



# CatWatch

Expert information on medicine, behavior and health from a world leader in veterinary medicine



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Is the risk of heartworm cause for worry for her indoor-outdoor cat?

## IN THE NEWS ...

### Breeds' Distinct Ears Offer Clue to Arthritis

At least two cat breeds — Scottish Folds and American Curls — have atypical ears. Scottish Folds' ears fold forward, while American Curls' fold backward. Only the ear cartilage is malformed in American Curls, while Scottish Folds can suffer additional bone malformations and crippling osteoarthritis.

The Morris Animal Foundation is supporting research at the University of Sydney in Australia to identify genes in both breeds

that may be responsible for these traits.

The possible outcome could provide information on the broader problem of feline osteoarthritis. ♦

A 7-month-old Scottish Fold.



## Cats Are Predators But Also Prey

*They can be fearful and even phobic of strangers, loud noises, aggressive dogs and the dreaded vacuum cleaner*

Cats have a reputation for being fearless and lethal predators, but there's a flip side to this characterization: While domestic cats who live with us still retain their hunting skills, they themselves are also prey — to dogs, urban coyotes, even birds such as hawks and owls.

Cats, then, have a well-developed sense of fear. They are often cautious in the presence of strangers, loud or unexpected



The most common fear response that cats experience: Run and hide.

noises startle them, and they dislike changes in their environment and daily routine.

### Escaping the Noise.

"Vacuum cleaners are certainly things they fear," says behaviorist Katherine A. Houpt, VMD, Ph.D., emeritus professor at Cornell University College of Veterinary Medicine. "When I turned on the vacuum to clean all the fur Hadley the Ragdoll had left on my rug, she

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## Cats Are More Likely to Have 'Hot Zones'

*Their hot spots can pop up with no apparent reason often causing wider and deeper skin damage than occurs in dogs*

Unlike dogs who typically develop discrete hot spots in response to irritation, insects and allergies, hot spots in cats are less common for one surprising reason: "Although they can have an identifiable trigger event, they can pop up for no apparent reason," says dermatologist William H. Miller, VMD, a medical director of the Cornell University Companion Animal Hospital.

"Instead of hot spots, cats can get hot zones. In dogs the hot spot is usually fairly small while they are much bigger in the cat, hence, a zone versus a spot. When clawed cats scratch an area, they usually do much

more damage than a scratching dog would. When the sore is created by licking, the cat does a better job and licks a much wider area than a dog."

**It's the Season.** A hot zone is a localized area of acute moist dermatitis caused by self-trauma. The trigger event can indeed be allergies, Dr. Miller says, and as we approach the height of summer, managing an allergic cat can be especially daunting.

Certain foods and dust mites can cause year-round itchiness and general misery for affected cats. But allergies to pollen, mold

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# CatWatch

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## SHORT TAKES

### A Push to Screen for Earlier Diagnosis of Hypertension

CatWatch has previously reported that hypertension in humans can damage the heart and arteries, and cause stroke, kidney damage and vision loss. *The Lancet* journal predicted that the risk of becoming hypertensive during a lifetime exceeds 90 percent for people in developed countries.

Even more alarming, it cautioned that "Screening is not done systematically, and the diagnosis is often made at a late stage when target organ damage has already happened."

As dangerous as it is for humans, hypertension — also known as high blood pressure — can also cause serious organ problems for our cats, particularly if they're 7 years of age or older. Yet symptoms aren't always evident even to the experts. Hypertension is insidious, meaning signs may develop slowly or not be apparent. Early signs, such as lethargy, may be barely discernible.

The International Society of Feline Medicine, a division of International Cat Care, says the condition in older cats probably remains significantly under-diagnosed. It stresses the importance of early diagnosis and intervention, particularly because routine blood pressure monitoring is generally performed infrequently in cats and, "Cats are notoriously susceptible to stress in the veterinary clinic, which can lead to 'white coat hypertension' and hamper interpretation of results."

