

INTESTINAL PARASITES

Brought to you by the makers of HEARTGARD® Plus (ivermectin/pyrantel)

Roundworm Basics

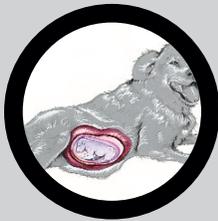
Roundworms are commonly diagnosed in puppies,¹ and may infect 90% of puppies under three months of age.² However, infection can occur in dogs of all ages. In a study roundworm eggs were found in 15% of all dogs.³

Hookworm Basics

Hookworms are dangerous intestinal parasites that infect dogs. All areas of the United States have dogs infected with hookworms.³ In a nationwide study, hookworm eggs were found in 19.2% of all dogs. Prevalence varies from region to region.³

ROUNDWORM TRANSMISSION METHODS

Roundworms in dogs are most often transmitted before birth.⁴ In fact, it is not unusual for puppies only 2-3 weeks old to have a significant number of worms.⁵



Otherwise, infection can occur by ingestion of the mother's milk by a nursing animal.



Older puppies and dogs are most often infected by contacting the feces or ingesting the meat of an infected animal.

HOOKWORM TRANSMISSION METHODS

Hookworm larvae can be transmitted in three ways:



Ingestion of larvae through the mother dog's milk (the most common form)⁷



Ingestion of larvae by adult or young dog



Penetration of skin by infective larvae

Health Risks Posed by Roundworm Infection

Once inside a dog's body, ingested roundworm eggs hatch and the larvae then migrate to the intestine and become adults. There, they feed, depriving the dog of vital nutrients and, in some cases, block the intestine entirely. Female roundworms can lay more than 100,000 eggs per day.⁶

Clinical signs can include diarrhea, weight loss and swollen abdomens. Left untreated, roundworms pose a serious health risk, especially for young dogs and puppies.

Health Risks Posed by Hookworm Infection

Hookworms present a severe health risk because of their unique feeding habit. They repeatedly remove a small amount of the intestinal lining, leaving bloody holes in their wake. This grazing results in blood loss and inflammation. Severe infection may lead to anemia, debilitation and even death.⁸ Young puppies are especially susceptible.

INTESTINAL PARASITES CAN INFECT HUMANS WITH SERIOUS CONSEQUENCES

Roundworms and Hookworms

Most pet owners do not know their pets may carry worms capable of infecting people.⁸ Infected dogs contaminate their surroundings by passing eggs in feces. People acquire roundworm and hookworm infections by coming into contact with an environment contaminated with eggs or larvae.

It is important to clean up pet feces on a regular basis to remove potentially infective eggs before they spread through the environment. Eggs in the environment can remain infective for years.⁸

Children are more likely to become infected in part because they are more apt to play in contaminated areas or put dirty objects in their mouths. Almost 73% of pediatricians in the US reported cases of children with parasitic infection.⁹

Roundworm Infection In Humans

The incidence of human infection with zoonotic intestinal parasites is significant. According to a 2008 study conducted by the CDC, overall roundworm prevalence in humans is 13.9% in the United States.¹⁰

Roundworm infection can cause morbidity in humans, however many roundworm infections remain asymptomatic and therefore remain underdiagnosed and underappreciated.¹⁰

Once inside a human, roundworms may migrate to areas of the body other than the intestine. This may make the disease more severe depending on the migration path and destination of the roundworms. When they migrate to the eye, they can impair vision or cause permanent blindness. These "wandering roundworms" can also damage the liver, heart and lungs in humans.

Ocular larva migrans caused by roundworms

Photo provided by Dr. Peter Schantz



COMMON ROUNDWORM SPECIES



Toxocara canis



Toxascaris leonina

COMMON HOOKWORM SPECIES



Ancylostoma braziliense



Ancylostoma caninum



Uncinaria stenocephala

Hookworm Infection In Humans

Hookworms are unique in their ability to penetrate human skin. When people come into contact with contaminated soil, infective larvae can pass through a person's skin and begin a prolonged migration under the skin, causing a painful, itchy rash. Some species of hookworms can penetrate deeper tissues. In rare cases, hookworm larvae may migrate to the intestine, causing an inflammatory response.¹¹



Cutaneous larva migrans "creeping eruption" - caused by hookworms

©Dermatology, University of Iowa

MISCONCEPTIONS ABOUT INTESTINAL PARASITES

MYTH 1: Intestinal parasites such as hookworms and roundworms can only infect dogs, not people.⁸

TRUTH: Hookworms and roundworms can pose a serious threat to humans, especially children.⁸ Almost 73% of pediatricians in the US reported cases of children with parasitic infection.⁹

MYTH 2: Ingestion of larvae is the only transmission method for hookworm infection in people.

TRUTH: In addition to ingestion, hookworms can also infect by penetrating the skin. That is a unique ability hookworms have. So pets as well as people can get infected if their skin comes in direct contact with the contaminated areas.

TAKE STEPS TO HELP PROTECT YOUR PET AGAINST INTESTINAL PARASITES



Nursing puppies are at the highest risk for intestinal parasitic infection. They must be dewormed early and repeatedly by your veterinarian in order to treat infections.



