Truth for Dogs

Exposing Myths, Lies and Outdated Information Affecting Dogs

*Written by Jan on May 13, 2009 – 1:00 am*

[*http://www.dogs4dogs.com/blog/2009/05/13/heartworm-medication-safety/*](http://www.dogs4dogs.com/blog/2009/05/13/heartworm-medication-safety/)

**Heartworms are Spread by Mosquitoes. Heartworm Meds are Spread by Fear.**

It’s getting warmer outside — time for sellers of heartworm medications to start scaring you to death. Television and print ads, which used to push meds only during warm summer months, now urge you to keep your dog on medication year round. The question is: why the change?

[Drs. David Knight and James Lok](http://www.ncbi.nlm.nih.gov/pubmed/9753795) of the University of Pennsylvania School of Veterinary Medicine, addressing recommendations for year round meds, warned:  “The practice of some veterinarians to continuously prescribe monthly chemoprophylaxis exaggerates the actual risk of heartworm transmission in most parts of the country and unnecessarily increases the cost of protection to their clients.”

So, is the change to year round meds all about money? Or is there more to this story?

Heartworm “prevention” is a major health decision for pet parents *and* multi-billion dollar Big Business for drug companies, veterinarians, testing laboratories and on-line sellers of medication. When health intersects money, there’s a lot of room for conflict of interest. Only by understanding the business aspects and the truth about heartworm transmission can you make an informed decision about if, how and when to protect your dog with commercial products.

While everyone agrees that heartworm infestations can be life-threatening, infestation is far from inevitable nor is it the immutable death sentence advertisers would have you believe. (Otherwise, all dogs and cats not on meds would die of infestation. But they don’t.)

Every holistic vet I’ve consulted had concerns about the long-term safety of heartworm *medications*. Well-known vet, author and columnist Martin Goldstein wrote in his wonderful book *The Nature of Animal Healing* that he sees heartworms as less epidemic than the “disease-causing toxicity” of heartworm medicine.

[Dr. Jeff Levy](http://www.homeovet.net/content/lifestyle/section4.html), vet and homeopath, concluded “that it was not the heartworms that caused disease, but the other factors that damaged the dogs’ health to the point that they could no longer compensate for an otherwise tolerable parasite load.” Those factors include, “… being vaccinated yearly, eating commercial dog food, and getting suppressive drug treatment for other symptoms….”

Heartworm meds do not, by the way, prevent heartworms. They are poisons that *kill* heartworm larvae (called microfilariae) contracted during the previous 30-45 days (and maybe longer due to what is call the [Reach Back Effect](http://en.wikipedia.org/wiki/Heartworm)).

The heartworm industry authority, [The American Heartworm Society](http://www.heartwormsociety.org/) (and their [cat heartworm site](http://www.knowheartworms.org/index.asp)) offers a wealth of information. Their website is a public service *but also* a marketing tool aimed at buyers and resellers of heartworm meds. Sponsors of this website are a Who’s Who of drug companies. Fort Dodge Animal Health (Wyeth), Merial and Pfizer are “Platinum Sponsors.” Bayer merits Silver. Novartis, Schering-Plough, Virbac and Eli Lilly get Bronze. Most of these companies have sales reps that regularly call on vets and show them how to sell you heartworm meds. With any purchase of any drug, we recommend you ask for information regarding possible adverse effects, the necessity for taking this drug and available alternatives.

**How Heartworms Infect Dogs: It’s Not Easy!**

Well, now that we’ve looked behind the scenes of the heartworm *industry*, let’s take a look at how the heartworms themselves (called Dirofilaria immitis) do business. Seven steps *must* be completed to give your dog a dangerous heartworm infestation:

Step 1: To infect your dog, you need mosquitoes (so you need warm temperatures and standing water). More specifically, you need a hungry *female* mosquito of an [*appropriate species*](http://www.heartworm-hotline.org/faq.htm). Female mosquitoes act as airborne incubators for premature baby heartworms (called microfilariae). Without the proper mosquito, dogs can’t get heartworms. Period.

***That means dogs can’t “catch” heartworms from other dogs or mammals or from dog park lawns. Puppies can’t “catch” heartworms from their mothers and moms can’t pass heartworm immunity to pups.***

Step 2: Our hungry mosquito needs access to a dog already infected with *sexually mature* male *and* female heartworms that have produced babies.

