

Keep The Worms Out Of Your Pet's Heart! The Facts About Heartworm Disease

Your pet's health is important. Learn the facts about heartworm disease so you can keep your pet healthy and heartworm-free.

Heartworm Disease – What Is It And What Causes It?

Heartworm disease is a serious disease that results in severe lung disease, heart failure, other organ damage, and death in pets, mainly dogs, cats, and ferrets. It is caused by a parasitic worm called *Dirofilaria immitis*. The worms are spread through the bite of a mosquito. The dog is the definitive host, meaning that the worms mature into adults, mate, and produce offspring while living inside a dog. The mosquito is the intermediate host, meaning that the worms live inside a mosquito for a short transition period in order to become infective (able to cause heartworm disease). The worms are called “heartworms” because the adults live in the heart, lungs, and associated blood vessels of an infected animal.

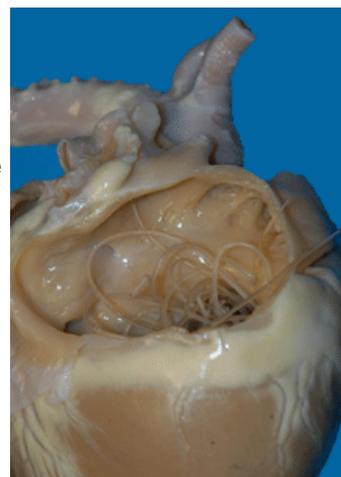


Photo courtesy of Matt W. Miller, DVM, MS, Diplomate ACVIM (Cardiology), College of Veterinary Medicine, Texas A&M University

In the United States, heartworm disease is most common along the Atlantic and Gulf coasts from the Gulf of Mexico to New Jersey and along the Mississippi River and its major tributaries, but it has been reported in dogs in all 50 states.



The Heartworm Lifecycle In Dogs

In an infected dog, adult female heartworms release their offspring, called microfilariae, into the dog's bloodstream. When a mosquito bites the infected dog, the mosquito becomes infected with the microfilariae. Over the next 10 to 14 days and under the right environmental conditions, the microfilariae become infective larvae while living inside the mosquito. Microfilariae cannot become infective larvae without first passing through a mosquito. When the infected mosquito bites another dog, the mosquito spreads the infective larvae to the dog through the bite wound. In the newly infected dog, it takes between six and seven months for the infective larvae to mature into adult heartworms. The adult heartworms mate and the females release their offspring into the dog's bloodstream, completing the lifecycle. See a graphic of the [heartworm lifecycle in dogs](http://wcms.fda.gov/downloads/AnimalVeterinary/ResourcesforYou/AnimalHealthLiteracy/UCM188497.pdf) (<http://wcms.fda.gov/downloads/AnimalVeterinary/ResourcesforYou/AnimalHealthLiteracy/UCM188497.pdf>).

Heartworm disease is not contagious, meaning that a dog cannot catch the disease from being near an infected dog. Heartworm disease is only spread through the bite of a mosquito.

Inside a dog, a heartworm's lifespan is five to seven years. Adult heartworms look like strands of cooked spaghetti, with males reaching about 4 to 6 inches in length and females reaching about 10 to 12 inches in length. The number of worms living inside an infected dog is called the worm burden. The average worm burden in dogs is 15 worms, but that number can range from 1 to 250 worms.



Photo courtesy of Matt W. Miller, DVM, MS, Diplomate ACVIM (Cardiology), College of Veterinary Medicine, Texas A&M University

How Is A Dog Tested For Heartworms?

The most common test that a veterinarian uses to check a dog for heartworms is called an antigen test. This blood test detects specific proteins, called antigens, which are released by adult female heartworms into the dog's bloodstream. In most cases, antigen tests can accurately detect infections with one or more adult female heartworms that are at least seven or eight months old, but the tests generally do not detect infections that are less than five months old.

There are also tests that detect microfilariae in a dog's bloodstream. Microfilariae in the bloodstream indicate that the dog is infected with adult heartworms (because only adult heartworms can mate and produce microfilariae). Microfilariae can be detected in a dog's bloodstream about six to seven months after it is bitten by an infected mosquito (because six to seven months is the time it takes the heartworms to develop from infective larvae into adults that mate and produce microfilariae).

When Should A Dog Be Tested For Heartworms?

The timing and frequency of heartworm tests depend on many factors. Some of these factors include:

- The dog's age when heartworm prevention is started;
- If the owner forgot to give heartworm prevention and for how long;
- If the dog is switched from one type of heartworm prevention to another;
- If the dog recently traveled to an area where heartworm disease is more common; and
- The length of the heartworm season in the region where the dog lives.

Dogs older than six to seven months of age should be tested for heartworms before starting heartworm prevention. A dog may appear healthy on the outside, but on the inside, heartworms may be living and thriving. Although they may shorten the lifespan of the worms, heartworm preventives do not kill adult heartworms. If a heartworm-positive dog is not tested before starting a preventive, the dog will remain infected with adult heartworms until it gets sick enough to show symptoms. Also, giving a heartworm preventive to a dog that has an adult heartworm infection may be harmful or deadly. If microfilariae are in the dog's bloodstream, the preventive may cause the microfilariae to suddenly die, triggering a shock-like reaction and possibly death in some dogs.

