canine Influenza Surveillance Network. H3N2 test results from March 2015 to present. Available at: <https://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: http://onlinelibrary.wiley.com/doi/10.1111/jsap.2_12431/full

Individual AKC Canine Health Foundation fact sheets on other CIRDC pathogens and related topics (i.e. canine influenza virus, canine distemper virus). Available at: akcchf.org/tophealthconcerns

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: <http://onlinelibrary.wiley.com/doi/10.1111/jvim.14627/full>

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

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Access our full series of canine health fact sheets here: akcchf.org/tophealthconcerns