As a guide to their patients, the society has published *ISFM Consensus Guidelines on the Diagnosis and Management of Hypertension in Cats* in its flagship *Journal of Feline Medicine and Surgery*. Veterinarians and academics in the U.K., Australia, New Zealand, Spain, France and the U.S. cover key topics, including monitoring blood pressure for cats of different ages and health status, providing anti-hypertensive therapy and identifying evidence of organ damage.

The society points out that measurement of blood pressure in cats can be readily performed, although care is needed for the choice



**High blood pressure** may result in subtle symptoms such as lethargy and can lead to organ damage.

and use of equipment to ensure meaningful and accurate results. It also cautions that systolic blood pressure — which indicates the pressure the blood exerts against the artery walls when the heart contracts — has been shown to increase with age in cats. It's important to work with your cat's veterinarian to determine a schedule for regular blood pressure monitoring when your cat approaches middle age.

The majority of cats diagnosed with hypertension have other systemic diseases that may cause or contribute to it. Such cases are referred to as secondary hypertension. The relationship between hypertension and the underlying disease may not always be understood. When secondary hypertension is found, the veterinarian needs to manage it and the underlying disease concurrently.

Cats with advanced secondary hypertension often exhibit symptoms such as:

- ◆ Sudden blindness
- ◆ Poor appetite and weight loss
- ◆ Increased drinking and urination
- ◆ Seizures
- ◆ Disorientation
- ◆ Difficulty breathing

"It is hoped that these guidelines will encourage more widespread monitoring of blood pressure in veterinary clinics to increase the early identification of this treatable condition and prevent the severe clinical consequences of untreated hypertension," says Samantha Taylor, BVetMed, ECVIM, a specialist in feline medicine and a co-chair of the guidelines panel. ♦



# A Rare Polyp Impedes Breathing

*Simple surgery can remove it from the throat or ear canal to change cats into 'happy kitties'*

If your cat has difficulty swallowing, shakes his head, sneezes and breathes noisily as if hacking or snoring, you could dismiss the behavior as fleeting. But while you might think the cause will clear up on its own, the problem may be a nasopharyngeal polyp — an uncommon, noncancerous bump at the very back of the throat or in the ear canal that must be removed through a fairly simple surgery.

The origin seems to be past upper respiratory virus infections from kittenhood. While most of those infections resolve and kittens never have another problem, a small subset faces a chronic inflammatory issue that seems to settle in the middle ear. The lining of the middle ear grows thicker and thicker as the pinkish-white mass of tissue grows in reaction to what probably is the residual virus — though “no one knows for sure,” says associate professor James A. Flanders, DVM, who is board-certified in surgery, at Cornell University College of Veterinary Medicine.

**Inflamed Canal.** As the mass grows, it can go two different ways. From the middle ear, it can grow outward through the eardrum and become a mass in the ear canal itself. As a result, cats usually 1 or 2 years old show signs of ear-canal infections. That’s because the polyp takes up space, allowing bacteria and yeast to enter and inflame the ear canal. A veterinarian can discover this kind of nasopharyngeal polyp easily by using an otoscope to peer into the ear canal.

For other cats, the mass in the middle ear grows in the opposite direction — inward. This time the polyp grows from the middle ear through the cat’s Eustachian tube (the small tube that drains the middle ear into the throat) and expands into the nasopharynx, where it presses down on the soft palate, causing a cat to hack, cough and gag to try to clear his

throat. This type afflicts both young and adult cats.

Cats become “very irritated by this mass pushing on their soft palate,” Dr. Flanders says of the inward-growing polyp. The bump can grow big enough to block air flow, leaving cats laboriously trying to breathe through the nose. “Cats love to breathe through their nose, so they’re very disturbed,” he says.