Avoid environments that can possibly be contaminated by pet feces – plants, soil or sand – and keep your pets away from these areas.



Dogs may ingest larvae through contaminated soil or larvae in the soil can penetrate the skin. This is especially relevant to animals allowed to roam or spend most of their time outside.



CDC recommends pet owners to promptly remove pet feces from the environment.¹²

It is important to keep your pets on a monthly heartworm preventive that also treats and controls intestinal parasites.

Important Safety Information:

HEARTGARD (ivermectin) is well tolerated. All dogs should be tested for heartworm infection before starting a preventive program. Following the use of HEARTGARD, digestive and neurological side effects have rarely been reported. For more information, please visit www.HEARTGARD.com.

¹ CAPC Recommendations. <http://www.cpcvet.org/recommendations/ascarids.html>. Accessed October 13, 2010.

² Schantz PM. Zoonotic ascarids and hookworms: the role for veterinarians in preventing human disease. In: *Emerging vector-Borne and Zoonotic Disease, The Compendium Suppl* 2002;24(1):47-52

³ Blagburn BL, Lindsay DS, Vaughan JL, et al. Prevalence of canine parasites based on fecal flotation. *Comp Cont Ed* 1996;18(5):483-509.

⁴ Parsons JC. Ascarid infections in cats and dogs. *Vet Clin North Am Small Anim Pract* 1987;17:1313-14.

⁵ Epe C. Biology of Intestinal Nematodes Ascaridal. *Vet Clin North Am Small Anim Pract* 2009;39:1092.

⁶ Lloyd S, Toxocarosis In: Palmer SR, Soulsby EJJ, Simpson DIH, eds. *Zoonosis*. New York: Oxford University Press, 1998;842.

⁷ Kalkofen U. Hookworms of dogs and cats. *Vet Clin North Am Small Anim Pract* 1987;17:1347.

⁸ Guidelines for Veterinarians: Prevention of Zoonotic Transmission of Ascarids and Hookworms of Dogs and Cats. Division of Parasitic Diseases, National Center for Infectious Diseases, Centers for Disease Control and Prevention, in cooperation with the American Association of Veterinary Parasitologists. Document available at www.cdc.gov/ncidod/diseases/roundworm/roundworm.htm. Accessed November 8, 2010.

⁹ Thomblyson P. Pets, worms and little people. *Contemporary Pediatrics*. September 2003.

¹⁰ Won KY, Kruszon-Moran D, Schantz PM and Jones JL. National Seroprevalence and Risk Factors for Zoonotic *Toxocara* spp. Infection. *Am J Trop Med Hyg* 2008; 79(4):552-557.

¹¹ Prociw P. Zoonotic Hookworm Infections. In: Palmer SR, Soulsby EJJ, Simpson DIH, eds. *Zoonoses*. Oxford, Oxford University Press, 1998:805.

¹² Toxocarosis Fact Sheet. Division of Parasitic Diseases, National Center for Infectious Diseases, Centers for Disease Control and Prevention, in cooperation with the American Association of Veterinary Parasitologists. Document available at www.cdc.gov/ncidod/dpd/parasites/toxocara/factsht_toxocara.htm#9. Accessed November 9, 2010.



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Heartgard[®]
(ivermectin/pyrantel) **Plus**
Easy to give. Protection to live.

Heartgard[®] Plus

(ivermectin/pyrantel)

CHEWABLES

CAUTION: Federal (U.S.A.) law restricts this drug to use by or on the order of a licensed veterinarian.

INDICATIONS: For use in dogs to prevent canine heartworm disease by eliminating the tissue stage of heartworm larvae (*Dirofilaria immitis*) for a month (30 days) after infection and for the treatment and control of ascarids (*Toxocara canis*, *Toxascaris leonina*) and hookworms (*Ancylostoma caninum*, *Uncinaria stenocephala*, *Ancylostoma braziliense*).

DOSAGE: HEARTGARD[®] Plus (ivermectin/pyrantel) should be administered orally at monthly intervals at the recommended minimum dose level of 6 mcg of ivermectin per kilogram (2.72 mcg/lb) and 5 mg of pyrantel (as pamoate salt) per kg (2.27 mg/lb) of body weight. The recommended dosing schedule for prevention of canine heartworm disease and for the treatment and control of ascarids and hookworms is as follows:

Dog Weight	Chewables Per Month	Ivermectin Content	Pyrantel Content	Color Coding On Foil Backing and Carton
Up to 25 lb	1	68 mcg	57 mg	Blue
26 to 50 lb	1	136 mcg	114 mg	Green
51 to 100 lb	1	272 mcg	227 mg	Brown

HEARTGARD Plus is recommended for dogs 6 weeks of age and older. For dogs over 100 lb use the appropriate combination of these chewables.

