

# Heartworm: History and Prevention

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A century ago, when veterinarians found 12-inch-long, spaghetti-like worms in dogs' hearts, they couldn't help but call them heartworm. That's all they knew about the condition: They didn't know where it came from and certainly had no way to treat it.

Today's veterinarians are much better educated about this disease. Most importantly, they know how to prevent it. But they still find dogs with the parasite. The reason: Some dog owners have a poor appreciation of the seriousness of heartworm and don't put their dogs on preventives. Their dogs become infested and, besides the threat to their own lives, put other dogs at risk.

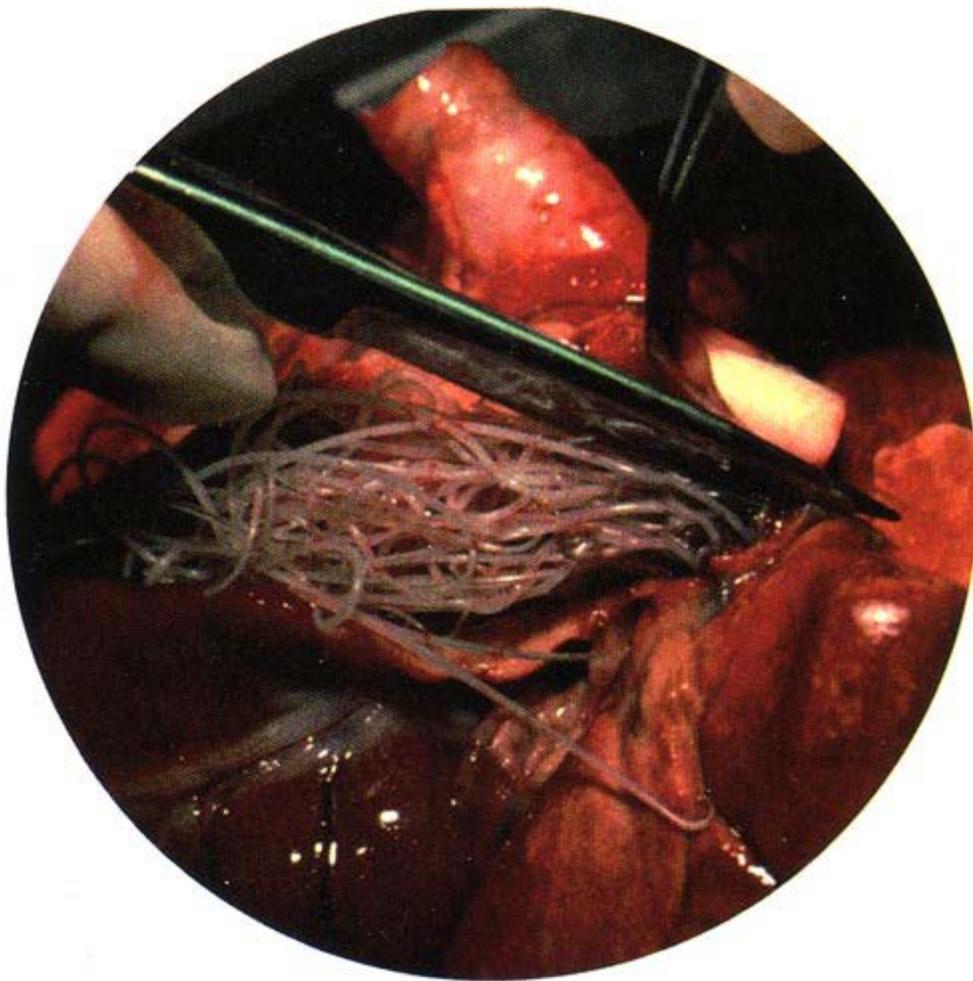
Contrary to what the name suggests, heartworms prefer to live in the pulmonary arteries leading from the heart to the lungs rather than in the heart itself. The worms bathe in and feed on the blood, reproduce and release thousands of microscopic young (microfilaria) into the bloodstream. These drift along waiting for a mosquito to take a blood meal and pick them up. It's only inside a mosquito that the microfilaria can mature into larvae.

If it's warm enough, it takes just two weeks for the larvae to be ready to infest the next mammalian host. As the mosquito sucks blood, the larvae charge down the salivary duct into the host's body. The host could be a dog, a cat, or a human. (A heartworm larva in a person usually ends up in the lungs, where the dog creates a cyst around the invader. This does not cause a medical problem, but it can be mistaken for lung cancer.) In dogs and cats, the larvae begin a six-to-seven-month migration as they change into adult heartworms. Adult worms can live up to seven years.

