



# OKLAHOMA 4-H

## UNDERSTANDING HEARTWORMS

### 4-PETS



#### WHAT IS A HEARTWORM

*Heartworms* are internal *parasites* that can infect your dog or cat. Parasites live on the inside (*internal*) or on the outside (*external*) of another animal for its own nutritional use. The animal they are feeding on is called the *host*.

Some of the more common internal parasites that affect pets are hookworms, roundworms and tapeworms. These parasites depend on the host animal for food and shelter and spend part of their life inside an animal's body.

Heartworms are extremely serious and often a deadly parasite of pets. The heartworm damages blood vessels causing severe heart and lung disease. They also often create immune system reactions in the body that damages other organs. These conditions are referred to as *heartworm disease*.

By working with your veterinarian, heartworm disease can be almost 100% prevented.

In this handout you will learn about:

- Life cycle of a heartworm
- The effects of heartworm disease
- Diagnosis and treatment of heartworm disease
- Prevention of heartworm disease

With this information you will understand how important it is to have your veterinarian develop a heartworm prevention plan for your pet. You will also be ready to encourage other 4-H members to visit with their veterinarians about heartworm prevention program for their pets.

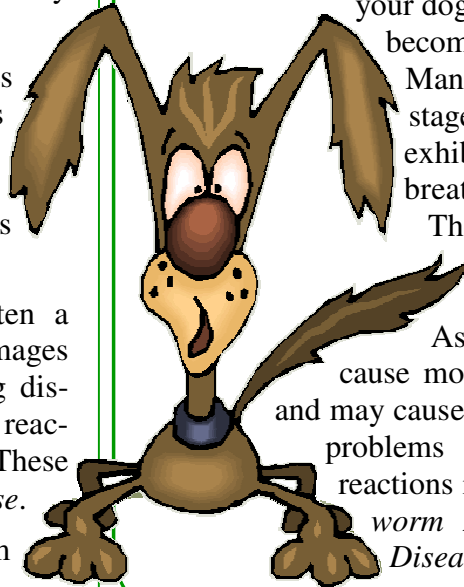
#### THE EFFECTS OF HEARTWORM DISEASE

Dogs may show no sign of heartworm disease if they have only recently been infected or are only mildly infected. As the adult worms develop your dog may begin coughing or become *lethargic*.

Many cats in the early stages of the disease will exhibit coughing, trouble breathing and vomiting.

These problems are often mistaken for asthma or allergic bronchitis.

As the worms die they cause more respiratory problems and may cause death. The respiratory problems associated with these reactions in cats are called *Heartworm Associated Respiratory Disease (HARD)*.



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## THE LIFECYCLE OF A HEARTWORM

Adult female heartworms living inside the infected animal release their young into the host's bloodstream. The young are called *microfilariae*.