Step 3: The heartworm babies must be at the L1 stage of developmentwhen the mosquito bites the dog and withdraws blood.

Step 4:  Ten to fourteen days later — if the temperature is right –the microfilariae mature *inside* the mosquito to the infective L3 stage then migrate to the mosquito’s mouth. (Yum!)

Step 5:  Madame mosquito transmits the L3’s to *your* dog’s skin with a bite. Then, if all conditions are right, the L3’s develop in the skin for three to four months (to the L5 stage) before making their way into your dog’s blood.  But your dog still isn’t doomed.

Step 6:   Only if the dog’s immune system doesn’t rid the dog of these worms do the heartworms develop to adulthood.

Step 7:   It takes approximately six months for the surviving larvae to achieve maturity. At this point, the adult heartworms may produce babies if there are both males and females, but the kiddies will die unless a mosquito carrying L3’s intervenes.  Otherwise, the adults will live several years then die.

In summation, a particular species of mosquito must bite a dog infected with circulating L1 heartworm babies, must carry the babies to stage L3 *and* then must bite your dog . The adult worms and babies will eventually die off in the dog unless your dog is bitten again!  Oh, and one more thing.

**Heartworms Development Requires Sustained Day & Night Weather Above 57˚F**

In Step 4 above I wrote that heartworm larvae develop “if the temperature is right.”

The University of Pennsylvania vet school (in a [study](http://cal.vet.upenn.edu/projects/merial/Nematodes/nems_6d.htm) funded by Merial) found: “Development in the mosquito is temperature dependent, requiring approximately two weeks of temperature at or above 27C (80F). Below a threshold temperature of 14C (57F), development cannot occur, and the cycle will be halted. As a result, transmission is limited to warm months, and duration of the transmission season varies geographically.”

Knight and Lok agree: “In regions where average daily temperatures remain at or below about 62˚F (17˚ C) from late fall to early spring, insufficient heat accumulates to allow maturation of infective larvae in the intermediate host [the mosquito], precluding transmission of the parasite.”

The [Washington State University](http://www.vetmed.wsu.edu/whatsnew/HW06.asp) vet school reports that laboratory studies show that maturation of the worms requires “the equivalent of a steady 24-hour daily temperature in excess of 64°F (18°C) for approximately one month.”  In other words, it has to be warm day AND night or development is retarded even if the *average* temperature is sufficiently warm. They add, that at 80° F, “10 to 14 days are required for development of microfilariae to the infective stage.”

[Jerold Theis](http://www.heartworm-hotline.org/faq.htm), DVM, PhD, says, “If the mean monthly temperature is only a few degrees above 14 degrees centigrade [57 degrees F] it can take so many days for infective larvae to develop that the likelihood of the female mosquito living that long is remote.”

I have never found this temperature-dependent information on a website promoting “preventatives,” but only in more scholarly works not easily accessed by the public. There is, as far as I can find, only one mention of temperature on the Heartworm Society (on the [canine heartworm page](http://www.heartwormsociety.org/article_1143.html)) and none in the Merck/Merial Veterinary Manual site or Merial’s heartworm [video](http://www.heartwormsociety.org/article_59.html)—even though Merial funded the UPenn study.

The [Society](http://www.heartwormsociety.org/article_1140.html#q19) also reports, “Factors affecting the level of risk of heartworm infection include the climate (temperature, humidity), the species of mosquitoes in the area, presence of mosquito breeding areas and presence of animal reservoirs (such as infected dogs or coyotes).”

 **Canadians**: Please click the link find maps and stats on [Heartworm in Canada in 2010](http://www.ovc.uoguelph.ca/heartworm/2010/reports/Western_Canada.pdf).

## [Heartworm Medication Part 2: Options to Fear-Based Recommendations](http://www.dogs4dogs.com/blog/2009/06/16/heartworm-preventative-options/%22%20%5Co%20%22Permanent%20Link%20to%20Heartworm%20Medication%20Part%202%3A%20Options%20to%20Fear-Based%20Recommendations)

<http://www.dogs4dogs.com/blog/2009/06/16/heartworm-preventative-options/>

*Written by Jan on June 16, 2009 – 12:01 am*



A Heartworm Society news release states:  “By giving heartworm prevention every month, forgetful pet owners will have their pets protected when they need it most.”  But doesn’t that also mean they get it when they need it *least*? Or need it not at all? Are *you* a “forgetful” owner?

