



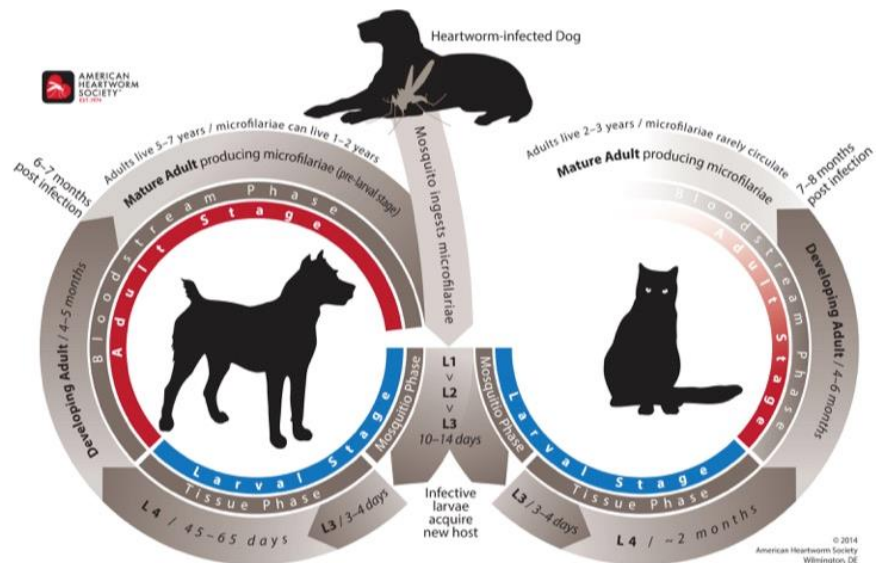
EAST COAST VETERINARY CARDIOLOGY

Heartworm Disease

Heartworms are a parasite of dogs and other canine species, such as foxes. Cats can also be affected, although they are more resistant to infection meaning that some exposed cats will clear the infection before it becomes significant. Very rarely, a few cases have been reported in people. Although heartworm disease prevalence is not high in Atlantic Canada, occasional cases are reported. It is possible that over time with environmental change, the prevalence will increase over time in our area.

Heartworms are transmitted by mosquitoes. Once limited to the southern regions of the United States, heartworms are now found in all the United States, and are well-recognized in Mexico, parts of Canada, Europe and Asia.

The life-cycle of heartworm disease is complex and requires a mosquito vector for transmission of disease. Mosquitoes inject a larval (immature) stage of the heartworm parasite, *Dirofilaria immitis*, into the dog or cat when they feed. The larvae mature into thin, adult worms that are several inches long. Adult heartworms live in the arteries of the lungs (pulmonary arteries) primarily and rarely are present within the heart (despite the name!). By their physical presence, they cause harm in two ways: they block the normal forward flow of blood, causing an excessive workload on the heart, and they also damage the inner lining of the blood vessels, which gives rise to blood clots that cut off circulation to parts of the lungs. Adult heartworms reproduce and release the next generation of immature larval worms, called microfilaria, into the bloodstream. Mosquitoes feeding on an infected dog pick up microfilaria and can then transmit heartworms to yet more animals.



The presence of worms in the heart and lungs (pulmonary arteries) causes damage that is related to the number of worms and the length of time they are present. Blood clots may form, or heartworms may die, forming an embolus (a blockage) that becomes lodged in a smaller artery, cutting off circulation to a part of the lungs. A large embolus can be fatal. Alternatively, but equally devastating,

large numbers of worms can progressively obstruct blood flow to the point that heart failure develops.

Due to their presence within the pulmonary arteries they incite inflammation which is called pneumonitis – this makes many dogs cough. Treatment is a short course of steroid and an antibiotic. Other clinical signs of disease may include lethargy, exercise intolerance, labored breathing and abdominal distension. Untreated animals are at risk for a disease called pulmonary hypertension which can then lead to right sided heart failure and death.

Treatment for heartworm disease is costly and prolonged. Prior to treatment, staging of the severity of the disease is recommended with thoracic radiographs, complete labwork including urine testing and possibly an echocardiogram. Treatment for the disease involves a staged-kill protocol, where three injections of a medication called an adulticide (melarsomine) are administered over the period of several months. This entails one injection followed by one month of strict rest, followed by two injections spaced 24 hours apart, with another one month of strict rest. Strict rest is important post treatment to minimize embolic complications with therapy. Prior to adulticide treatment, animals will be prescribed one month of an antibiotic called doxycycline. This therapy has been shown to treat a type of bacteria called Wolbachia which lives in synergism with the adult heartworms. It is felt that Wolbachia may play a role in post treatment complications as studies showed that dogs receiving doxycycline had fewer post treatment complications compared to those who did not receive it. Animals are also treated with a monthly heartworm preventative for several months (if possible) prior to adulticide therapy. Prognosis with treatment depends on the severity of the infection. For those animals with few clinical signs associated with infection, prognosis with treatment is excellent with treatment success reported in over 90% of individuals.

It is important to note that the ‘slow-kill’ protocol for heartworm disease is not presently recommended by the American Heartworm Society. A rare complication of severe heartworm infestation is a condition called caval syndrome. This occurs when many worms move into the heart and obstruct blood flow. This is an emergency and is treated by surgical extraction of the worms.

As cats are inherently more resistant to heartworm infection, treatment is often not required. If a cat is symptomatic for heartworm disease, they generally have respiratory signs such as coughing and trouble breathing. They sometimes may have vomiting. Supportive treatment is generally prescribed for these affected cats. Melarsomine is not administered to cats as it has been associated with significant side effects including death.



It is important to remember that preventing heartworm disease is much easier (and less costly!) than treating it. Therefore, monthly heartworm prevention is key to prevent the disease and there are several safe products that are routinely prescribed by veterinarians. Heartworm testing (antigen test) is part of the prevention protocol and confirms that the preventative medications are protecting your pet.

The American Heartworm Society (<https://www.heartwormsociety.org/>) is an excellent resource for those wishing to learn more about heartworm disease. They have a panel of experts who routinely revisit the treatment recommendations and report on the prevalence of the disease worldwide.