Heartworms in dogs don't physically block the flow of blood. Instead, they create inflammation in the arterial wall, which thickens and thereby disrupts blood flow, making the heart work harder. Once blood flow slows sufficiently, a heartworm-infested dog develops a mild, persistent cough, may become fatigued after only mild exercise, and suffers from a reduced appetite. The result can be heart failure.

Though veterinarians look for typical signs (such as weight loss, poor muscling, and a scurfy coat) to suggest a heartworm infestation, most dogs harboring this parasite do not have clinical symptoms before the worms are detected by screening tests conducted prior to administering preventives.

Heartworm testing has advanced considerably in the last 20 years. Back then, veterinarians used to look for microfilaria on blood smears under the microscope. Writhing worms magnified 400 times look impressive, and it is certainly a positive diagnosis of the disease, but 20% of heartworm-infested dogs do not have circulating microfilaria. This means the infestation can be overlooked.



*The rather shocking appearance of heartworm can help persuade owners to protect their dogs from this parasite.*

The modern screening test, which is often done in-office during routine veterinary check-ups, detects heartworm antigen (minute amounts of cuticle from the surface of the adult parasite). It is so sensitive that it can detect a single worm in a dog's body. But because the test can only detect the presence of adult heartworms, the timing of the test is extremely important. Remember that it takes up to seven months for the minute larvae to develop into adults. This means the test won't be effective until at least seven months after the last period of heartworm transmission. There is also no point in testing puppies less than 7 months old, even if they were born in heartworm season.

Three factors are necessary for heartworm to become a threat to your dog: other infested dogs, mosquitoes to carry the parasite, and the right temperature. If any one of these three is missing, heartworm is not a problem. For heartworm larvae to mature in a mosquito, the temperature must remain above 56 degrees F. The period for a microfilaria to mature into an infective larva inside a mosquito is about 29 days at 65 degrees, and 8 days at 86 degrees. Thus the occasional emergence of overwintering mosquitoes on warm winter days does not represent a risk of infection.

Most areas of the United States are too cold in the winter for heartworm larvae to develop. In most of the country, heartworm transmission is probably limited to no more than six to eight months.

For dogs infested with heartworm, treatment is complicated and expensive. Veterinarians administer an insecticidal drug to kill the worms. The dog must be kept quiet during treatment to decrease the risk of dying worms blocking blood flow to the lungs and triggering heart or breathing problems.

Fortunately, there are many extremely effective options for heartworm prevention (see sidebar). These include daily and monthly

tablets and chewables, and monthly topicals. All these medications interrupt development of the larvae and prevent them from maturing into adult worms. It is essential that any of the preventives be administered according to the prescribed schedule, but otherwise it is a fairly simple matter nowadays to keep your dog healthy and safe from heartworm.

## Heartworm Prevention

About 20 years ago, the only medication available to prevent heartworm infestation was diethylcarbamazine (DEC). It killed heartworm larvae by paralyzing their nervous systems. It had to be given daily so that larvae picked up each day would be killed. If more than two days were missed, larvae injected by mosquitoes during that period would go on to mature into adult heartworms, even with the re-institution of daily medication.

The real problem with DEC is that if it is given to a dog with an undiagnosed heartworm infestation, sudden death of the parasites could trigger a severe, often fatal, allergic reaction in the dog. For this reason, all dogs had to be tested for heartworm infestation before starting medication.

Heartworm prevention programs changed dramatically when new preventives were introduced. These medications include ivermectin (Heartgard), milbemycin oxime (Interceptor and Sentinel), selamectin (Revolution), and imidacloprid/moxidectin (Advantage Multi). These medications have a much greater degree of safety than DEC, and only need to be given monthly.

The new preventives work by killing larval stages injected by mosquitoes over the previous month (or more). Given time, they also kill microfilaria (immature larval stages produced by adult heartworms). They are safe to use if a dog is carrying heartworm and, in fact, are recommended as part of an adult heartworm-treatment program.

If you live in a heartworm region, you probably know it. If you are unsure, talk to your veterinarian. If heartworm has made an appearance in your vicinity, pan on giving your dog preventive medication to protect him.

For more information, go to [www.heartwormsociety.org](http://www.heartwormsociety.org).

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