ADMINISTRATION: Remove only one chewable at a time from the foil-backed blister card. Return the card with the remaining chewables to its box to protect the product from light. Because most dogs find HEARTGARD Plus palatable, the product can be offered to the dog by hand. Alternatively, it may be added intact to a small amount of dog food. The chewable should be administered in a manner that encourages the dog to chew, rather than to swallow without chewing. Chewables may be broken into pieces and fed to dogs that normally swallow treats whole.

Care should be taken that the dog consumes the complete dose, and treated animals should be observed for a few minutes after administration to ensure that part of the dose is not lost or rejected. If it is suspected that any of the dose has been lost, redosing is recommended.

HEARTGARD Plus should be given at monthly intervals during the period of the year when mosquitoes (vectors), potentially carrying infective heartworm larvae, are active. The initial dose must be given within a month (30 days) after the dog's first exposure to mosquitoes. The final dose must be given within a month (30 days) after the dog's last exposure to mosquitoes.

When replacing another heartworm preventive product in a heartworm disease preventive program, the first dose of HEARTGARD Plus must be given within a month (30 days) of the last dose of the former medication.

If the interval between doses exceeds a month (30 days), the efficacy of ivermectin can be reduced. Therefore, for optimal performance, the chewable must be given once a month on or about the same day of the month. If treatment is delayed, whether by a few days or many, immediate treatment with HEARTGARD Plus and resumption of the recommended dosing regimen will minimize the opportunity for the development of adult heartworms.

Monthly treatment with HEARTGARD Plus also provides effective treatment and control of ascarids (*T. canis*, *T. leonina*) and hookworms (*A. caninum*, *U. stenocephala*, *A. braziliense*). Clients should be advised of measures to be taken to prevent reinfection with intestinal parasites.

EFFICACY: HEARTGARD Plus Chewables, given orally using the recommended dose and regimen, are effective against the tissue larval stage of *D. immitis* for a month (30 days) after infection and, as a result, prevent the development of the adult stage. HEARTGARD Plus Chewables are also effective against canine ascarids (*T. canis*, *T. leonina*) and hookworms (*A. caninum*, *U. stenocephala*, *A. braziliense*).

ACCEPTABILITY: In acceptability and field trials, HEARTGARD Plus was shown to be an acceptable oral dosage form that was consumed at first offering by the majority of dogs.

PRECAUTIONS: All dogs should be tested for existing heartworm infection before starting treatment with HEARTGARD Plus which is not effective against adult *D. immitis*. Infected dogs must be treated to remove adult heartworms and microfilariae before initiating a program with HEARTGARD Plus.

While some microfilariae may be killed by the ivermectin in HEARTGARD Plus at the recommended dose level, HEARTGARD Plus is not effective for microfilariae clearance. A mild hypersensitivity-type reaction, presumably due to dead or dying microfilariae and particularly involving a transient diarrhea, has been observed in clinical trials with ivermectin alone after treatment of some dogs that have circulating microfilariae.

Keep this and all drugs out of the reach of children.

In case of ingestion by humans, clients should be advised to contact a physician immediately. Physicians may contact a Poison Control Center for advice concerning cases of ingestion by humans.

Store between 68°F - 77°F (20°C - 25°C). Excursions between 59°F - 86°F (15°C - 30°C) are permitted. Protect product from light.

ADVERSE REACTIONS: In clinical field trials with HEARTGARD Plus, vomiting or diarrhea within 24 hours of dosing was rarely observed (1.1% of administered doses). The following adverse reactions have been reported following the use of HEARTGARD: Depression/lethargy, vomiting, anorexia, diarrhea, mydriasis, ataxia, staggering, convulsions and hypersalivation.

SAFETY: HEARTGARD Plus has been shown to be bioequivalent to HEARTGARD, with respect to the bioavailability of ivermectin. The dose regimens of HEARTGARD Plus and HEARTGARD are the same with regard to ivermectin (6 mcg/kg). Studies with ivermectin indicate that certain dogs of the Collie breed are more sensitive to the effects of ivermectin administered at elevated dose levels (more than 16 times the target use level) than dogs of other breeds. At elevated doses, sensitive dogs showed adverse reactions which included mydriasis, depression, ataxia, tremors, drooling, paresis, recumbency, excitability, stupor, coma and death. HEARTGARD demonstrated no signs of toxicity at 10 times the recommended dose (60 mcg/kg) in sensitive Collies. Results of these trials and bioequivalency studies, support the safety of HEARTGARD products in dogs, including Collies, when used as recommended.

HEARTGARD Plus has shown a wide margin of safety at the recommended dose level in dogs, including pregnant or breeding bitches, stud dogs and puppies aged 6 or more weeks. In clinical trials, many commonly used flea collars, dips, shampoos, anthelmintics, antibiotics, vaccines and steroid preparations have been administered with HEARTGARD Plus in a heartworm disease prevention program.

In one trial, where some pups had parvovirus, there was a marginal reduction in efficacy against intestinal nematodes, possibly due to a change in intestinal transit time.

HOW SUPPLIED: HEARTGARD Plus is available in three dosage strengths (See DOSAGE section) for dogs of different weights. Each strength comes in convenient cartons of 6 and 12 chewables.

For customer service, please contact Merial at 1-888-637-4251.



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