

## **Which product do you recommend for monthly heartworm prevention?**

We receive this question by telephone and e-mail from pet owners, veterinary practitioners, technicians, and students several times throughout the year. More often during the Spring and Summer months when prevention of canine heartworm infection is a primary concern in everybody's mind. Our short answer to this question is simply stated "*It depends*".

All of the pharmaceutical products currently available for monthly heartworm prevention do an exceptional job of protecting pet dogs and cats from developing deadly heartworm disease by killing the infective larvae transmitted by mosquitos before they mature and become reproducing adult worms. The choice of a monthly heartworm prevention product is a decision based on the specific needs and concerns of pet owners and their pets. Heartworm preventive products are available for oral, topical and injectable administration to pet dogs and cats. Factors important in choosing a specific heartworm prevention product for a client and their pet include: the economic cost of product, its formulation, palatability, ease and frequency of administration, and its spectrum of efficacy against GI and other ectoparasites in addition to heartworms. Each of the currently available heartworm products are reviewed in the paragraphs below with the hope that this information will be useful for deciding which product best fits the specific needs of clients and their pets.

### **Heartworm Medications Given Orally**

#### **Heart gard Plus<sup>®</sup> Chewables for Dogs ([U.S. Merial](#))**

Is a beef flavored chewable formulation of Ivermectin and Pyrantel pamoate for dogs. This product is recommended for pet owners seeking to prevent parasitic disease in their pets resulting from concurrent infection with heartworms (*Dirofilaria immitis*) and intestinal roundworms (*Toxocara canis*, *Toxascaris leonina*) and hookworms (*Ancylostoma caninum*, *A. braziliensis*, *Uncinaria stenocephala*). This product is well suited for pet owners and pets that live in areas where the threat of heartworm transmission is high, and there is consistent environmental exposure to the eggs and infective larvae of intestinal roundworms and hookworms. Pets that visit public parks and designated pet recreation areas benefit from use of this or a similar product. Ivermectin is delivered at dose of 2.72 ug/lb body weight and effective for the elimination of tissue stage heartworm larvae acquired in the 30 days prior to administration of the drug. Pyrantel pamoate is delivered at the dose of 2.27 mg/lb and effective for the removal of intestinal roundworms and hookworms. Consistent use of the product will prevent the occurrence of parasitic disease resulting from infection with heartworms by killing the larvae before they develop in the heart and its blood vessels and by periodic removal of adult roundworms, and hookworms before they can cause disease. Owners should be advised to remove the feces of pets and other environmental hygiene measures to reduce the transmission potential for infection with intestinal roundworms and hookworms. The drug has a wide-margin of safety for all dog breeds and sizes. It is has FDA approval for use in puppies as young as 6 weeks, small dogs regardless of weight, pregnant or breeding females, stud dogs, and Collies. The complete product insert is available at [http://heartgard.us.merial.com/downloads/chewablesPlus\\_dogs.pdf](http://heartgard.us.merial.com/downloads/chewablesPlus_dogs.pdf)

### **Heart gard® Chewables for Dogs ([U.S. Merial](#))**

Is a beef flavored chewable formulation of Ivermectin for dogs. This product is recommended for pet owners seeking to prevent parasitic disease in their pets resulting from infection with the canine heartworm (*Dirofilaria immitis*). This product is well suited for pet owners and pets that live in areas where the threat of heartworm transmission is high and infection in an unprotected dog is inevitable. Ivermectin is delivered at dose of 2.72 ug/lb body weight and effective for the elimination of tissue stage heartworm larvae acquired in the 30 days prior to administration of the drug. Consistent use of the product will prevent the occurrence of parasitic disease resulting from infection with heartworms by killing the larvae before they develop in the heart and its blood vessels and cause disease. The drug has a wide-margin of safety for all dog breeds and sizes. It is has FDA approval for use in puppies as young as 6 weeks, small dogs regardless of weight, pregnant or breeding females, stud dogs, and Collies. The complete product insert is available at [http://heartgard.us.merial.com/downloads/chewables\\_dogs.pdf](http://heartgard.us.merial.com/downloads/chewables_dogs.pdf)