What’s more, small nasal secretions that normally would simply drain down the throat now are blocked by the growing mass, so the cat continually sneezes to get rid of nose secretions. “It’s all sorts

## MISCONCEPTIONS

**The word “polyps” means that nasopharyngeal polyps are cancerous.**

**Truth:** No, they’re benign masses and they don’t spread throughout the body, says James Flanders, DVM, at Cornell.

**They’re a bacterial infection.**

**Truth:** Normally, no. In most cases, if a culture test is performed, no signs of bacterial infection will be found. The mass blocks the area — it’s essentially akin to blocked sinuses.

of bad things for them,” Dr. Flanders says of the discomfort, sneezing and hacking. “It doesn’t seem to be painful, as far as we can tell. It’s more just irritating to them. That seems to be the issue.”

Veterinarians diagnose this inward-growing type of mass by anesthetizing the cat to thoroughly examine the back of the mouth. Sometimes they also use an X-ray or CT scan in their diagnosis.

**Slow Growth.** It may take many months for symptoms to arise and prompt owners to seek veterinary care.



Arrows in this CT scan point to a nasopharyngeal polyp on the top of a cat’s soft palate.

It takes one to three years for the polyps to produce clinical signs, he says. For the typical affected cat, symptoms most commonly arise at around 13 months of age. Treatment is fairly simple — it’s extraction, Dr. Flanders says. The anesthetized cat’s soft palate is pulled forward so that the veterinarian can clearly see the polyp at the back of the throat and use forceps to move the mass.

Prognosis is favorable. Dr. Flanders estimates an 80 to 90 percent success rate if the entire polyp is removed. That’s followed by treatment with oral steroids (prednisone) for about a month to reduce inflammation, which usually prevents polyps from regrowing. Perhaps 10 percent of masses regrow, he says, requiring another treatment.

Dr. Flanders sees a night-and-day difference in cats after surgery, especially those with dangerous cases of bilateral polyps — meaning the masses grow both outward and inward from the middle ear. “It’s really bad,” he says of bilateral cases, “because it completely obstructs the air passage through the nose. They cannot breathe through their nose at all. And it’s very disturbing to a cat to have to open-mouth breathe.

“When you treat them — and they can now breathe again through their nose, and they don’t have that thing pushing on their palates — they’re just happy kitties.” ♦

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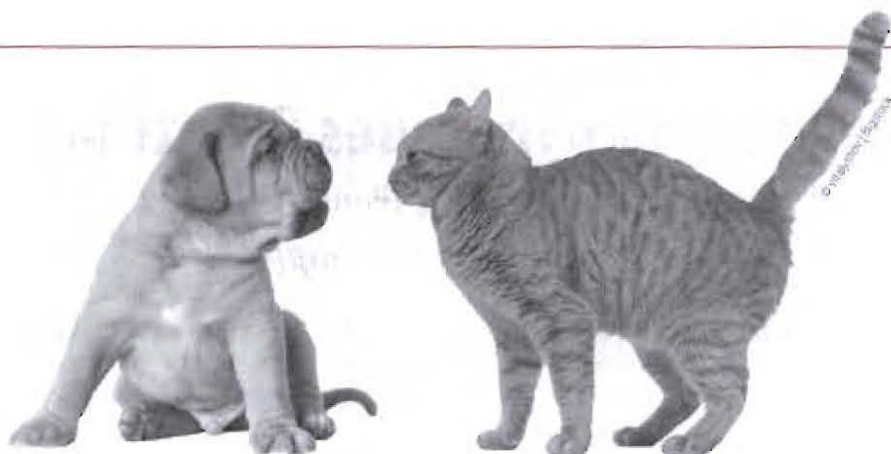
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**FEAR**...*(continued from cover)*

had disappeared out her cat door into 20-degree weather rather than endure the noise of the vacuum."

Cats are sensitive to changes in their environment, so strange people of any kind can bother them. "Many are afraid of dogs. They are often afraid of their cat carriers because that means something frightening is going to happen, such as being stuck on a plane or going to the vet," Dr. Houpt says.