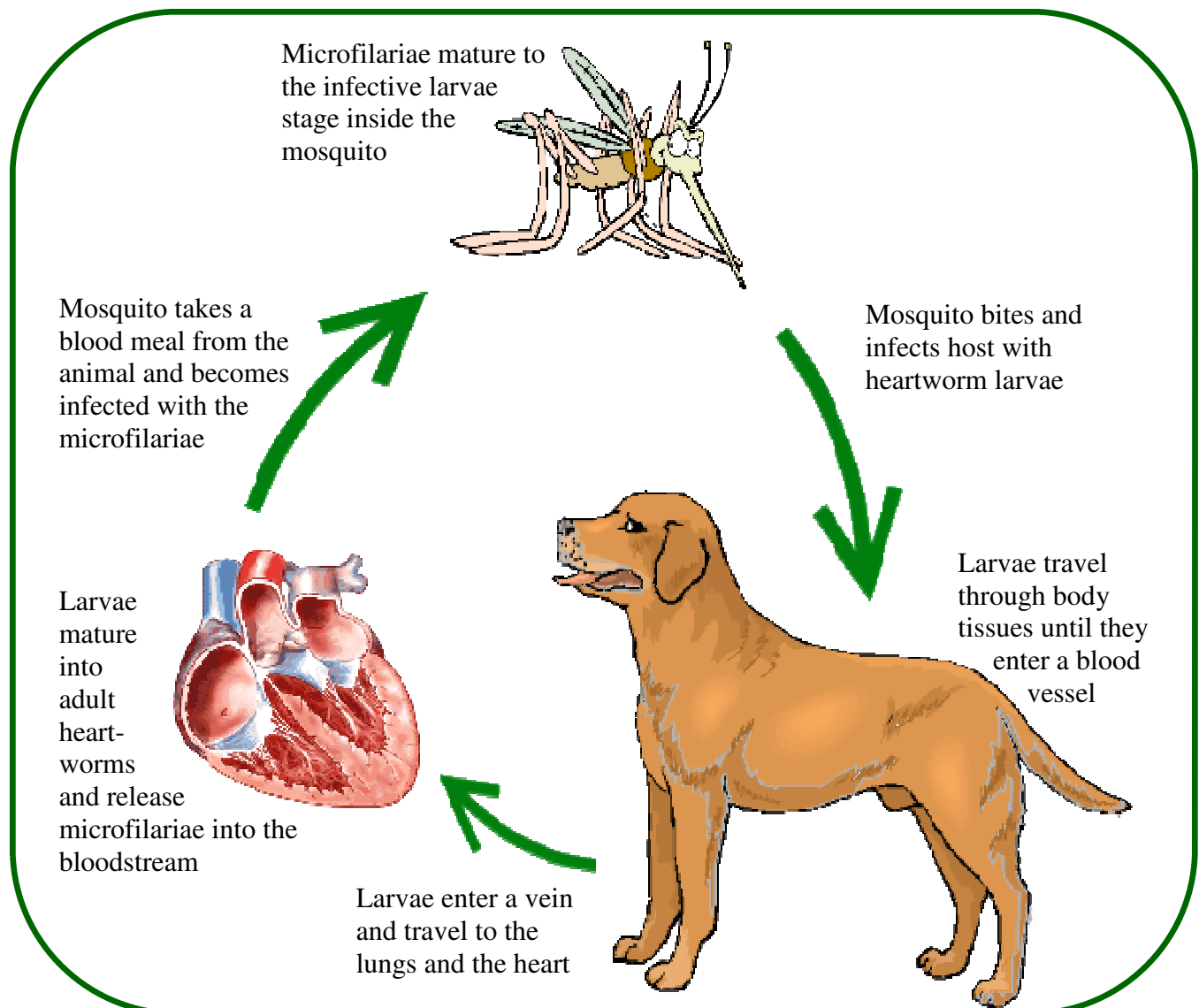
Then, mosquitoes bite and suck the blood of an animal that is infected with the heartworms and the mosquitoes become infected with the microfilariae. During the next 10-14 days the microfilariae mature to the *infective larval* stage within the mosquito. The microfilariae cannot mature into infective larvae without first living in the mosquito.

The mosquito then bites a susceptible mammal and the infective larvae enter the animal through the bite. Almost 100% of dogs that are bitten by mosquitoes with infected larvae become infected with the heartworm larvae.

During the next few months the larvae travel through body tissues and eventually enter a blood vessel where they are transported to the lungs and the heart of the animal. The larvae then mature into *adult heartworms* up to 12 inches in length where they may live up to 3 years in a cat or 7 years in a dog.

