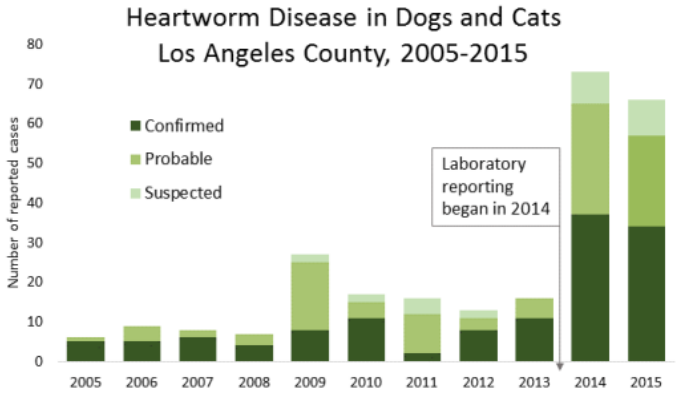
B- Heartworm in Animals in Los Angeles County

What is heartworm disease?

It is an infection in animals caused by a worm called *Dirofilaria immitis*. This worm is spread by mosquito bites. The adult worms live in the heart and large blood vessels in the chest. Dogs, cats, ferrets, wolves, coyotes, seals, and sea lions can all become infected. The disease does NOT spread directly from animal-to-animal.



What are the symptoms of heartworm disease?

Infected animals may have tiredness, problems breathing, coughing, and heart failure. Infected cats may breathe hard and be more likely to vomit. Infection can be present for a while in the pet before symptoms appear.

How do you know if your pet is infected with heartworms? The only way to know is by having a blood test for heartworms performed at a veterinary hospital.

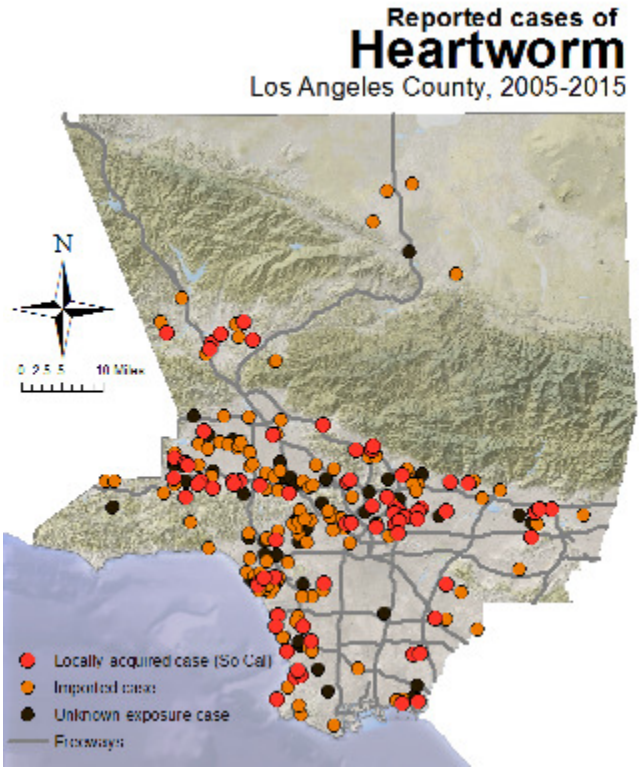
What is the treatment for heartworm infection?

Veterinarians treat infected pets by giving medication to kill the worms in the bloodstream. As the worms die, there is a risk of the pet having a bad reaction to the dead worms. Therefore, heartworm disease is treated **only** under the close supervision of a veterinarian.

Is there any heartworm disease in Los Angeles County?

Yes. Between 2005-2015, veterinarians in Los Angeles County reported 257 cases - in 18 cats and 239 dogs. The majority of the cases (70%) had **no symptoms** at the time they were diagnosed.

In 29% of these cases, the pet had not traveled outside of Southern California, so they had acquired the infection locally. The graph seen at the right shows these cases by year. The amount of reports received per year increased in 2014 because laboratories began to report cases.



How Can I Prevent Heartworm in My Pet?

1. Mosquito Control. Mosquitoes breed in stagnant water. Stop mosquito breeding by dumping any standing water on your property every 2 days. Mosquitoes feed the most at dawn, dusk and at night, so keep your pet indoors at night.

2. Heartworm Preventative Medication.Heartworm preventative medications are generally regarded as safe and help prevent infection with additional parasites. Discuss the issue with your pet's veterinarian.

