

What is Heartworm?

Heartworm is a silent killer of both dogs and cats. It develops when a dog or cat is bitten by a mosquito carrying heartworm, *Dirofilaria immitis*. Through the bite, the mosquito injects microscopic larvae into the blood vessels. These larvae will grow into adult worms which may grow to a size of up to 10 to 12 inches. Travelling through the vessels, they will reach the right side of the heart and the arteries of the lungs where they will continue to stay for the rest of their lives.

Due to their large size, if enough worms accumulate in the heart, they will create a blockage and will obstruct the flow of blood to the heart. This can lead to serious consequences and even death.

Treatment

There are two treatment options depending on the severity of the heartworm infection.

Medications: Dogs with milder signs are usually treated with drugs over 6 months. Heartworm preventatives will be prescribed every month to kill juvenile heartworms and reduce new infections. Doxycycline will also be prescribed in order to kill an endosymbiont bacteria, *Wolbachia*, that live within the worms. This antibiotic will disrupt heartworm transmission and reduce the pathology associated with dead worms. If dog is symptomatic, prednisone will also be prescribed to reduce the risk of anaphylaxis.

Melarsomine, a drug that will kill the adult heartworms, will also be given through an injection on days 60, 90 and 91. The adulticide is only given 2 months later as this allows time for the proteins and metabolites made by *Wolbachia* to dissipate and allows time for the worms to wither as they become unthrifty when the bacteria is eliminated. Pets should then be tested 4 months later to ensure that all worms have been eradicated from the pet. If tests are negative, a year-round heartworm preventative program should be then continued for the rest of the dog's life.

Surgery: In the severe cases of heartworms, surgical removal of the worms may be needed. If these dogs were treated with drugs instead, the dead worms may create a total blockage in the heart leading to rapid heart failure and death.

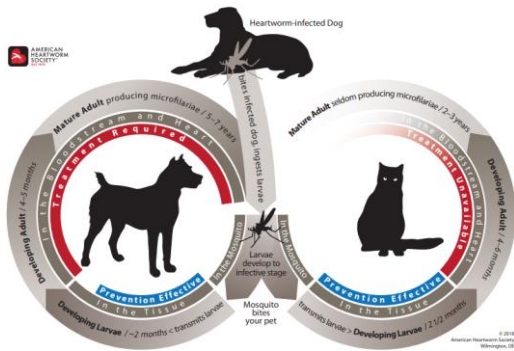
Exercise restriction is also essential for minimizing cardiopulmonary complications. Drug treatment for dogs with mild signs are usually successful. Dogs that will have to undergo surgery would usually recover however, run a higher risk of complications and even death. Therefore, the best cure of all would be prevention.

For more detailed information on heartworm treatment, please refer to the American heartworm society guidelines. <https://www.heartwormsociety.org/images/pdf/2018-AHS-Canine-Guidelines.pdf>

Heartworm Prevention

How does one prevent their dog from being infected with heartworm?





Lifecycle of Heartworm

When a dog is bitten by a mosquito infected with heartworm, the female worms will release their larvae into the bloodstream. Over the period of 6 to 7 months, these larvae will eventually migrate into the right chamber of the heart and the arteries of the lung where they will continue to develop to full maturity.

Once they have grown into mature adult worms, more young (microfilariae) will be produced and they will travel through the bloodstream. If a mature female mosquito bites the dog, these microfilariae will be ingested by the mosquito along with the blood of the dog. The microfilariae will develop in the mosquito into larvae and the cycle continues.

Signs of heartworm

As signs only develop when the worm burden is high, it may take a few years for an infected dog to show signs. Presence of microfilariae can be confirmed through a test that can be done at the vet.

Heartworm slowly causes damage to the pulmonary artery of the lungs and therefore, signs may include a mild persistent cough, reluctance to exercise, fatigue after moderate activity, decreased appetite and weight loss.

Eventually as the blood flow through the diseased lungs become more restricted, heart failure may occur. This will be presented as a swollen belly as there is a buildup of fluid within the abdomen.

If worm burden is very high, this may lead to a life-threatening form of heart failure called “caval syndrome”. This is due to a large number of worms living in the heart and the arteries of the lungs, obstructing blood flow through the heart and the lungs.



Prevention

There are three different methods of prevention. They are oral (to be eaten). Topical (to be applied on the skin) and injectable.

Below is a table with the commonly used products in out clinic.

	Application	Control of other parasites
Heartgard	Oral	None (dog) Hookworms (cats)
Interceptor	Oral	Hookworm, roundworm, whipworm
Nexgard Spectra	Oral	Fleas, ticks, hookworms, roundworms, whipworms
Revolution	Topical	Fleas, ear mites +ticks, sarcoptic mange mites, roundworms (in dogs) +hookworms, roundworms (in cats)
Advocate	Topical	Fleas, hookworms, roundworms, whipworms, ear mites, skin mites, lice

The injectable is called Proheart. It is dosed according to your pet’s weight and administered under the skin. This protection will last 12 months. It can be combined with the C6 annual vaccination.

If your pet misses a dose, a blood test will be required, before your pet can continue prevention.