In this part of my heartworm series, we’ll discusses informed decision-making, and suggests ways, *if you want them*, to limit or eliminate heartworm drugs. I am a researcher and holistic health advocate, not a vet.  Please learn the facts then discuss with your vet the appropriate course given your dog’s location, lifestyle, travel schedule, health, climate and the time of year.  Expect an open-mind and respect from your vet, or find another vet.  Just as with [vaccination](http://www.dogs4dogs.com/blog/2009/04/22/no-unnecessary-dog-shots/), “one size fits all” is outdated, profit-driven, lazy medicine.

Take a look at the map above, courtesy of the  Heartworm Society.  [Part 1](http://www.dogs4dogs.com/blog/2009/05/13/heartworm-medication-safety/) of this article demonstrated that transmission is heat and mosquito dependent.   As expected, dark areas of the map, which show the most heartworm cases per clinic, are found in the hot, humid Southeastern US, especially the Atlantic and Gulf coasts and Mississippi Delta.

Don’t let the map scare you. If published seasonally, map colors would pale significantly during cool months. Also remember that you’re seeing generalities, not specifics.  A clinic near a rural pond will likely have many cases while an urban clinic 15 miles away may have a much lower incidence.  Maps are general.  Determine your own microclimate. Ask your vet how many cases of heartworm infection he/she treated in the past year.  Also ask if he/she treats all positive cases, or just those with advanced infestation. If the vet doesn’t keep detailed records, that should tell you something.

Conservative start/stop maps from heartworm researchers Drs. David Knight and James Lok (in “Seasonality of Heartworm Infections and Implications for Chemoprophylaxis”) show only two areas requiring year round heartworm meds: the southernmost areas of Florida and Texas.  Houston, New Orleans and similar areas are shown requiring meds for 9 months.  Other states range from 3-7 months. The Drs. wrote:  “For nearly 80% of the states, the potential for heartworm transmission is limited to 6 months or less.” Here are [start/stop maps](http://www.citadeltm.com/Heartworm.html) for the US and [California](http://www.heartworm-hotline.org/). Again, they are very conservative and very general. Do your own research and be specific.

The Heartworm Society warns that heartworm infestations are getting worse.  [DVM Magazine](http://veterinarynews.dvm360.com/dvm/Veterinary%2Bnews/Heartworm-spreading-in-the-United-States/ArticleStandard/Article/detail/587440), a magazine for vets, reports that recent results do show a rise in the number of positive cases per clinic in 31 states. DMV reports: “The reasons likely are multifactorial, including increased heartworm testing, increased client base per clinic or even climate trends.”

**Does Year Round Medicating Bring Extra Protection?**

Applying sunscreen at night is useless. So is taking heartworm medication when climate conditions prevent transmission.  Only a small percentage of climes permit year-round transmission. Everyone else is unnecessarily subsidizing drug companies and “preventatives” sellers *and, more importantly,* exposing their dog to unnecessary risks.

Two exceptions: 1) “Forgetful” and irresponsible pet parents who won’t begin the medication on time *or* build their dog’s natural immunity *might* want to medicate year round, although that means they have to remember to give meds every month.  2) If your dog contracts heartworms within a few years of beginning medication … *and* you can show you gave meds year round … *and* your dog had the required blood tests (2 or 3),  you may benefit a little financially because drug companies will pay for dog’s treatment. (Read the [guarantee](http://www.1800petmeds.com/guarantee_info.jsp) terms published by an on-line seller.)

**Are Heartworm Preventatives Safe?**

*You’ve seen those scary photos of worm-strangled hearts, right? Shouldn’t you give meds year round just in case? Isn’t safe better than sorry?*

But is that harmless little pill or yummie medical “brownie” really safe?  No drug is completely free of risk and  adverse reactions.I can find no *long-term* studies regarding cancer risks and organ damage for dogs receiving heartworm insecticides year round (or even for a few months). Such a study would be difficult to conduct and very expensive.  Who would fund such a study — or publish any negative findings?

One clue to the possibility of adverse reactions should be label warnings: call *your doctor immediately if ingested; keep away from children; wash your hands immediately after use….* How can medication be good for dogs but so dangerous for *you?*

Another question: is your dog healthy enough for these medications?The “Heartworm Prevention” page of the [American Animal Hospital Association](http://www.healthypet.com/faq_view.aspx?id=194) states: “Healthy kidneys and normal liver functions are essential in metabolizing most medications.”  Many dogs, including my Jiggy, do not have healthy organ function. I wonder how many unhealthy animals are nevertheless on meds?

