

Kennel Cough (Infectious Tracheobronchitis)

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What is it?

Kennel cough is an infectious bronchitis of dogs characterized by a harsh, hacking cough that most people describe as sounding like “something stuck in my dog’s throat.” This bronchitis may be of brief duration and mild enough to warrant no treatment at all or it may progress all the way to a life-threatening pneumonia depending on which infectious agents are involved and the immunological strength of the patient. An uncomplicated kennel cough runs a course of a week or two and entails frequent fits of coughing in a patient who otherwise feels active and normal. Uncomplicated cases do not involve fever or listlessness, just lots of coughing.

Numerous organisms may be involved in a case of kennel cough; it would be unusual for only one agent to be involved. Infections with the following organisms frequently occur concurrently to create a case of kennel cough:

- *Bordetella bronchiseptica* (bacteria)
- Parainfluenza virus
- Adenovirus type 2
- Canine distemper virus
- Canine influenza virus
- Canine herpesvirus (very young puppies)
- *Mycoplasma canis* (a single-cell organism that is neither virus nor bacterium)
- Canine reovirus.

The classical combination for uncomplicated kennel cough is infection with parainfluenza or adenovirus Type 2 with *Bordetella bronchiseptica*. Infections involving the distemper virus or canine influenza are more prone to progressing to pneumonia but pneumonia can readily result in any dog or puppy that is sufficiently young, stressed, or debilitated.

Not sure what a Coughing Dog sounds like?

Dogs can make an assortment of respiratory sounds. Usually a cough is recognizable but it is important to be aware of another sound called a reverse sneeze. The reverse sneeze is often mistaken for a cough, a choking fit, sneezing, retching, or even gasping for breath. In fact, the reverse sneeze represents a post-nasal drip or tickle in the throat. It is considered normal especially for small dogs or dogs and only requires attention if it is felt to be excessive. The point here is to know a cough when you see one. A cough can be dry or productive, meaning it is followed by a gag, swallowing motion, production of foamy mucus (not to be confused with vomiting). Here are some videos that might help.

How Infection Occurs

An infected dog sheds infectious bacteria and/or viruses in respiratory secretions. These secretions become aerosolized and float in the air where they can be inhaled by a healthy dog. Obviously, crowded housing and suboptimal ventilation play important roles in the likelihood of transmission but organisms may also be transmitted on toys, food bowls or other objects.

The normal respiratory tract has substantial safeguards against invading infectious agents. The most important of these is probably what is called the mucociliary escalator. This safeguard consists of tiny hair-like structures called cilia that protrude from the cells lining the respiratory tract and extend into a coat of mucus over them. The cilia beat in a coordinated fashion through the lower and more watery mucus layer called the sol. A thicker mucus layer called the gel floats on top of the sol. Debris, including infectious agents, get trapped in the sticky gel and the cilia move them upward towards the throat where the collection of debris and mucus may be coughed up and/or swallowed.

The mucociliary escalator is damaged by the following:

- cigarette smoke exposure
- infectious agents (as listed previously)
- cold temperature

- poor ventilation.

Without this, a fully functional mucociliary escalator or invading bacteria, especially *Bordetella bronchiseptica*, the chief agent of kennel cough, may simply march down the airways unimpeded.

Bordetella bronchiseptica organisms have some tricks of their own as well:

- They are able to bind directly to cilia, rendering them unable to move within 3 hours of contact.
- They secrete substances that disable the immune cells normally responsible for consuming and destroying bacteria.

Because it is common for *Bordetella* to be accompanied by at least one other infectious agent (such as one of the viruses listed below), kennel cough is actually a complex of infections rather than infection by one agent.

Classically, dogs get infected when they are kept in a crowded situation with poor air circulation and lots of warm air (i.e., a boarding kennel, vaccination clinic, obedience class, local park, animal shelter, animal hospital waiting room, or grooming parlour). In reality, most causes of coughing that begin acutely in a dog are due to infectious causes and usually represent some form of kennel cough.

THE INCUBATION PERIOD IS 2 TO 14 DAYS

Dogs are typically sick for 1-2 weeks. Infected dogs shed *Bordetella* organism for 2-3 months following infection.

How is Diagnosis Made?

Usually the history of exposure to a crowd of dogs within the proper time frame, plus typical examination findings (coughing dog that otherwise feels well) is adequate to make the diagnosis. Radiographs show bronchitis and are particularly helpful in determining if there is a complicating pneumonia.

Recently, PCR (polymerase chain reaction) panels have become available in many reference laboratories. Using technology to amplify the presence of DNA in a swab, the lab is able to test for most of the kennel cough infectious agents listed. This knowledge is helpful in guiding therapy and understanding expectations.

How is Kennel Cough Treated?

Most cases will go away on their own, but we like to think we can hasten recovery with antibiotics to directly kill the *Bordetella* organism but this is not always the case. We prefer to treat kennel cough with an anti-inflammatory agent to stop the irritation in the throat. Kennel cough may be treated with cough suppressants to provide comfort during natural recovery but this is only to allow patients to get some sleep.

Prevention through Vaccination

Vaccination is only available for: *Bordetella bronchiseptica*, canine adenovirus type 2, canine parainfluenza virus, canine distemper, and canine influenza. Infections with other members of the kennel cough complex cannot be prevented. Vaccine against adenovirus type 2, parainfluenza, and canine distemper is generally included in the basic puppy series and subsequent boosters (the DHPPi or distemper-parvo shot). For *Bordetella bronchiseptica*, vaccination can either be given as a separate injection or as a nasal immunization. There is some controversy regarding which method provides a better immunization or if a combination of both formats is best.

Nasal Vaccine

Intranasal vaccination may be given as early as 3 weeks of age and immunity generally lasts 12 to 13 months. The advantage is that the local immunity is stimulated right at the site where the natural infection would try to take hold.

It takes four days to generate a solid immune response after intranasal vaccination, so it is best if vaccination is given at least four days prior to the exposure. Some dogs will have some sneezing or nasal discharge in the week following intranasal vaccination; this should clear up on its own. As a general rule, nasal vaccination provides faster immunity than injectable vaccination.

Nasal vaccines for *Bordetella* generally also include vaccine against parainfluenza virus and some also include vaccine against adenovirus type 2.

Injectable Vaccine

Injectable vaccination is a good choice for aggressive dogs who may bite if their muzzle is approached. For puppies, injectable vaccination provides good systemic immunity as long as two doses are given (approximately one month apart) after age 4 months. Boosters are generally given annually. Some dogs experience a small lump under the skin at the injection site. This should resolve without treatment.

VACCINATION IS NOT USEFUL IN A DOG ALREADY INCUBATING KENNEL COUGH.

If boarding is planned and more than 6 months have passed since the last booster shot, ideally the vaccine should be boosted 5 days or more before the start of boarding.

Bordetella bronchiseptica vaccination may not prevent infection. In some cases, vaccination minimizes symptoms of illness but does not entirely prevent infection. This is true whether nasal or injectable vaccine is used.

Dogs that have recovered from Bordetella bronchiseptica are typically immune to reinfection for 6 to 12 months.

What if Kennel Cough doesn't Improve?

As previously noted, this infection is generally self-limiting. It should be at least improved partially after one week. If no improvement has been observed in this time, a re-check exam (possibly including radiographs of the chest) would be a good idea. Failure of kennel cough to resolve suggests an underlying condition. Kennel cough can activate a previously asymptomatic collapsing trachea or the condition may have progressed to pneumonia.