Untreated animals

In 21% of the cases in LA County, the animal had not been treated for heartworm infection at the time of the report. Untreated animals may become "reservoirs" for the disease. This means they can infect mosquitoes, and then the mosquitoes can infect more pets. Infected coyotes can be reservoirs for the disease.

Can humans catch heartworm?

However human infections with *Dirofilaria immitis* are very rare. In most cases, the person has no symptoms, but a small shadow ("coin lesion") may be seen inside the lungs on a chest X-ray. No cases of human heartworm infection have been reported in LA County. See articles in blue box below for more information.

Tracking Heartworm in LA County

Heartworm in animals is reportable in LA County. In 2014, laboratories were required to begin reporting cases, and the reports available increased. Cases are categorized as Confirmed, Probable, or Suspected based on the Heartworm Case Definition for LA County. Of the 257 cases reported between 2005-2015, 51% were Confirmed, 39% were Probable, and 10% were Suspected.

Invasive *Aedes* mosquitoes in Los Angeles (LA) County

- Three new species of drought-resistant mosquitoes are spreading LA County.
- They are black with white stripes, and bite in daytime.
- Two of the new mosquito species have transmitted heartworm in other countries, and therefore may spread heartworm here.
- The Yellow Fever mosquito and Asian Tiger mosquito are potential vectors for multiple human viruses, such as West Nile, Zika, chikungunya, and dengue.

Your help is needed! Be a mosquito-fighter.

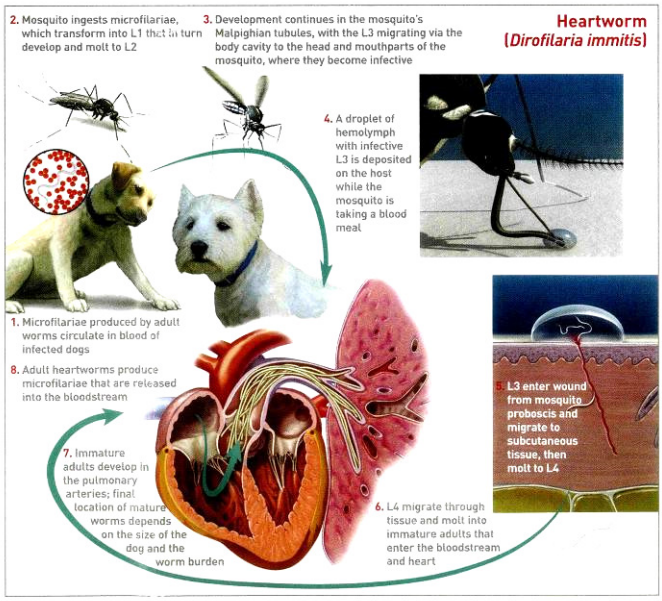
- Remove all standing water from your property at least once a week. These mosquitoes can breed in a bottle cap of water.
- Learn more about *Aedes* mosquitoes in California.
- Call your local vector control agency if you see these mosquitoes.

HEARTWORMS IN PETS

Heartworms are nine to eleven-inch long worms that live in a pet's heart or in the pulmonary arteries, the arteries leading to the lungs. Although heartworms occur commonly in dogs, most people do not consider them a problem for the cat. However, recent studies of cats with heart and respiratory diseases have found an incidence of heartworms that is far greater than previously thought. The prevalence of exposure to heartworm disease in indoor cats has been reported as high as 15% in certain geographical areas.

How are heartworms transmitted to a pet?

Heartworms are transmitted by mosquitoes. When an infected mosquito bites a pet, it deposits baby heartworms (larvae). The larvae migrate and mature for several months, ending up in the right side of the heart and the pulmonary arteries. They mature into adult heartworms about six months from the time they enter the pet. Shortly thereafter, they begin to release immature heartworms, known as microfilaria. Microfilariae live in the pet's blood for about one month. Mosquitoes ingest microfilaria by feeding on an infected cat or, more commonly, an infected dog. Because of this life cycle, it is necessary for a pet to be bitten by a mosquito in order to become infected with heartworms. Heartworms are not transmitted directly from one cat to another or from a dog directly to a cat.



Life cycle of *Dirofilaria immitis*. L1 = first-stage larvae; L2 = second-stage larvae; L3 = third-stage larvae; L4 = fourth-stage larvae

How are heartworms diagnosed?