**Adverse Reactions to Heartworm Medications**

With any drug, study FDA and manufacturer information *before* medicating.

These adverse reactions have been reported to the FDA by manufacturers.  (Click the links for more information; write or call manufacturers with any questions). Terms you might not understand include ataxia (gross lack of coordination of muscle movements), pruritus (itchy dermatologic condition), urticaria (hives), mydriasis (excessive pupil dilation), and erythema (skin redness). Other terms should be self-explanatory.

[HEARTGARD](http://www.drugs.com/vet/heartgard-tablets-for-dogs.html) and [TriHeartPlus](http://www.triheartplus.com/product_information.html) (ivermectin): Depression/lethargy, vomiting, anorexia, diarrhea, mydriasis, ataxia staggering, convulsions and hypersalivation. [INTERCEPTOR](http://www.interceptor.novartis.us/dog/en/label.shtml) (milbemycin oxime) reports the above reactions *plus* weakness.  [Sentinel](http://www.sentinelpet.com/product_insert.pdf) (milbemycin oxime) reports vomiting, depression/lethargy, pruritus, urticaria, diarrhea, anorexia, skin congestion, ataxia, convulsions, hypersalivation and weakness.

[REVOLUTION®](http://www.revolution4dogs.com/PAHimages/compliance_pdfs/US_EN_RV_compliance.pdf) (selamectin), Topical Parasiticide For Dogs and Cats: pre-approval reactions of vomiting, loose stool or diarrhea with or without blood, anorexia, lethargy, salivation, tachypnea, and muscle tremors. Post-approval experience included the above plus pruritis, urticaria, erythema, ataxia, fever, and rare reports of death and seizures in dogs.

[Proheart 6](http://www.proheart6dvm.com/docs/client_info_03_09.pdf) :  severe allergic reactions (anaphylaxis): facial swelling, itching, difficulty breathing, collapse;  lethargy (sluggishness); not eating or losing interest in food; any change in activity level; seizures; vomiting and/or diarrhea (with and without blood); weight loss; pale gums, increased thirst or urination, weakness, bleeding, bruising; rare instances of death. This product was voluntarily withdrawn from the market in 2004 because of deaths but has been reintroduced. Read my post [Heartworm Protection: Do We Need ProHeart 6?](http://www.dogs4dogs.com/blog/2008/06/18/your-dogs-heartworm-protection-do-we-need-proheart-6/)

For any other brand, research the product or its **active** ingredient *before* even thinking of administering it.

Also, never give any meds without first learning if any vitamins, minerals, herbal products or drugs interact negatively with the medication. Note age restrictions. *Most importantly, learn what symptoms alert you to a reaction.* Important note: Collies, Australian Shepherds and related breeds have a sensitivity to [Ivermectin](http://www.vetmed.wsu.edu/depts-vcpl/) (Heartgard and others).

Beware any website or person professing the absolute safety of *any* medication.  I’d like adverse reactions for pet medications to be included in all TV ads, as they are for meds for humans — but I don’t expect it.

**Reporting Adverse Events**: Call your veterinarian immediately if you suspect a reaction to this or any other drug.  Discuss alternatives and treatment and make sure the reaction is recorded in your dog’s file. The AVMA says : “… notify the US Food and Drug Administration (FDA) by contacting the manufacturer. The FDA requires that manufacturers of FDA-approved drugs forward adverse event reports to the agency.”   Is the fox is guarding the hen house? Ask your vet to report the reaction, then *follow up* and make sure your vet did it. Under-reporting is common. (An estimated 99% of adverse reactions go unreported according to the FDA.) Click here for [FDA reporting instructions](http://www.fda.gov/AnimalVeterinary/SafetyHealth/ReportaProblem/ucm055305.htm).

**Tests for Heartworm Infection**Heartworms can, and should, be detected by a simple blood test before administering medication.  The antigentest detects an adult female worms at least 5-8 months old. The [Merck Veterinary Manual](http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/11300.htm) says: “The antigen detection test is the preferred diagnostic method for asymptomatic dogs or when seeking verification of a suspected HW infection.”

