

The website for which this piece was produced created layperson-friendly translations of highly technical scientific material. The site's stated goal was to "keep readers entertained while also providing accurate information."

KEY FACTORS INFLUENCING HEARTWORM IN THE UNITED STATES

Heartworm.

It's exactly what it sounds like: parasitic worms that feed on your dog's heart. They're disgusting, [deadly](#), found all over the world, and spread by mosquitoes. **(If you're at all squeamish, don't click on that link.)** I got a very personal introduction to heartworms when I adopted my dog Skittles, a heartworm-positive survivor of Hurricane Katrina, from the [LASPCA](#).

Heartworms are dog-loving [parasites](#) (though [you](#) can get them too). Baby heartworms hitch a ride in the mouths of mosquitoes, and when an infected mosquito bites your dog, the baby worms are injected into your dog's bloodstream. They grow, latch onto organs to feed, have more babies that are sucked up by mosquitoes, and spread to more dogs.

My adoptee Skittles's situation wasn't rare, either. While nationally [one in 76](#) dogs have heartworm, nearly [50 percent](#) of Katrina rescues were infected with heartworms. I became obsessed with understanding how so many dogs ended up so sick.

Luckily for me, a [group of researchers](#) also wanted to understand the ideal conditions for heartworm disease, and calculate what kinds of patterns or changes might increase a dog's chances of getting heartworm.

The researchers found [ten factors](#), or items and conditions, that when combined make an ideal environment for heartworm to thrive; their hope was that knowing those ten factors could help create better "spatial risk maps," AKA predictions for where heartworm outbreaks would be the worst.

Each one of the factors was like an ingredient in a cake recipe. With only a few of the ingredients, it's hard to make a proper cake. But if you add every ingredient from the recipe in the proper amounts and bake it for the right time, you get a perfect cake. Except, in this case, cake is heartworm disease. Sorry if I just ruined cake for you.

Those heartworm "ingredients" fall into three broad groups: "vector factors," or conditions that make it easy for mosquitoes to thrive; "parasite factors," or how easy it is for heartworms to grow and multiply; and "host factors," meaning how well-protected the dog population is from heartworm.

The #1 spot on the doctor's ingredients list belongs to mosquitoes: called the [most lethal animal](#) on the planet, mosquitoes are the [vectors](#) that fuel the heartworm infection engine. Think of mosquitoes as the cake pan into which all the other heartworm ingredients are dumped. Without that pan, there's no cake. Likewise, without mosquitoes, there would be no heartworm. The researchers knew that by pinpointing where mosquitoes were most active, they'd already be well on their way to predicting heartworm outbreaks.

Unluckily for us, there are at least nine species of mosquitoes that are GREAT at carrying heartworm, and 60 that are decent at it. Those nine super skeeters range [all over the country](#), which means every. single. dog is at risk. Yes, even Alaskan dogs.

It makes sense, then, that other important ingredients are what affect mosquitoes' ability to survive, breed and bite. Where I'm from, I set my "it's summertime" alarm by how many mosquito bites I get when I go outside. That's because mosquitoes are more active in summer. They need a warm climate and standing water to make [babies](#).

The researchers discovered that by tracking changes in seasons and rainfall across mosquito territory, they could predict a baby boom, and thus, could guess when there would be more bugs to carry heartworm.

The "vector factor" ingredient list conveniently solves the first piece of Skittle's and other Katrina rescue dog's high heartworm disease rate puzzle: the South, with more rain and a warmer climate, breeds more mosquitoes. So after Katrina, when there was standing water in the city for *months* and temperatures well over 80 degrees, the bugs threw a block party.

In order to get heartworm disease, you need mosquitoes, but you also need HEARTWORMS. The researcher's next ingredients all had to do with what kinds of things encourage heartworms to survive and reproduce. (The "parasite vectors.")

Heartworms also have ideal environmental conditions for growing and breeding, but their environment is *inside* mosquitoes and eventually your dog.

Like other kinds of parasites, heartworms have different "developmental stages." You can think of them as being a newborn versus a small child versus an adolescent versus adult. Newborn heartworms (called "microfilaria") are what [live in mosquitoes](#), and if the mosquito is doing well, hanging out at a nice temperature and feeding, the newborn heartworm is able to grow into an adolescent.

What's really crazy is that in order to grow, heartworms need their mosquito host's environment to be at least 57 degrees, but if the temperature dips below that, the heartworm can *pause their development* and then restart once it gets warm again. That's like putting a cake in the oven, shutting off the oven for a while, and then

getting right back to it without ruining the cake. If the mosquitoes can stand it, so can the worms.

On average, it takes about four months for that newborn heartworm to become an adolescent. Just like human teenagers, adolescent heartworms are awful; it's in this stage they become "infectious" and can jump from mosquito to your dog.

By knowing heartworm growth patterns, the researchers could use the number of days with good heartworm growing conditions to forecast initial infections. I say "initial" because the test to detect heartworm isn't effective until the worms reach their adult stage, which doesn't happen for another six or nine months after they've entered your dog.

For example, let's say a dog shows up at a vet clinic in November and has a positive heartworm test. We know that at the latest, a heartworm-carrying mosquito bit the dog in May, but it could have been as early as February, or even some time in the previous year if the temperature wasn't ideal and the heartworms took longer than average to develop.

Why does that matter? For the researchers, that delay between infection and diagnosis was really, really important to take into account. For any diagnosed case of heartworm, doctors had to consider what conditions had been present seven months to two years prior, which made the whole risk prediction process a lot squishier. In order to be accurate, a lot of data over a longer period of time have to be crunched.

For the Katrina pups, that lag between infection, testing, and treatment probably would have happened anyway. City services, like vet clinics and shelters, were so nonexistent that it took months and months to get a lot of the dogs off the streets and do tests.

My best friend Skittles had a particularly rough go of it. The vets thought she'd been a puppy when the storm hit, got heartworm almost immediately, and then wasn't taken to a shelter for a long time. By the time I adopted her, she'd had heartworm for a while, which leads us into the third group of ingredients—"host factors," or how well protected the dog population is against heartworm.

If you have a dog, you're no doubt familiar with heartworm preventatives. (At least I hope you're familiar! If you aren't, I'm so glad you're reading this!) *Curing* heartworm is expensive and dangerous (I'll tell you about Skittles' treatment in a bit), and preventatives are very gentle and effective, so there's really no reason to skip it.

Not having your dog on preventative is like preheating the oven and carefully prepping your cake ingredients. Unless you REALLY want cake, don't do it!

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