### **Heart gard® Tablets for Dogs ([U.S. Merial](#))**

Is a tablet formulation of Ivermectin for dogs with food allergy sensitivity to the chewable beef formulated product. This product is recommended for pet owners seeking to prevent parasitic disease in their pets resulting from infection with the canine heartworm (*Dirofilaria immitis*). This product is well suited for pet owners and pets that live in areas where the threat of heartworm transmission is high and infection in an unprotected dog is inevitable. Ivermectin is delivered at dose of 2.72 ug/lb body weight and effective for the elimination of tissue stage heartworm larvae acquired in the 30 days prior to administration of the drug. Consistent use of the product will prevent the occurrence of parasitic disease resulting from infection with heartworms by killing the larvae before they develop in the heart and its blood vessels and cause disease. The drug has a wide-margin of safety for all dog breeds and sizes. It is has FDA approval for use in puppies as young as 6 weeks, small dogs regardless of weight, pregnant or breeding females, stud dogs, and Collies. The complete product insert is available at [http://heartgard.us.merial.com/downloads/tablets\\_information.pdf](http://heartgard.us.merial.com/downloads/tablets_information.pdf)

### **Heart gard® Chewables for Cats ([U.S. Merial](#))**

Is a beef flavored chewable formulation of Ivermectin for cats. This product is recommended for pet owners seeking to prevent parasitic disease in their pets resulting from infection with the canine heartworm (*Dirofilaria immitis*). This product is well suited for pet owners and pets that live in areas where the threat of heartworm transmission is high and infection in an unprotected cat is inevitable. Ivermectin is delivered at dose of 10.9 ug/lb body weight and effective for the elimination of tissue stage heartworm larvae acquired in the 30 days prior to administration of the drug. Consistent use of the product will prevent the occurrence of parasitic disease resulting from infection with heartworms by killing the larvae before they develop in the heart and its blood vessels and cause disease. The drug has a wide-margin of safety for all cat breeds and sizes. It is has FDA approval for use in puppies as young as 6 weeks, small cats regardless of weight, sex and pregnant or breeding status. The complete product insert is available at [http://heartgard.us.merial.com/downloads/Cat\\_information.pdf](http://heartgard.us.merial.com/downloads/Cat_information.pdf)

### **Interceptor® Flavor Tabs for Dogs ([Novartis Animal Health](#))**

Is a flavored chewable formulation of Milbemycin oxime for dogs. This product is recommended for pet owners seeking to prevent parasitic disease in their pets resulting from concurrent infection with heartworms (*Dirofilaria immitis*) and intestinal roundworms (*Toxocara canis*, *Toxascaris leonina*), hookworms (*Ancylostoma caninum*), and whipworms (*Trichuris vulpis*). This product is well suited for pet owners and pets that live in areas where the threat of heartworm transmission is high, and there is consistent environmental exposure to the eggs and infective larvae of intestinal roundworms and hookworms. Pets that visit public parks and designated pet recreation areas benefit from use of this or a similar product. Milbemycin oxime is delivered at dose of 0.23 mg/lb body weight and effective for the elimination of tissue stage heartworm larvae acquired in the 30 days prior to administration of the drug. The drug is also effective for the removal of intestinal roundworms, hookworms, and whipworms when given monthly at the same dosage. Consistent use of the product will prevent the occurrence of parasitic disease resulting from infection with heartworms by killing the larvae before they develop in the heart and its blood vessels and by periodic removal of adult roundworms, hookworms, and whipworms before they can cause disease. Owners should be advised to remove the feces of pets and other environmental hygiene measures to reduce the transmission potential for infection with intestinal roundworms and hookworms. The drug has a wide-margin of safety for all dog breeds and sizes. It has FDA approval for use in puppies as young as 4 weeks, small dogs regardless of weight, pregnant or breeding females, stud dogs, and Collies. The complete product insert is available at <http://www.interceptor.novartis.us/dog/en/label.shtml>