**Loud or aggressive dogs** can frighten a cat, as this body language suggests.

**Fear vs. Phobia.** A fear is not exactly the same as a phobia. Startling at a loud noise, for instance, and then recovering quickly is a normal response to fear. When that normal response becomes consistently exaggerated, fear develops into phobia.

A phobia is a type of anxiety disorder. It may be caused by changes in levels of neurotransmitters such as serotonin in the brain. Serotonin affects many different aspects of mind and body, including mood, memory and learning, certain social

behaviors, and cardiovascular, endocrine and muscle function.

It's no surprise to anyone who has lived with a cat that the primary fears involve any kind of loud noise such as a vacuum cleaner; the presence of large, loud or aggressive dogs, and anything new or different.

Fears of loud or unexpected noises are triggered by what's called the orienting response. That's the brain's mechanism for awareness. When cats or humans hear certain sounds, the brain

instantly processes them to determine if they signal danger.

**Suffering Anxiety.** Cats can also suffer separation anxiety, although it's not as common as it is in dogs. Or at least owners don't notice it as much. "Usually in cats they seem to have separation anxiety only when you're gone overnight as opposed to during the day," Dr. Houpt says. "Some cats will not use their kitty litter. Some cats just act nervous. Some will have diarrhea when their caretaker is not there. Many cats who have a bladder problem such as idiopathic [of unknown cause] cystitis will be much worse if anything in their environment changes or even if their schedule has changed."

Cats with separation anxiety can resort to destructive or annoying acts. They may urinate on bedding or clothing, yowl mournfully in their owner's absence or shred a newly reupholstered sofa. Other signs of separation anxiety include depression, sulking, aggression toward other pets in the home, refusing to eat or chewing at themselves until they leave bald spots.

Their destructive behavior isn't caused by spite. It's a cat's way of calming himself. That's because your belongings carry your scent. When your cat sprays urine on them, he's adding his scent to yours, giving him a sense of security. Sort of a backhanded compliment.

Separation anxiety, especially the destructive form, may develop in cats who were orphaned as kittens or weaned too early. Older cats can become phobic about being left alone after a divorce or death in the family. They may pace and cry.

## SIGNS OF FEAR AND PHOBIAS

Every cat reacts differently to fear, but some reactions are universal. Your cat is afraid, perhaps intensely, when he displays the following behaviors:

- ◆ Running
- ◆ Hiding
- ◆ Hair standing on end like the classic Halloween cat. The cat makes himself tall to make potential predators think he is more of a threat. The hair stands on end when epinephrine (adrenaline) is released, as part of the flight or fight response, says behaviorist Katherine A. Houpt, VMD, Ph.D., at Cornell.
- ◆ Freezing, which is standing rooted to the spot
- ◆ Ears laid back
- ◆ Eyes wide and pupils enlarged
- ◆ Rapid hair loss in minutes
- ◆ Hissing
- ◆ Scratching or biting



**Adrenaline makes cats' hair stand on end** when confronted with the flight or fight response to danger. The posture makes them taller, discouraging potential predators.



**Stay Away!** While some cats are phobic about being left alone, others want nothing to do with meeting strangers, whether human, canine or feline. Cats with anthrophobia (fear of people), haphophobia (fear of being touched) or cynophobia (fear of dogs) are the ones who run and hide when faced with their phobia.

Fear of strangers isn't uncommon, Dr. Houpt says. Guests don't smell familiar. When they walk in the door, it's the cue for a cat to run and hide. Some cats refuse to eat.

That fear is often embedded in a cat's genes, inherited from the male who sired him. A 1992 study by Dr. Houpt and other researchers found that kittens in cat colonies who were friendly toward humans were identified disproportionately as offspring of one of two fathers.

Novel objects can also be the source of a cat's phobia. Phobias can seem humorous at first glance. Remember the "cats scared by cucumbers" videos that went viral? When unexpectedly presented with a cucumber, cats tended to run, jump or otherwise startle in response to them.