Annual testing of all dogs on heartworm prevention is recommended. Talk to your dog's veterinarian about the best time for your dog's annual heartworm test.

What Are The Symptoms Of Heartworm Disease In A Dog?

The severity of heartworm disease is directly related to how many worms are living inside

the dog (the worm burden), how long the dog has been infected, and how the dog's body is responding to the presence of the heartworms. The dog's activity level also plays a role in the severity of the disease and in when symptoms are first seen. Symptoms of heartworm disease may not be obvious in dogs that have low worm burdens, have been recently infected, or are not very active. Dogs that heavy worm burdens, have been infected for a long time, or are very active often show obvious symptoms of heartworm disease.

There are four classes, or stages, of heartworm disease. The higher the class, the worse the disease and the more obvious the symptoms.

- Class 1: No symptoms or mild symptoms such as an occasional cough.
- Class 2: Mild to moderate symptoms such as an occasional cough and tiredness after moderate activity.
- Class 3: General loss of body condition, a persistent cough, and tiredness after mild activity. Trouble breathing and signs of heart failure are common. For class 2 and 3 heartworm disease, heart and lung changes are usually seen on chest x-rays.
- Class 4: Also called caval syndrome. There is such a heavy worm burden that blood flowing back to the heart is physically blocked by a large mass of worms. Caval syndrome is life-threatening and quick surgical removal of the heartworms is the only treatment option. The surgery is risky, and even with surgery, most dogs with caval syndrome die.

Not all dogs with heartworm disease develop caval syndrome. However, if left untreated, heartworm disease will progress and damage the dog's heart, lungs, liver, and kidneys, eventually causing death.

Is There A Treatment For Heartworm Disease In Dogs?

There are two drugs approved by the U.S. Food and Drug Administration (FDA) for the treatment of heartworm disease in dogs. Both drugs contain arsenic and are effective at killing adult heartworms. Caparsolate Sodium (arsenamide sodium), the older of the two drugs, is injected into a vein. It is not currently manufactured or marketed in the United States. The newer drug, Immiticide (melarsomine hydrochloride), is given by a deep injection into the back muscles to treat dogs with stabilized class 1, 2, and 3 heartworm disease.

Currently, no drugs are approved to get rid of microfilariae in the bloodstream. However, certain approved monthly heartworm preventives are sometimes used by veterinarians in an extra-label ("off-label") manner to get rid of the microfilariae.

The treatment for heartworm disease is not easy on the dog or on the owner's pocket book. Treatment can be potentially toxic to the dog's body and can cause serious

What Does "Extra-Label" Mean?

When an approved drug is used in a manner other than what is stated on the approved labeling, it is an extra-label use. This is commonly referred to as an "off-label" use because the drug is used in a manner that is "off the label". Extra-label use includes using an approved drug for a condition that it is not approved for, such as using an approved monthly heartworm preventive to get rid of microfilariae in a dog's bloodstream. Extra-label use also includes using an approved drug in a species that it is not approved for, such as using an approved dog or cat heartworm preventive in ferrets. Veterinarians are legally allowed to use approved drugs in an extra-label manner in animals under the Animal Medicinal Drug Use Clarification Act (AMDUCA) of 1994. Learn more about AMDUCA and extra-label drug use in animals by clicking here: <http://www.fda.gov/AnimalVeterinary/ResourcesforYou/FDAandtheVeterinarian/ucm077390.htm>.

complications, such as life-threatening blood clots to the dog's lungs. Treatment is expensive because it requires multiple visits to the veterinarian, bloodwork, x-rays, hospitalization, and a series of injections with Immiticide.

The Best Treatment Is Prevention!

There are many FDA-approved products that prevent heartworm disease in dogs. All require a veterinarian's prescription. Most products are given monthly, either as a topical liquid applied on the skin or as an oral tablet. Both chewable and non-chewable oral tablets are available. One product is injected under the skin every six months, and only a veterinarian can give the injection. There is an FDA-approved daily product but it is no longer commercially available in the United States. Some heartworm preventives contain other ingredients that are effective against certain intestinal worms (such as roundworms and hookworms) and other parasites (such as fleas, ticks, and ear mites).



Year-round prevention is best! Talk to your dog's veterinarian to decide which preventive is best for your dog.

Can Cats Get Heartworm Disease?

Cats can also get heartworms after being bitten by an infected mosquito, although they are not as susceptible to infection as dogs. A cat is considered a resistant host of heartworms because the worms do not thrive as well inside a cat's body. Both indoor and outdoor cats are at risk for heartworm disease.

Is Heartworm Disease Different In Cats?

Heartworm disease in cats is a bit different than in dogs. Heartworms in cats do not live as long (average lifespan is only two to three years) or grow as long, and fewer of them mature into adults. Worm burdens are much lower in cats, with the average being only one to three worms.