### **Interceptor® Flavor Tabs for Cats ([Novartis Animal Health](#))**

Is a flavored chewable formulation of Milbemycin oxime for cats. This product is recommended for pet owners seeking to prevent parasitic disease in their pets resulting from concurrent infection with the canine heartworm (*Dirofilaria immitis*), and intestinal roundworms (*Toxocara cati*, *Toxascaris leonine*) and hookworms (*Ancylostoma tubaforme*). This product is well suited for pet owners and pets that live in areas where the threat of heartworm transmission is high and infection in an unprotected cat is inevitable. Milbemycin oxime delivered at the dose of 0.9 mg/lb body weight is effective for the elimination of tissue stage heartworm larvae acquired in the 30 days prior to administration of the drug and elimination of adult roundworms and hookworms residing in the small intestine of infected cats at the time of drug administration. Consistent use of the product will prevent the occurrence of parasitic disease resulting from infection with heartworms by killing the larvae before they develop in the heart and its blood vessels and cause disease and by periodic removal of adult roundworms, and hookworms before they can cause disease.. The drug has a wide-margin of safety for all cat breeds and sizes. It has FDA approval for use in kittens greater or equal to 6 weeks, small cats greater or equal to 1.5 lbs body weight. The drug's safety in breeding, pregnant and lactating queens, and breeding toms has not been established. The complete product insert is available at <http://www.interceptor.novartis.us/cat/en/label.shtml>.

## **Sentinel<sup>®</sup> Flavor Tabs ([Novartis Animal Health](#))**

Is a flavored chewable formulation of Milbemycin Oxime and Leufenuron for dogs. This product is recommended for pet owners seeking to prevent parasitic disease in their pets resulting from concurrent infection with heartworms (*Dirofilaria immitis*), intestinal worms (including roundworms *Toxocara canis*, *Toxascaris leonina*, hookworms *Ancylostoma caninum*, and whipworms *Trichuris vulpis*) and infestation with fleas (*Ctenocephalides felis*). This product is well suited for pet owners and pets that live in areas where the threat of heartworm transmission is high, and there is consistent environmental exposure to the eggs and infective larvae of intestinal worms and fleas. Pets that visit public parks and designated pet recreation areas benefit from use of this or a similar product. Milbemycin Oxime is delivered at dose of 0.23 mg/lb body weight and effective for the elimination of tissue stage heartworm larvae acquired in the 30 days prior to administration of the drug. The drug is also effective for the removal of intestinal roundworms, hookworms, and whipworms when given monthly at the same dosage. Leufenuron delivered at a dose of 4.5 mg/lb body weight is effective for control of flea populations by breaking the life cycle through the inhibition of egg development and hatching of larvae. Consistent use of the product will prevent the occurrence of parasitic disease resulting from infection with heartworms by killing the larvae before they develop in the heart and its blood vessels and by periodic removal of adult roundworms, hookworms, and whipworms before they can cause disease. The mean number of fleas infesting dogs after 6 months of treatment was significantly reduced compared to untreated animals in well controlled studies because of the drug's ability to suppress the reproduction of household flea populations. Owners should be advised to remove the feces of pets and employ other environmental hygiene measures to reduce the transmission potential for infection with intestinal roundworms and hookworms. Pet owners of dogs in flea infested premises are also advised to treat associated pets whether or not they exhibit overt signs of discomfort and irritation. The application of additional products that are effective in killing and repelling adult fleas may be necessary to prevent disease resulting from allergic reaction to flea bites in hypersensitive animals. The drug has a wide-margin of safety for all dog breeds and sizes. It has FDA approval for use in puppies as young as 4 weeks, small dogs regardless of weight, pregnant or breeding females, stud dogs, and Collies. The complete product insert is available at [http://www.sentinelpet.com/product\\_insert.pdf](http://www.sentinelpet.com/product_insert.pdf)