**Novel Objects.** "The cats in the videos may be reacting to the sudden appearance of a novel object," says behaviorist and lecturer Pamela Perry, DVM, Ph.D., in the Cornell Feline Health Center's article on "Cats and Cucumbers" at [www.cornell.edu/FHC](http://www.cornell.edu/FHC). "It might be the fearful ones who are most likely to react to the appearance of a strange object behind them that was not there a minute earlier."

Scaring a cat by showing him a cucumber may seem like harmless fun, but Dr. Perry warns that it can have lasting effects. Fear is stressful to both mind and body. Worse, a cat who is already fearful can come to associate the scary object — a cucumber, in this case — with surround-

ing items such as the food bowl or even the area where the fright occurred.

That can be a problem if a phobia causes a cat to be reluctant to eat from his food dish or refuse to enter the kitchen where he is fed. He may even associate a nearby family member with the frightening event, causing him to avoid or display active fear of that person.

Worse, a phobic cat can do a lot of damage. Dr. Houpt recalls one client whose daughter begged for a talking doll for Christmas. When activated, it would say, "Hello, my name is Jenny."

"The doll started to talk and the cat ran right up to the child and scratched her," Dr. Houpt says. "They lent me the

tion, environmental enrichment, behavior modification, playtime and pheromone sprays or diffusers that mimic natural feline facial pheromones. Cats with separation anxiety or changes to their life such as a move to a new home, a new baby or houseguests may respond favorably to the techniques.

Environmental enrichment often involves providing puzzle toys that contain food or giving a cat a window seat or tall cat tree so he has a room with a view. Scheduling meals and play at the same time every day can also help encourage a cat's sense of security.

Desensitizing your cat to clues that you are preparing to leave home—getting dressed, packing a suitcase or picking up your keys for instance—is a common form of behavior modification. Another is presenting your cat with a treat or toy, then leaving the house while he is distracted.

If you are traveling, try to separate the clues that you're going away from your actual departure. For instance, pack early and put your suitcase in the car early, as much as a couple of days beforehand. Ask the pet sitter to stick as closely as possible to the cat's

normal schedule for meals and playtime.

Cats need time to adjust to new situations and people. Short repetitions or periods of exposure over a long period of time may help them become accustomed to a person, situation, object or other animal. The operative words here are "long period of time." Never try to rush things.

If your cat's phobias are beyond help with these methods, consult a board-certified veterinary behaviorist. He or she may offer insights based on educated observations or prescribe anti-anxiety medication that can help your cat feel calm. Medication alone is ineffective, but it can give the other techniques time to work. ♦



**It's almost universal:** Cats hate the noise of vacuum cleaners — as do dogs.

doll, and I played it to various cats. It really upset cats. I had two cats who climbed up the screen of a porch they were trying so hard to escape."

**Their Response.** Fortunately, cats don't typically do physical damage to humans or objects when they encounter something they fear. The more common response is to run and hide. Dr. Houpt says that's why cat owners typically don't complain to her about a cat's fears. The exception is when the cat is afraid of the owner.

Managing or treating feline phobias usually calls for one or more different techniques. They may include medica-



**HOT SPOTS...** (continued from cover)

and flea bites tend to be more seasonal. They become more prevalent in warm weather, waxing and waning in severity.

The encouraging news is that the incidence of flea-bite allergy, once the most typical allergic reaction seen in cats, has decreased considerably since the advent of effective, easy-to-use flea control products. "However, in areas where people do not use these preventives, flea bite hypersensitivity is still alive and well," Dr. Miller says.

An allergy is an immunologic reaction that causes clinical signs — some more serious than others. Allergic cats typically react to normally innocuous substances, including food ingredients,

insects and substances in the environment, including various chemicals.

"It can also extend to agents that are normally somewhat harmful such as insect bites," Dr. Miller says. "But in these cases, the response to the insect bite is well out of proportion to what you'd expect from the number of bites the animal gets." They can result in redness, rashes, bleeding and secondary skin infections.