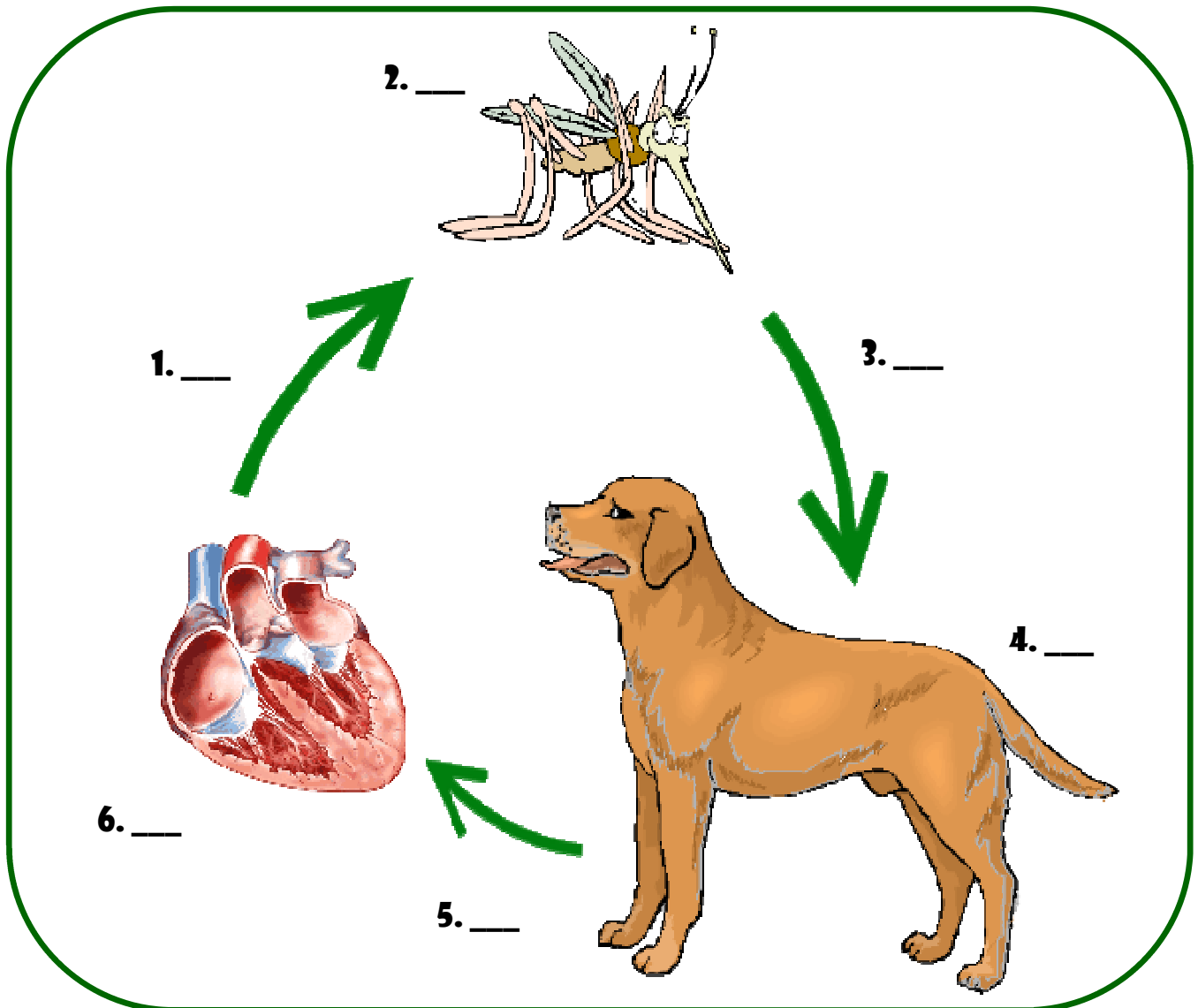
Then the cycle may be repeated.

Dogs, cats and some other mammals can get heartworms only if bitten by an infected mosquito, the disease is not contagious from one pet to another.