There are several methods used in diagnosing heartworms; unfortunately, none are 100% reliable so a combination of tests is often needed. The diagnostic sequence usually progresses as follows:

Clinical Signs

One of the most challenging aspects of diagnosing feline heartworm disease is that there are no specific clinical signs. The most common signs are a sudden onset of coughing and rapid breathing. However, these clinical signs can be caused by several other diseases. Other common clinical signs include weight loss and vomiting, also common in other diseases. On occasion, an apparently normal pet may be found dead, or may develop sudden overwhelming respiratory failure. This is thought to happen due to a reaction within the lungs to the young heartworms, or when dead or live heartworms enter the pulmonary arteries and obstruct the flow of blood to the lungs.

Blood Tests

1. There are two diagnostic tests that are proving to be very helpful in diagnosing heartworms. The **heartworm antibody test** determines that the pet's immune system has been exposed to heartworms. A positive test may indicate that an active infection is present. However, pets who have had heartworms but whose heartworms have died will also have antibodies for an unknown period of time. We currently believe that the antibodies persist for two to four months after the heartworms have died. Pets with late stage larvae that are not yet adults, and pets with adult heartworms in places other than the heart, may also test positive with the antibody test. This test is very sensitive, so it is used first. However, if it is positive the next test is performed.

2. The next test is the **heartworm antigen test**. This detects the presence of adult female heartworms. It is very specific, but not as sensitive. A positive test indicates that heartworms are present, but a negative test does not mean that they are absent. Because the pet must have at least two adult female worms present to make this test positive, a negative test may mean that the pet may only have a small number of worms or that all the worms present are male.

In summary, a diagnosis of heartworm infection is confirmed when **both** the antibody and antigen tests are positive. This information, combined with medical history and clinical signs, are most commonly used to diagnose feline heartworm disease.

3. Blood can be tested for the presence of **microfilariae**. However, less than 10% of pets with heartworms have microfilariae in their blood, and microfilariae are only present for one to four weeks. Although a positive test is diagnostic, a negative test means little.

4. Pets suspected of heartworms can also be tested for their level of **eosinophils**. Eosinophils are a type of white blood cells that occur in increased numbers when certain parasites are present. They are elevated in the presence of heartworms, but this elevation only occurs for a few months. This test is not specific, since pets with other parasites (intestinal worms, fleas, etc.) or allergies also commonly have increased eosinophil counts.

Radiographs

Radiographs (x-rays) permit us to view the size and shape of the heart. They also allow us to measure the diameter of the pulmonary arteries. Many pets with heartworms have an increase in the size of the pulmonary arteries; they may suddenly come to an apparent stop (blunted) on their way to the lungs due to worms obstructing them. However, many other pets with heartworms have no abnormal findings on their radiographs, especially early in the infection.

An **angiogram** is an x-ray study in which contrast material (dye) is injected into the heart or veins and is seen as it goes through the pulmonary arteries. This illuminates the arteries so they can be better seen. There is some risk with this procedure so it is not used often.

Ultrasound or Echocardiography

An **ultrasound** machine produces an image of internal organs and structures without the use of radiation. It is a testing procedure that is becoming more and more common in veterinary practices. With it, one is able to view the internal structures of the heart and the pulmonary arteries. In some pets, the actual heartworms can be seen; this finding confirms the presence of heartworms. However, in many pets the worms are not seen since there are generally only one or two worms present.

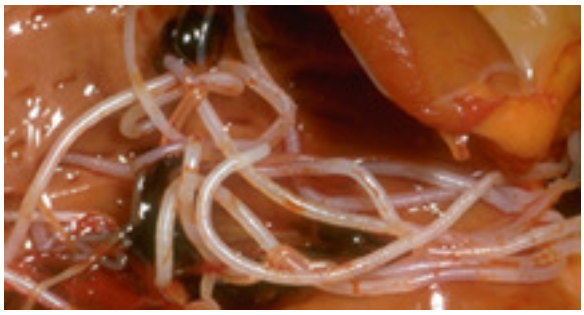
Can heartworm disease be treated?

1) Feline

There is no drug approved for treating heartworms in cats. One of the drugs for treating dogs has been used in cats, but there are potentially significant side-effects. Another problem is that when the heartworms die they pass through the pulmonary arteries to the lungs. This can result in sudden death. Thus, we have a dilemma when a cat is diagnosed with heartworms. One of two choices must be made:

1. Treat with the drug designed for dogs. However, this is a drug that has been shown to have side-effects in cats. These side-effects include acute pulmonary (lung) failure and death in a small percentage of cats.