Unfortunately, allergies remain with the cat for life. "Cat owners have to appreciate that long-term control is necessary and will probably have to be adjusted as time goes on," Dr. Miller says.

The most common sufferers are domestic shorthair cats because they're the most common cat "breed."

**Genetic Influence.** Young cats are particularly susceptible to some types of allergies. "Skin allergies are a genetically influenced disorder, so the signs occur early in life — often between 1 and 3 years of age," Dr. Miller says. "We often don't see the cat until he is 5 or older. This apparent later onset may be because the early signs of itching, such as excessive fur licking, aren't noticed or don't appear serious enough to go to the veterinarian."

Often the cat's unwillingness to take oral medications presents additional challenges. "Depending upon the cat, his temperament and the severity of his allergies, long-term control can be costly and time-consuming," Dr. Miller says.

One type of treatment called immunotherapy, generally must be continued for months or even years to achieve results. Once a list of



A food allergy has caused this cat's severe hot spot reaction.



It doesn't matter if a garden is fenced. Pollens and other allergens can still torment an allergic cat.



A veterinary visit is warranted when chronic gastrointestinal or skin conditions develop. They could be signs of a food allergy.

offending allergens is identified via blood or intradermal skin testing, a specialized serum, containing small quantities of these allergens, can be formulated specifically for your cat. Through injection of small amounts of the allergy serum over time, many cats experience a decreased sensitivity and reduced response to allergens.

Your cat's veterinarian may prescribe topical ointments and oral antibiotics for hot spots. In severe cases, the cat may have to wear a collar to prevent further irritating the wound and risking reinfection. Once the underlying cause has been identified and the wound treated, the hot spot can finally begin to cool down.

"Strict flea control can prevent the development of flea allergies. And good breeding practices can prevent other allergies. The parents and siblings of an allergic cat should not be used for breeding," Dr. Miller says. "Unfortunately, for food hypersensitivity, nothing has yet been shown to impact the development of the disease, including grain-free diets."

New research developments may help quell itching. "The mechanics of allergic reactions are being studied, so we know much more about the molecular mechanics of the disorder in dogs than we used to," Dr. Miller says. "This knowledge is being used to develop new treatments. With time these treatment modalities will spill over into the cat so we'll have better, safer, and, hopefully, easier to administer medications for the cat." ♦



## THREE TOP ALLERGENS: FOOD, FLEAS AND AIRBORNE SUBSTANCES

Diagnosis and treatments for allergic cats can often be difficult or at least more difficult than in dogs. To rule out food allergy, the patient has to eat a carefully selected diet for four or more weeks. It's usually no problem to get a dog to eat the new diet but the same can't be said for the cat.

## FOOD ALLERGIES CAN MIMIC SKIN CONDITIONS

"Incidence figures on food hypersensitivity in cats are hard to find, since cats often won't eat the special diets needed to either diagnose or treat food hypersensitivity," says dermatologist William H. Miller, VMD, at Cornell.

Cats with a suspected food allergy usually visit either the gastroenterologist or the dermatologist, but not both. "Animals with vomiting and diarrhea rarely have skin issues associated with their diets and those with itchy skin rarely show signs of vomiting and diarrhea. But from the veterinary dermatologist's perspective, the itching caused by food allergies can mimic that seen in scabies, flea allergies, environmental allergies or any number of other itchy conditions," Dr. Miller says.

Cats with food allergies may continually scratch their head and neck, develop tiny crusted lesions over their bodies (miliary dermatitis), lick off their fur or develop larger sores (eosinophilic granuloma complex). These symptoms can also be seen in cats with other allergies. Any cat with a chronic GI or skin condition should see a veterinarian.

**Diagnosis:** "There is no reliable blood or skin test for food allergies in cats," Dr. Miller says. "The diagnosis is tentatively confirmed by changing the food to some very well-selected novel or hydrolyzed diet and seeing if the clinical signs disappear. If the signs disappear, then the old food is reintroduced to see if the signs recur. If they do, then the diet is implicated." However, "Because of cats' general reluctance to eat new foods, allergy testing isn't commonly done on cats."