**EFFECTIVELY CONTROLLING PARASITES IS DEPENDENT ON UNDERSTANDING THE PARASITES LIFE CYCLE. PRACTICE YOUR KNOWLEDGE OF THE HEARTWORM LIFE CYCLE BY PLACING THE LIFE CYCLE EVENTS IN THE CORRECT ORDER IN THE ILLUSTRATION BELOW.**

- A. MICROFILARIAE MATURE TO THE INFECTIVE LARVAE STAGE INSIDE THE MOSQUITO
- B. LARVAE ENTER A VEIN AND TRAVEL TO THE LUNGS AND THE HEART
- C. LARVAE TRAVEL THROUGH THE BODY TISSUE UNTIL THEY ENTER A BLOOD VESSEL
- D. A MOSQUITO TAKES A BLOOD MEAL FROM THE ANIMAL AND BECOMES INFECTED WITH THE MICROFILARIAE
- E. MOSQUITO BITES AND INFECTS HOST WITH HEARTWORM LARVAE
- F. LARVAE MATURE INTO ADULT HEARTWORMS AND RELEASE MICROFILARIAE INTO THE BLOODSTREAM



**FETCH MORE INFORMATION FROM THESE WEBSITES**

The American Heartworm Association, <http://heartwormsociety.org>

The Companion Animal Parasite Council, <http://www.petsandparasites.org>

The American Veterinary Medical Association, <http://www.avma.org>

Know Heartworms, <http://www.knowheartworms.org>

## WHAT ANIMALS CARRY HEARTWORMS

Many people think that heartworms only infect dogs but there are many animals that can become infected with heartworms. *Domestic pets* like dogs, cats and ferrets suffer from heartworm infections. Heartworms also infect numerous wild animals including *wild canids* (e.g., foxes, wolves, coyotes), *wild felids* (e.g., tigers, lions, pumas), raccoons, opossums, and *pinnipeds* (e.g., sea lions and seals), as well as others. In very rare cases humans have become infected.

**DRAW A LINE TO MATCH THE SILHOUETTES WITH THE CORRECT NAME**

### A. DOMESTIC PETS

### B. WILD CANIDS

### C. WILD FELIDS

### D. PINNIPEDS



## DIAGNOSING HEARTWORMS

Testing for heartworms in dogs can be done easily and accurately by your veterinarian. Your veterinarian will collect a little blood to perform a lab test to detect a protein indicating the presence of adult female heartworms. If the test comes back positive your veterinarian may decide to run further tests on your dog. During the additional testing they will see how serious the disease is and determine the best treatment plan.

Testing for heartworms in cats is much more difficult. Your veterinarian may want to run multiple tests to get the best chance of identifying heartworms. A negative heartworm test in a cat doesn't rule out heartworm disease. Tests that are positive for heartworms do indicate that the worms have been present.

## TREATMENT OF HEARTWORMS

Treatment of heartworms in dogs is a lengthy and expensive process. The goal of the treatment is to kill the adult heartworms and the microfilariae. It is important to keep in mind that the worms that are being killed live inside the dogs' heart and lungs so there is a risk that the dead worms could create a blockage of blood flow. During the treatments your dog will require hospitalization and will have to be watched closely for up to 24 hours after the treatment. After leaving the hospital your dog's exercise will be restricted for up to six weeks. In addition to the actual treatment, other medications may be needed to help control the body's reaction as the worms die and are broken down in the lungs.

Unfortunately there is no safe medical treatment for heartworm disease in cats. If your cat is diagnosed with heartworms, your veterinarian may prescribe medications to ease the respiratory symptoms or surgery.

In severe cases of heartworm disease your veterinarian may recommend surgery. Surgical removal of the heartworms is considered a high-risk procedure.

## HEARTWORM PREVENTION

The good news about heartworm disease is it is almost 100% preventable. Heartworm preventative products are safe, easy and inexpensive. The American Heartworm Society (AHS) recommends year-round prevention to make sure that providing heartworm preventatives becomes a routine habit for pet owners. Additionally, the AHS recognizes that most monthly preventatives also provide the added benefit of de-worming pets against *intestinal parasites* such as roundworms, hookworms and whipworms.

Preventative medications are designed to stop the development of infective larvae before they develop into adult worms and reach the heart and lungs. It is important to have your pet examined by a veterinarian before starting a heartworm preventative. Heartworms in cats are more difficult to detect and additional testing may be required.

Preventatives are available in several easy to use forms. Visit with your veterinarian about which products are best suited to your situation. One of the most common methods of giving preventative medications is by using a monthly oral tablet. Most dogs and cats like these tablets and will gladly eat them as a tasty treat.