2. Treat the symptoms of heartworm disease and hope the pet outlives the worms. Since heartworms live in a cat for about two years, several months of treatment are needed. When cats are in a crisis, they are treated with oxygen and corticosteroids ("cortisone") to relieve the reaction occurring in the pulmonary arteries and lungs, and, if needed, drugs to remove fluid from the lungs (diuretics). When they are stable, they are treated continuously or periodically with corticosteroids. However, the threat of an acute crisis or sudden death always exists.



There is some risk involved in treating dogs with heartworms, although fatalities are rare. In the past, the drug used to treat heartworms contained arsenic so toxic effects and reactions occurred more frequently. A newer drug is now available that does not have the toxic side-effects, allowing successful treatment of more than 95% of dogs with heartworms.

2) Canine

Some dogs are diagnosed with advanced heartworm disease. This means that the heartworms have been present long enough to cause substantial damage to the heart, lungs, blood vessels, kidneys, and liver. A few of these cases will be so advanced that it will be safer to treat the organ damage rather than risk treatment to kill the heartworms. Dogs in this condition are not likely to live more than a few weeks or months.

Treatment to kill adult heartworms: An injectable drug to kill adult heartworms is given. It kills the adult heartworms in the heart and adjacent vessels. These injections may be divided and given thirty days apart.

Complete rest is essential after treatment: The adult worms die in a few days and start to decompose. As they break up, they are carried to the lungs, where they lodge in the small blood vessels and are eventually reabsorbed by the body. This can be a dangerous period so it is absolutely essential that the dog be kept quiet and not be allowed to exercise for one month following treatment. The first week after the injections is critical because the worms are dying. A cough is noticeable for seven to eight weeks after treatment in many heavily infected dogs.

Prompt treatment is essential if the dog has a significant reaction in the weeks following the initial treatment, although such reactions are rare. If a dog shows loss of appetite, shortness of breath, severe coughing, coughing up blood, fever, and/or depression, you should notify us. Response to antibiotics, cage rest, and supportive care and intravenous fluids is usually good in these cases.

Treatment to kill microfilaria: Approximately one month following treatment to kill the adults, the dog is returned to the hospital for administration of a drug to kill the baby heartworms or microfilariae. Your dog needs to stay in the hospital for the day. Your dog is started on heartworm preventive after this treatment.

Other treatments: In dogs with severe heartworm disease, it may be necessary to treat them with antibiotics, special diets, diuretics to remove fluid accumulations, and drugs to improve heart function prior to treatment for the heartworms.

Dogs with severe heart disease may need lifetime treatment for the heart failure, even after the heartworms have been killed. This includes the use of diuretics, heart drugs, and special low salt, low protein diets.

Is there a way to prevent heartworms?

It is strongly recommended that all cats receive year-round monthly heartworm preventative in areas where mosquitoes are active all year round. Pets that live in colder areas, where mosquitoes are seasonal, should be on monthly preventative for at least 6 months of the year. There are excellent heartworm preventatives now available for cats, making prevention of heartworm disease safe and easy. The reasons that heartworm prevention should be considered for your pet are:

1. **Diagnostic Difficulty.** Diagnosing heartworms is not as easy in cats as in dogs.

2. **Unknown Incidence.** Heartworms are not nearly as common in cats as they are in dogs. However, they are probably more common than we realize. As we look more aggressively for heartworms in cats with better and better tests, we expect to find that the incidence is greater than previously thought. Many university studies have shown that up to 15% of all cats, indoor and outdoor alike, have been exposed to feline heartworm disease.

3. **There Is No Treatment.** There is simply no good treatment for heartworm-infected cats. Effective drugs are not available, and cats that seem to be doing well may die suddenly. Treating heartworm infections in cats is risky at best, and not treating these cats is just as risky. It will take about two years for the parasitic infection to be eliminated in the cat, and serious clinical signs can suddenly appear at any time during this period.

4. **Prevention Is Safe and Easy.** Cats given heartworm prevention drugs have not shown signs of toxicity. There is a wide margin of safety, even in kittens as young as six weeks of age.

5. **Indoor Pets Get Heartworms, Too.** Exposure to mosquitoes is required for transmission. Pets do not have to be exposed to cats or dogs infected with heartworms. Obviously, pets that go outdoors are more likely to be exposed. However, an infected mosquito can easily get into the house and infect the pet.

This client information sheet is based on material written by Ernest Ward, DVM

Products we carry:

Tablets:

1) Sentinel

2) Interceptor

Liquid Topical:

1) Revolution **(no blood test needed prior to application)**

Order Online:

Beef-Flavored Chew:

1) Heartguard (Iverheart)