



**Veterinary Emergency  
+ Referral Center**  
of Hawaii

**Ettinger: Textbook of  
Veterinary Internal Medicine, 7th Edition  
Pneumonia  
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**What is pneumonia?**

Pneumonia is a condition characterized by "inflammation" of the lung. In this situation, *inflammation* refers to an irritation in the lungs that causes the body to respond. One example of a source of irritation would be bacteria in large numbers that cause the body to attempt killing these foreign invaders. As a result, fever, lethargy, and other symptoms may result. Pneumonia results in an inability to oxygenate the blood, leading to lethargy and shortness of breath. Inflammation also stimulates excessive secretion of airway fluid and mucus, resulting in cough and difficulty breathing. Pneumonia is more common in the dog than the cat, and the most common causes of pneumonia are infectious in origin.

Infectious organisms that can cause pneumonia in dogs and cats include the following:

- Bacteria
- Fungal organisms
- Viruses
- Parasites
- Protozoa

Aspiration of gastrointestinal contents during vomiting or regurgitation episodes or following a seizure can also lead to severe pneumonia. The inflammatory damage is due to both bacteria in the fluid and injury caused by acid. Inhalation of a foreign body such as a grass awn or stick is fairly common in certain geographic areas and generally results in both bacterial and mechanical inflammation in the lung.

**What pneumonia is most common in young animals?**

In young animals, viral infection can predispose the lungs to bacterial invasion, and true pneumonia results. "Kennel cough" is caused by viruses and bacteria. It usually results in mild symptoms, mild or no pneumonia, and it resolves within 5 to 7 days. Severe symptoms in combination with poor appetite could indicate pneumonia. This disease can be difficult to distinguish from pneumonia associated with canine distemper virus, which can attack the nervous system after causing respiratory signs. Young animals can also develop pneumonia because of an abnormal immune system or an inability to respond to an infection. Specific diagnostic tests can be required in these instances.

An additional cause of pneumonia that can be seen in dogs is a "hypersensitivity response" within the lung triggered by parasitic infection, allergens, irritants, or unknown causes. It is important to rule out infectious disease in these animals and search for underlying heart or lung parasites to

provide the most beneficial therapy. Determining the cause of pneumonia is always required in order to provide rapid and appropriate treatment.

### **What are the symptoms of pneumonia?**

Symptoms of bacterial pneumonia in dogs and cats may include the following:

- Moist or productive cough
- Rapid respiratory (breathing) rate
- Nasal discharge
- Loud breathing sounds
- Malaise/depression
- Loss of appetite
- Weight loss

These signs of illness and the presence of a moist cough for more than 2 or 3 days should prompt consultation with your veterinarian. Young animals in particular can become dehydrated easily because of a combination of fever and lack of water intake.

### **What tests are needed?**

Some fungi or parasites are more prevalent in different regions of the country, so it is important to alert your veterinarian to any recent travel outside of your area. Your veterinarian will search for evidence of pneumonia by completing a thorough physical examination and performing various diagnostic tests. Listening to the chest cavity often reveals loud bronchial noises and moist crackles throughout the lung fields.

A complete blood count (CBC) is used to evaluate the body's response to infection by assessing the numbers and types of white cells present. The total number of white cells is usually increased in a dog or cat with pneumonia. Increased neutrophils (a type of white blood cell) are exposed when bacteria are the cause of pneumonia. Parasites or a hypersensitivity response can cause an increase in eosinophils (a type of white blood cell) and fungal infection usually results in increases in both neutrophils and monocytes (another white blood cell).

Your veterinarian may also elect to perform a blood chemical profile and urinalysis to make sure that the liver and kidneys are functioning properly prior to therapy. In cats, blood tests are often performed to rule out leukemia or immunodeficiency virus infection in conjunction with pneumonia. Some fungal infections or protozoal infections can be diagnosed in dogs or cats with blood tests; however, analysis of specimens from the lungs may also be required.

Chest x-rays are always recommended when pneumonia is suspected. The x-ray pattern helps determine the most likely cause of pneumonia and also assesses the severity of the disease. In some instances, an inhaled foreign object such as a piece of wood might be seen in the airways, although many objects cannot be seen and blend in with the lung tissue or cause consolidation (increased whiteness) on the x-ray. Bone and metal objects usually can be seen.

Depending on the changes that are seen on x-ray and your animal's general health, your veterinarian may recommend light sedation or anesthesia to obtain samples from the airway for culture and analysis. Airway sampling through a tracheal wash or bronchoscopy with

bronchoalveolar lavage may be offered (see Tracheal Wash and Bronchoscopy). If a foreign object is suspected as the underlying cause of pneumonia, bronchoscopy or surgery is usually required for removal and treatment of the pneumonia.

**What treatment is needed?**

Some animals with pneumonia require treatment in the hospital. This is particularly true when your pet is dehydrated or requires oxygen therapy because supportive care is important in aiding resolution of pneumonia. In addition to these treatments, animals often receive "nebulization" and "coupage" therapy to remove excessive secretions from the lung and improve breathing. This type of therapy is achieved by supplying moisture-laden air to your dog or cat in a closed environment and then lightly striking the chest with a cupped hand to loosen mucus. Sometimes this therapy is also required when animals are discharged from the hospital. Ultrasonic nebulizers can be purchased for home use from a hospital supply company or respiratory therapy unit.

Because removal of mucus is so important in animals with pneumonia, cough suppressants should not be used early in the course of disease because infectious secretions can become trapped in the airways and worsen pneumonia.

Bacterial pneumonia requires treatment with specific antibiotics that are directed against the organisms isolated from the lung. All antibiotic prescribed must be administered to your pet. Before stopping any medications, please consult with your veterinarian. Fungal pneumonia can be treated with intravenous and/or oral agents to kill or slow the growth of particular fungus. Prolonged therapy is often required. If lung hypersensitivity is the cause of pneumonia, steroids may be required for treatment; however, these are prescribed only when infectious causes of pneumonia have been ruled out.

Any medication used to treat pneumonia can be associated with side effects such as loss of appetite, vomiting, or diarrhea. Steroids cause excessive drinking, urinating, and eating. Any adverse responses should be reported to your veterinarian immediately because changes may be required to restore your animal's health.

In an animal with non-resolving pneumonia, the possibility of a foreign body or pulmonary abscess may be considered. Consolidation (collapse) of one or more lung lobes may serve as a source for recurrent infection or result in failure of therapy. In these cases, surgical removal of a lung lobe may be recommended to control disease.