## **Heartworm Medications Applied Topically**

### **Revolution<sup>®</sup> Topical Parasiticide for Dogs ([Pfizer Animal Health](#))**

Is a topically applied formulation of Selamectin for dogs. This product is recommended for pet owners seeking to prevent parasitic disease in their pets resulting from concurrent infection with heartworms (*Dirofilaria immitis*) and infestation with fleas (*Ctenocephalides felis*), ticks (*Dermacentor variabilis*), scabies (*Sarcoptes scabiei*), and ear mites (*Otodectes cynotis*). This product is well suited for pet owners and pets that live in areas where the threat of heartworm transmission is high, and there is consistent environmental exposure to the infective stages of fleas, ticks, and mites. Pets that visit public parks and designated pet recreation areas benefit from use of this or a similar product. Selamectin is delivered at dose of 2.7 mg/lb body weight and effective for the elimination of tissue stage heartworm larvae acquired in the 30 days prior to administration of the drug. Consistent use of the product will prevent the occurrence of parasitic disease resulting from infection with heartworms by killing the larvae before they develop in the heart and its blood vessels. Monthly application of the drug has been shown to repel and kill

adult flea and mites before they can cause disease, and prevent flea eggs from hatching. Ticks on topically treated dogs were observed to drop off within 3 days following application of Selamectin. Owners of dogs in flea infested premises are advised to treat associated pets despite the presence or absence of overt signs of discomfort and irritation and apply other environmental hygiene measures to reduce the transmission potential for infestation with juvenile fleas hatching from pupae. The drug has a wide-margin of safety for all dog breeds and sizes. It has FDA approval for use in puppies as young as 6 weeks, small dogs regardless of weight, pregnant or breeding females, stud dogs, and Collies. The drug should not be used on sick, debilitated, or underweight animals. Complete product information is available at <http://www.revolution4dogs.com/docs/pdf/FullInfill.pdf>

### **Revolution® Topical Parasiticide for Cats ([Pfizer Animal Health](#))**

Is a topically applied formulation of Selamectin for cats. This product is recommended for pet owners seeking to prevent parasitic disease in their pets resulting from concurrent infection with heartworms (*Dirofilaria immitis*), intestinal roundworms (*Toxocara cati*) and hookworms (*Ancylostoma tubaeforme*), and infestation with fleas (*Ctenocephalides felis*) and ear mites (*Otodectes cynotis*). This product is well suited for pet owners and pets that live in areas where the threat of heartworm transmission is high, and infection in an unprotected cat is inevitable. The drug is also recommended for animals that live in places with consistent environmental exposure to the infective stages of roundworms, hookworms, fleas, and ear mites. Pets that visit public parks and designated pet recreation areas benefit from use of this or a similar product. Selamectin is delivered at dose of 2.7 mg/lb body weight and effective for the elimination of tissue stage heartworm larvae acquired in the 30 days prior to administration of the drug. Consistent use of the product will prevent the occurrence of parasitic disease resulting from infection with heartworms by killing the larvae before they develop in the heart and its blood vessels, and by periodic removal of adult roundworms, and hookworms before they can cause disease. Monthly application of the drug has been shown to repel and kill adult fleas and mites before they can cause disease, and prevent flea eggs from hatching. Owners of cats in flea infested premises are advised to treat associated pets despite the presence or absence of overt signs of discomfort and irritation and apply other environmental hygiene measures to reduce the transmission potential for infestation with juvenile fleas hatching from pupae. The drug has a wide-margin of safety for all cat breeds and sizes. It has FDA approval for use in kittens as young as 8 weeks and pregnant or lactating females. The drug should not be used on sick, debilitated, or underweight animals. Complete product information is available at <http://www.revolution4cats.com/docs/pdf/FullInfill.pdf>

