

## Canine Heartworm Disease (Dirofilariasis)

Heartworm disease is a potentially serious problem in dogs in every geographic area in the United States. The disease was initially prevalent in the southern coastal areas of the U.S., but due to the movement of dogs with the human population, the disease has spread over most of the country. It is currently present in this area; however, with proper preventive therapy, heartworm disease will not be a risk to your dog.

### DESCRIPTION

Heartworm disease is caused by *Dirofilaria immitis*, a parasitic worm that lives as an adult in the right side of the dog's heart and large blood vessels leading to the lungs. Heartworms do most of the damage in the adult stage, at which time the full grown male worms measure about six inches in length and the females can reach a length of twelve inches.

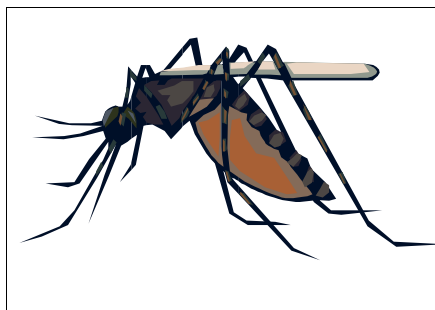
### DISEASE TRANSMISSION

Heartworms are transmitted from dog to dog by mosquitoes. There are three stages in the development of heartworms in the dog.

1. The adult female, living in the right side of the heart and/or major vessels to the lungs, produces immature worms called "microfilariae" that circulate in the blood stream. The microscopic microfilariae can live for up to 3 years.
2. When a mosquito bites an infected dog, it takes in blood containing microfilariae. The microfilariae mature in the mosquito over a period of two weeks to become infective larvae.
3. The mosquito, carrying infective larvae, deposits them in other dogs during blood meals. Larvae develop over 3-6 months and migrate to the right heart. Within 6 months, the larvae develop into adult heartworms that are responsible for the disease process in the heart and lungs. The adult heartworms can live up to 7 years. The adults produce microfilariae, hence completing the life cycle.

### CLINICAL SIGNS

Signs of heartworm disease may occur within 6 months of infection or may not appear at all depending the number of adult worms that are present. In most cases, signs will begin within 1-2 years after infection. Typical signs include coughing, labored breathing, weakness, and tiring with exercise. Since the signs vary, the disease may be well advanced before the dog begins to show any problems, or signs may be mistaken for another problem. In advanced stages, the heart and lungs can be severely damaged. Eventually, heart failure can occur and the dog can die from damage cause by heartworms unless appropriate treatment is instituted.



### DIAGNOSIS

To identify heartworm infection, a blood sample is taken from your dog. This test detects antigens from female worms and is very sensitive and accurate.

## TREATMENT

The elimination of heartworms from your dog requires that your veterinarian give medication to kill the adult heartworms and microfilariae. Currently, there are two drugs approved for treatment of adult heartworms.

1. Melarsomine (Immiticide®) is an arsenical type compound that kill the adult heartworms. Immiticide® is the preferred treatment at the Virginia-Maryland Regional College of Veterinary Medicine. There are two basic treatment options with Immiticide® – the two injection method and the three injection method. The American Heartworm Society recommends a three injection method for all dogs. One injection is administered intramuscularly and the returns for 2 more injections, 30 days later.
2. Following treatment with an arsenical compound, your dog must be rested for 4-6 weeks, during which time the dead adult heartworms will slowly be reabsorbed.
3. The microfilariae must also be eliminated so your dog will not be a source of infection for other dogs. This is easy to do using one of the preventative drugs (Heartgard, Interceptor) discussed in the next section. Elimination of the microfilariae is monitored by using blood tests that can easily identify microfilariae in the blood. In some cases, not all microfilariae can be eliminated and your veterinarian may recommend retreatment of your dog for adult heartworms and microfilariae.

## PREVENTION

The two preventive medications that are recommended by the Virginia-Maryland Regional College of Veterinary Medicine are ivermectin (Heartguard®) and milbemycin (Interceptor®). These products are intended to be given on a monthly basis and are highly effective in preventing heartworm disease if given as directed.

## RECOMMENDATIONS

To control heartworms in the dog population and to provide your pet with the best possible protection against heartworms, the following guideline are recommended:

1. All puppies should be started on preventive medication no later than 8 weeks of age.
2. Your dog should be checked annually for heartworms with an antigen test particularly if there have been breaks in the administration of preventive medication.
3. All dogs in our area should be on preventive medication year round. In cooler climates, the medication can be used only during the high risk season.
4. Dog that shows signs of weakness, persistent coughing, breathing difficulty, or decreased ability to exercise may have heartworms and should be tested.
5. If your dog is diagnosed with heartworms, it should be treated by a veterinarian to prevent permanent damage to the heart and lungs.
6. Prevention is the best approach to heartworms. If preventive and monitoring programs are followed, unnecessary treatment and permanent heart and lung damage can be avoided.

## CATS

Heartworms can infect the cat but this is an uncommon problem in this area. Monthly preventative medication is available but is not routinely recommended at the Virginia-Maryland College of Veterinary Medicine; however, it is available for owners who decide preventive therapy is appropriate for their cat.