Microfilariae (babies) in the blood are detected by a different blood test.  These show exposure, but do not detect  female adults (potential breeders).  [*Antibody tests*](http://www.vetinfo.com/dencyclopedia/dehwtest.html) (as opposed to *antigen* tests) are not preferred because they indicate only that the dog has been exposed to heartworms at some time in his or her life, even if the worms subsequently died.

If you plan to give “preventatives,” test before beginning medication, preferably within a month of when daily temperatures consistently climb above 57˚ F.  Read more at the [Heartworm Society](http://www.heartwormsociety.org/article_11.html) Serology section.

If you’re *not* going to use meds, homeopathic veterinarian [Jeff Feinman](http://www.homeovet.net/content/lifestyle/section4.html) wrote me that he advises semi-annual testing when not using preventatives.  My own vet, [Tamara Hebbler](http://www.healinghope.net), agrees.  Testing twice yearly helps you catch disease early when it’s easier to treat. Dr. Martin Goldstein in *The Nature Of Animal Healing* says: “Only a small percentage of dogs who get heartworm die of it, especially if they’re routinely tested twice yearly for early detection. Even in untreated dogs, after a period of uncomfortable symptoms, the adult worms die….”

Heartworms, like other parasites, don’t become life threatening quickly or inevitably. It takes at least five months, and more often 7-8 months, for a baby to grow to a reproducing adult—presuming the dog’s immune system doesn’t intervene.  Also, adult males *and* females must both survive to breed.

**Important Note:**If your dog’s antigen test comes back *positive*, do a second test to verify results. Holistic vet [Tamara Hebbler](http://www.healinghope.net) suggests that **before you rush into treatment with harsh, poisonous drugs, you should get a cardiac ultrasound to determine the extent of the infestation**. Heartworms, like other parasites, often live with their hosts without ever causing a dangerous problem.  It’s quite common for animals in the wild to live entire lives with heartworms. (If worms always killed dogs, they’d soon run out of hosts.)  Unless heartworms are re-introduced by another infected mosquito, the adults and their babies will eventually die off.

**When Should You *Start* Administering Meds—If You’re Going To?**Remember, you kill heartworm babies after the fact. You can only “prevent” them by avoiding mosquitoes.  (You can also kill them with a healthy immune system.) This means starting meds 30-45 *after* the weather warms and mosquitoes appear. Also, Washington State University warns, “If your pet travels to heartworm areas, prevention needs to be administered within 30 days of exposure to infected mosquitoes. Adult dogs (older than 6 mos.) need to be tested before starting preventative.”

[Dr. Margo Roman](http://www.mashvet.com/), an integrative vet from in Massachusetts, [documentary film maker](http://drdomore.org) and Founder of the first-ever [Integrative Health Pet Expo](http://ihpe.info/) in Massachusetts this fall, tells me she begins medication six weeks after sees mosquitoes. This allows 2 weeks for the microfilariae (baby heartworms) to mature inside a mosquito to the infective stage and be transferred to a dog, plus 30 additional days covered by the medication working backwards to kill those babies.

**When Should You *Stop* Heartworm “Preventatives”?**

Dr. Roman recommends stopping meds after the first frost for people living in an area with cold winters.  In other areas, vets recommend stopping 30-45 days after weather is consistently below 57 F degrees and you see no mosquitoes. See Part 1 of this article, and the start/stop maps, for more details.

**What Brand Should You Use?**

Consumers often think that “preventing” as many parasites as possible with one product is a bargain — and ultimately safer for the dog.  But why expose your dog to additional, unnecessary toxins?  Most holistic vets will tell you to protect against *only* those pests (and diseases) your dog is likely to encounter.  To see which products do what, see the “preventatives” comparison chart at [Veterinary Partner](http://www.veterinarypartner.com/Content.plx?P=A&C=15&A=488&SourceID=).

**\*\*\**Low Dose* “Safeheart” Medication Approved by the FDA**

More than a decade ago — on June 4, 1998 — the FDA approved a 1/5 dose version of Interceptor heartworm medication, a product called Safeheart.This expensive field trial was conducted and the dosage approved — but inexplicably *the product was* *never marketed in the U.S*.