### **Advantage Multi® for Dogs Topical Solution ([Bayer Animal Health](#))**

Is a topically applied formulation of Moxidectin and Imidacloprid for dogs. This product is recommended for pet owners seeking to prevent parasitic disease in their pets resulting from concurrent infection with heartworms (*Dirofilaria immitis*), intestinal roundworms (*Toxocara canis*), hookworms (*Ancylostoma caninum*), and whipworms (*Trichuris vulpis*), and infestation with fleas (*Ctenocephalides felis*). This product is well suited for pet owners and pets that live in areas where the threat of heartworm transmission is high, and there is consistent environmental exposure to the eggs and infective larvae of intestinal roundworms, hookworms, whipworms, and fleas. Pets that visit public parks and designated pet recreation areas benefit from use of this or a similar product. Moxidectin is delivered at dose of 1.1 mg/lb body weight and effective for

the elimination of tissue stage heartworm larvae acquired in the 30 days prior to administration of the drug. The drug is also effective for the removal of intestinal roundworms, hookworms, and whipworms when given monthly at the same dosage. Imidacloprid is delivered at the dose of 4.5 mg/lb body weight and effective for killing and repelling adult fleas. Consistent use of the product will prevent the occurrence of parasitic disease resulting from infection with heartworms by killing the larvae before they develop in the heart and its blood vessels and by periodic removal of adult roundworms, hookworms, and whipworms before they can cause disease. Monthly application of the product has been shown to repel and kill adult fleas before they can cause disease or reproduce. Owners should be advised to remove the feces of pets and other environmental hygiene measures to reduce the transmission potential for infection with intestinal roundworms and hookworms. The drug is safe for all dog breeds. It has FDA approval for use in puppies as young as 7 weeks, and small dogs greater than 4 lbs in weight. The safety of the drug for use in sick and debilitated animals, and pregnant or breeding females has not been established. The complete product insert is available at [http://advantagemulti.petparents.com/pdfs/Advantage\\_Multi\\_Dog.pdf](http://advantagemulti.petparents.com/pdfs/Advantage_Multi_Dog.pdf)

### **Advantage Multi® for Cats Topical Solution ([Bayer Animal Health](#))**

Is a topically applied formulation of Moxidectin and Imidacloprid for cats. This product is recommended for pet owners seeking to prevent parasitic disease in their pets resulting from concurrent infection with heartworms (*Dirofilaria immitis*), intestinal roundworms (*Toxocara cati*), hookworms (*Ancylostoma tubaeforme*), and infestation with fleas (*Ctenocephalides felis*). This product is well suited for pet owners and pets that live in areas where the threat of heartworm transmission is high, and infection in an unprotected cat is inevitable. The drug is also recommended for animals that live in places with consistent environmental exposure to the eggs and infective larvae of intestinal roundworms, hookworms, and fleas. Pets that visit public parks and designated pet recreation areas benefit from use of this or a similar product. Moxidectin is delivered at dose of 0.45 mg/lb body weight and effective for the elimination of tissue stage heartworm larvae acquired in the 30 days prior to administration of the drug. The drug is also effective for the removal of intestinal roundworms and hookworms when given monthly at the same dosage. Imidacloprid is delivered at the dose of 4.5 mg/lb body weight and effective for killing and repelling adult fleas, and treatment and control for ear mites (*Otodectes cynotis*). Consistent use of the product will prevent the occurrence of parasitic disease resulting from infection with heartworms by killing the larvae before they develop in the heart and its blood vessels and by periodic removal of adult roundworms, hookworms, and whipworms before they can cause disease. Monthly application of the product has been shown to repel and kill adult fleas before they can cause disease or reproduce. Owners should be advised to remove the feces of pets and other environmental hygiene measures to reduce the transmission potential for infection with intestinal roundworms and hookworms. The drug is safe for all cat breeds. It has FDA approval for use in kittens as young as 9 weeks, and small cats greater than 2 lbs in weight. The safety of the drug for use in sick and debilitated animals, and pregnant or breeding females has not been established. Use of the product in these animals is not authorized. The complete product insert is available at [http://advantagemulti.petparents.com/pdfs/Advantage\\_Multi\\_Cat.pdf](http://advantagemulti.petparents.com/pdfs/Advantage_Multi_Cat.pdf)