In cats, it takes infective larvae eight months to mature into adult heartworms and produce microfilariae. This is about one month longer than in dogs. The presence of microfilariae in a cat's bloodstream is uncommon. Only 20 percent of cats with heartworm disease have microfilariae in the bloodstream, compared to 80 to 90 percent of dogs with heartworm disease. Also, the presence of microfilariae in the bloodstream is inconsistent and short-lived in cats.

It is harder to detect heartworm infections in cats than in dogs. Veterinarians generally use two types of blood tests in combination to check a cat for heartworms. However, negative test results do not rule out heartworm infection, and positive test results may or may not mean that there is an active heartworm infection. A veterinarian uses the results of both blood tests, along with the cat's symptoms and the results of other tests such as x-rays and an ultrasound of the heart, to determine if a cat has heartworm disease.

What Are The Symptoms Of Heartworm Disease In Cats?

Not all cats with heartworm disease show symptoms. Many cats are able to spontaneously rid themselves of heartworms without showing symptoms. However, some infected cats die suddenly from heartworm disease without ever showing signs of being sick.

In cats that show symptoms of heartworm disease, respiratory signs are the most obvious due to the lung damage caused by the heartworms. Cats typically show symptoms of heartworm disease at two time points – when the immature heartworms arrive in the heart and lung arteries and when the adult heartworms die.

The immature heartworms arrive in the heart and lung arteries about three to six months after a cat is bitten by an infected mosquito. Many of these immature heartworms die, causing a strong inflammatory response in the cat's lungs. This response is called heartworm associated respiratory disease (HARD) because respiratory signs, such as trouble breathing, increased respiratory rate, and cough, are the most obvious. It may be difficult to distinguish HARD from feline asthma or feline bronchitis.

When the adult heartworms die, they release toxins into the cat's bloodstream which cause lung damage, leading to respiratory problems or sudden death. Even the death of one worm can be fatal for a cat.

Often, cats with heartworm disease show very nonspecific symptoms that mimic many other cat diseases. These nonspecific symptoms include vomiting, decreased activity and appetite, and weight loss. Cats with heartworm disease rarely show signs of heart failure.

There is no FDA-approved drug for the treatment of heartworm disease in cats, although symptoms may be managed with medications. Surgical removal of adult heartworms may be a treatment option if the heartworms can be seen by ultrasound. But surgery is risky, and if the heartworms are not removed intact, there can be potentially serious complications, such as shock and death.

Again, Prevention Is The Best Treatment!

There are several FDA-approved products to prevent heartworms in cats, although not as many are available for cats as there are for dogs. There are both topical and oral products for cats, and all are given monthly and require a veterinarian's prescription. Some heartworm preventives contain other ingredients that are effective against certain intestinal worms (such as roundworms and hookworms) and other parasites (such as fleas and ear mites).

Again, year-round prevention is best! Talk to your cat's veterinarian to decide which preventive is best for your cat.



Should Cats Be Tested For Heartworms?

It is recommended that cats older than six to seven months of age be tested for heartworms before starting heartworm prevention and then annually. Talk to your cat's veterinarian about testing your cat for heartworms.

What About Heartworm Disease In Ferrets?

Photo courtesy of David A. Crum, DVM, Stahl Exotic Animal Veterinary Services

those seen in cats.

Ferrets can also get heartworms from the bite of an infected mosquito. Ferrets are similar to dogs in their susceptibility to heartworm infections, but their symptoms are more similar to

Infected ferrets typically have low worm burdens, and microfilariae are seen in the bloodstream in only 50 to 60 percent of ferrets with heartworm disease. Symptoms of

heartworm disease in ferrets include decreased activity level, coughing, trouble breathing, and overall weakness. Heart failure can occur in severe cases. Based on a ferret's symptoms, a veterinarian may perform chest x-rays and an ultrasound of the heart to determine if it has heartworm disease. Blood tests to detect heartworm infections in ferrets are generally unreliable.

No drugs are FDA-approved for the treatment or prevention of heartworm disease in ferrets. However, a veterinarian may use drugs that are approved in other animals in an extra-label manner to treat a ferret with heartworm disease. To prevent heartworm disease in ferrets, a veterinarian may prescribe an approved dog or cat preventive in an extra-label manner.

Again, prevention is the best treatment! Year-round prevention is recommended for all ferrets. Talk to your ferret's veterinarian about preventing heartworm disease in your furry friend.

Can People Get Heartworms From Their Pets?

People cannot get heartworms from their pets. Heartworms are only transmitted by the bite of an infected mosquito. In rare cases, people can get heartworms after being bitten by an infected mosquito. But because people are not a natural host for heartworms, the larvae usually migrate to the heart and lung arteries and die before they become adult worms.

How Can You Get More Information On Heartworm Disease?

- Talk to your pet's veterinarian
- Contact the FDA's Center for Veterinary Medicine at 240-276-9300 or AskCVM@fda.hhs.gov
- Visit the American Heartworm Society's website at www.heartwormsociety.org/
- Visit www.knowheartworms.org/

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