To duplicate the Safeheart heartworm “prevention” method — which you can’t buy — you have split the Interceptor dose into quarters. Check with Interceptor first, and ask your pharmacist or vet how to do this accurately.  The recommended once-a-month dosage is 0.1 mg of milbemycin oxime per kg of body weight (0.05 mg/lb). (Interceptor’s regular dose of dosage is 0.5 mg milbemycin oxime per kg of body weight.) Print the FDA’s [Safeheart report](http://www.fda.gov/AnimalVeterinary/Products/ApprovedAnimalDrugProducts/FOIADrugSummaries/ucm054862.htm) and take it to your vet for your prescription and additional instructions.

*Note: At this dose, only heartworms will be treated with the Safeheart method, not other worms or fleas.*

**How Often Should You Give Meds?**

In his important book *Homeopathic Care For Cats and Dogs*, veterinarian Don Hamilton says of heartworm:  “In dogs the “monthly” preventives are effective if given at six week intervals, and possibly even at seven- or eight week intervals….”  Author/veterinarians Richard Pitcairn and Allen Schoen told us essentially the same thing when we were researching our book [Scared Poopless](http://www.dogs4dogs.com/).  If you opt for this “less is more” treatment with “preventatives,” mark dosing dates on your calendar and don’t miss them.

The vets at [Holistic Vet Center](http://www.holisticvetcenter.com/heartworm-disease.htm) say:  “… monthly heartworm preventatives are actually 100% effective if given every 45 days and 99% effective if given every 60 days.”

I presume that the monthly schedule was designed for the ease of remembering when to give meds.  However … giving meds monthly rather than every 45 days requires more doses  — and offers more opportunities for adverse reactions.  For someone medicating year-round, that’s 4 fewer doses per year.

**Are There Natural Heartworm Preventatives?**

Mosquito control is the ultimate natural preventative.  No mosquitoes, no heartworms.  Control mosquitoes by eliminating standing water and staying indoors at dusk and dawn. Use bug spray (marked safe and non-toxic for animals and children). Buy bug zappers. (All these are good ideas for human protection from mosquito-borne diseases as well.)

Is mosquito control 100% effective? No, but [Mosquito.org](http://www.mosquito.org/mosquito-information/control.aspx) has some great tips. (Note: one study showed that a full moon increased mosquito activity by 500%.)  Find more information on [controlling mosquitoes](http://news.ucanr.org/newsstorymain.cfm?story=751) in this University of California report.

**What do I do?** Well, for me, the choice was easy. I live in Southern California. I rarely see mosquitoes. My dogs spend most of their time indoors. Nights are invariably cool.

With the advice of two local vets, I decided to protect my own dogs (both of whom have health challenges) against the toxicity of heartworm “preventatives” rather than protect against an unlikely infection. I use non-toxic alternatives like mosquito control, an excellent diet and no drugs unless they’re absolutely unavoidable. I increase safety by testing blood twice yearly. I haven’t used “preventatives” for five or six years and my dogs remain heartworm free. This is my personal decision.  I am not a vet.

If I lived in a mosquito-heavy area, however, I might do much the same. I would determine local risks and would consult a local holistic vet to get help preventing heartworms naturally. I would control mosquitoes and test blood twice or more yearly. Someone who had “outside dogs,” and who was the nervous about heartworms, might also use heartworm meds or the Safeheart method during the peak heartworm months of July and August, but only if their dogs had healthy kidneys and livers. They should make any decision with a knowledgeable vet.

Dr. Will Falconer, a holistic vet certified in acupuncture and homeopathy, has written an e-book called “[Drug-Free Heartworm Prevention](http://vitalanimal.com/drugfreeheartworm/).”  This 50+ page, well-written e-book is delivered electronically.  I do not profit from sales of this book although I was given a complementary review copy.  Drs. Richard Pitcairn and Martin Goldstein have also written about heartworms in their books.

Please leave us a comment and let us know how you liked this article. Tell us about your concerns and decisions.  If we have made any errors, please let us know so we can rectify them. And, please, tell your friends the facts behind heartworm transmission.

Most importantly, do not make decisions out of fear. Don’t let anyone, even your vet, intimidate or ridicule you. Be an educated consumer and a rabid advocate for your dog’s health.

***Disclaimer:*** *The information provided here is for educational purposes only. Do not rely on this information without doing your own research including consultation with your own veterinarian.  Do not buy or fail a product for treating heartworm without evaluating it carefully.*

There are reports of medication-resistant  heartworm in the deep South region of the US.  Read the article at <http://www.clarionledger.com/article/20100424/NEWS/4240342/1001/Pet-owners-concerned-with-resistant-heartworms>