## Heartworm Medications Given by Injection

### ProHeart 6<sup>®</sup> ([Fort Dodge Animal Health](#))

Is a sustained release injectable formulation of Moxidectin for dogs. This product is recommended for pet owners seeking to prevent parasitic disease in their pets resulting from concurrent infection with heartworms (*Dirofilaria immitis*), and hookworms (*Ancylostoma caninum*, *Uncinaria stenocephala*). This product is well suited for pet owners and pets that live in areas where the threat of heartworm transmission is high, and desire effective prophylaxis without the commitment to administering it at 30 day intervals. Following the initial injection at 6 month intervals, Moxidectin is delivered via a sustained release microsphere at dose of .17 mg/lb body weight and effective for the elimination of tissue stage heartworm larvae. The drug is also effective for the removal of canine hookworms at the time of the initial injection. Persistent effectiveness against hookworm infection has not been established and re-infection with the parasite may occur sooner than 6 months. Consistent use of the product will prevent the occurrence of parasitic disease resulting from infection with heartworms by killing the larvae before they develop in the heart and its blood vessels. Removal of adult hookworms at 6 month intervals may be helpful for prevention of hookworm disease, but animals living in geographic localities and residential environments where the potential for re-infection and accumulation of large worm burdens is imminent should be treated more frequently. Owners should be advised to remove the feces of pets and other environmental hygiene measures to reduce the transmission potential for infection with hookworms. The drug is safe for all dog breeds. It has FDA approval for use in dogs older than 6 months of age. It should not be used in dogs that are sick, debilitated, and underweight. Proheart 6<sup>®</sup> should be used with caution in dogs with pre-existing allergic disease, including previous vaccine reactions, food allergy, atopy, and flea allergy dermatitis. The complete product insert is available at [http://www.proheart6dvm.com/docs/Cient\\_Info\\_PH6-23.pdf](http://www.proheart6dvm.com/docs/Cient_Info_PH6-23.pdf)

**Table 1. Veterinary Licensed Products for Prevention of Heartworm Disease in Dogs and Cats in the United States**

Product Trade name	Minimum Age/Weight	Treatment Frequency	Primary Pharmaceutical Compound	Additional Compounds Included	Effective for Treatment/control of other parasites
<b>Products Administered Orally</b>					
<a href="#"><u>Heartgard for Dogs</u></a>	6 weeks	Monthly	Ivermectin	None	N/A
<a href="#"><u>Heartgard Plus for Dogs</u></a>	6 weeks	Monthly	Ivermectin	Pyrantel pamoate	Roundworms, hookworms
<a href="#"><u>Heartgard for Cats</u></a>	6 weeks	Monthly	Ivermectin	None	N/A
<a href="#"><u>Interceptor for Dogs</u></a>	4 weeks/ 2 lbs	Monthly	Milbemycin oxime	None	Roundworms, whipworms, hookworms.
<a href="#"><u>Interceptor for Cats</u></a>	6 weeks/ 1.5 lbs	Monthly	Milbemycin oxime	None	Roundworms, hookworms.
<a href="#"><u>Sentinel for Dogs</u></a>	4 weeks/2 lbs	Monthly	Milbemycin oxime	Lufenuron	Roundworms, whipworms, hookworms, flea egg hatching
<b>Products Administered Topically</b>					
<a href="#"><u>Revolution for Dogs</u></a>	6 weeks	Monthly	Selamectin	None	Adult fleas, flea egg hatching, ear mites, sarcoptic mange mite, and American Dog Ticks.
<a href="#"><u>Revolution for Cats</u></a>	8 weeks	Monthly	Selamectin	None	Adult fleas, flea egg hatching, ear mites, hookworms, roundworms.
<a href="#"><u>Advantage Multi for Dogs</u></a>	7 weeks	Monthly	Moxidectin	Imidacloprid	Adult fleas, roundworms, hookworms, whipworms.
<a href="#"><u>Advantage Multi for Cats</u></a>	9 weeks	Monthly	Moxidectin	Imidacloprid	Adult fleas, roundworms, hookworms, ear mites.
<b>Products Administered by Injection</b>					
<a href="#"><u>ProHeart 6 for Dogs</u></a>	6 months	Every 6 months	Moxidectin	None	Adult hookworms at the time of injection.