There are also topical treatments where you squeeze the preventive liquid right on your pet's back once a month. Topical preventatives can be a good choice if your pet is finicky and won't eat the tablet. They may also be a good option if you desire to buy a topical that also includes flea and tick control.



Additionally, there is an injectable heartworm preventative for use on dogs that lasts for six months. This might be a good option if your schedule doesn't allow for consistent monthly treatments with the other products.

Since the tests to determine if your pet has heartworms only detects the adult heartworms, your veterinarian may recommend a follow up test in six months. This will help insure that your pet wasn't already infected with larvae before you began preventive medications.

Regardless of the method your veterinarian determines is appropriate for your pet, it is your responsibility to make sure that your pet receives its preventative medication on schedule!

### "AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE"

Benjamin Franklin was quoted as saying, "An ounce of prevention is worth a pound of cure" but does his quote hold true when dealing with heartworms. Do the research to fill out the table below and find out if an ounce of heartworm prevention is worth a pound of heartworm treatment.

	PREVENTION	TREATMENT
<b>COST IN DOLLARS</b>		
<b>HOW EFFECTIVE IS IT FOR MY PET (E.G., CAT, DOG)</b>		
<b>WHAT ARE THE POSSIBLE SIDE EFFECTS?</b>		
<b>ARE THERE ANY NON-FINANCIAL COSTS (E.G., TIME, ANXIETY, DEATH)</b>		



## GLOSSARY

**ADULT HEARTWORMS**—Fully grown and mature heartworms capable of producing offspring, females can range from 10 to 12 inches in length.

**DOMESTIC PETS**—Animals that have been tamed through many years of selection for human companionship.

**EXTERNAL PARASITE**—A parasite that lives and feeds on the outside of the host animal.

**HEARTWORMS**—An internal parasite that is spread from host to host through the bites of mosquitoes.

**HEARTWORM ASSOCIATED RESPIRATORY DISEASE (HARD)**—Respiratory problems in cats due to the lung inflammation caused by the presence of heartworm larvae and adult heartworms.

**HEARTWORM DISEASE**—Illness in an animal due to blockage and damage caused by adult heartworms.

**HOST**—The animal or plant on which another organism lives.

**INFECTIVE LARVAE**—Heartworm stage that occurs after the microfilariae have developed inside a mosquito. At this stage the larva can infect the host animal while the mosquito takes a blood meal.

**INTERNAL PARASITE**—A parasite that lives and feeds on the inside of a host animal.

**INTESTINAL PARASITE**—An internal parasite that lives in and feeds on the intestines of its host.

**LETHARGIC**—Physically slow and mentally dull as a result of tiredness, disease or drugs.

**MICROFILARIAE**—Microscopic heartworm offspring that are incapable of developing into larvae without first living in a mosquito.

**PARASITE**—An organism that lives on the outside or inside of another animal to obtain its nourishment.

**PINNIPEDS**—A sea mammal that has a streamlined body and four flippers (e.g., sea lion, walrus, seal).

**VETERINARIAN**—a person that is trained to provide medical treatment for your pets. They provide your pet with vaccinations, medicine, emergency care and are also a valuable source of information about pet care.

**WILD CANIDS**—Non-domestic carnivorous and omnivorous mammals of the dog family (e.g., wolves, foxes, coyotes).

**WILD FELIDS**—Non-domestic animals of the cat family (e.g. tigers, lions, pumas).

## LIFE CYCLE STAGE GAME ANSWERS

1. D, 2. A, 3. E, 4. C, 5. B, 6. F

## MATCHING SILHOUETTES ANSWERS

C. WILD FELID—PUMA



D. PINNIPED—SEAL



A. DOMESTIC PET—FERRET



B. WILD CANID—COYOTE



A. DOMESTIC PET—DOG



C. WILD FELID—LION



B. WILD CANID—FOX



A. DOMESTIC PET—CAT



C. WILD FELID—TIGER



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