**Treatment:** "Cats can be reluctant to change their diet. If an owner is unwilling or unable to do the dietary elimination correctly, then medications used to treat itchy cats can be tried," says Dr. Miller.

**Prognosis:** "Excellent. It is very rare for the food-allergic animal to become allergic to new foods as years go by," he says.

## A FLEA COMB AND LESIONS CAN BE THE BEST INDICATORS

A cat with flea allergies will often chew, lick or scratch at his abdomen, back, legs, tail base and nape of the neck. "A skin examination will reveal red papular (rash-like) lesions resulting from the flea bites," says Dr. Miller. "With careful inspection or the use of a flea comb, flea feces in the form of tiny black specks, also called flea dirt, or fleas themselves will also be found."

**Diagnosis:** If the cat is very itchy and has significant skin damage, a trip to the veterinarian is indicated to get medications to stop the itching and control the fleas. Although blood and skin tests are available, Dr. Miller believes they usually aren't necessary. "The clinical evaluation is good enough, provided that the owner doesn't bathe the animal or treat him for fleas right before taking him to the veterinarian."

**Treatment:** "If the skin isn't too bad, owners can try to solve the problem by designing their own flea-control program by buying products online or in pet stores," says Dr. Miller. "However, owners should be aware that some products really don't work and that pet store employees may not know much about the products."

Alternatively, a wide variety of topical (spot application or collar) and systemic (orally administered or absorbed through the skin) products can be recommended by your veterinarian. "The best ones to use are determined on a case-by-case basis," says Dr. Miller.

**Prognosis:** With good flea control, the prognosis for a flea-allergic cat is favorable. "The temptation is to stop flea control after a couple years when fleas aren't seen," Dr. Miller says. "But owners need to remember that fleas can reappear at almost anytime."

## AIRBORNE ALLERGIES SHOW UP AS PERSISTENT ITCHING

Cats with allergies to mold, pollen and other airborne particles primarily manifest itchy skin, says Dr. Miller. "Any persistent itching or any itching severe enough to create sores warrants a trip to the veterinarian."

**Diagnosis:** "It is tentatively made when elimination of all the other probable diagnoses — via flea control, infection control and dietary testing — do not change the pet's itching. Allergy testing can be done, but this is used to identify the agents that the cat is allergic to, rather than to diagnose an environmental allergy itself," Dr. Miller says.

**Treatment:** New medications for environmental allergies in cats are appearing, Dr. Miller says. "These usually have fewer side effects than conventional medications and are often very effective. However, they can also be very expensive."

**Prognosis:** Cats allergic to airborne substances may be plagued by skin problems throughout their lives, as with all other allergies.





Elizabeth

Elizabeth is thankful for the assistance of the Cornell Feline Health Center in providing the answer on this page.

## Is Heartworm Cause for Worry About Her Indoor-Outdoor Cat?

**Q** We live in Maryland and have a 6-year-old indoor/outdoor cat who is in apparently good health. I was recently talking with a friend of mine whose dog was infected with heartworms, and this made me worry about my kitty. Is this something I should be worried about?

**A** I certainly understand why you are worried. The first thing I should say is that you should ideally be keeping your kitty indoors, although this would not preclude potential exposure to heartworms, as a recent study showed that approximately 25 percent of cats infected with heartworms were considered indoor cats.

Feline heartworm infection is less common than its canine counterpart, but heartworm infection in cats has been reported in all regions of the U.S. in which it occurs in dogs (all 50 states).

The heartworm organism, *Dirofilaria immitis*, is transmitted by mosquitos, which ingest the L1 infective larval stage (also called microfilaria) while taking a blood meal primarily from an infected dog. This larva then matures to an L3 form in the mosquito in approximately two weeks as long as the ambient temperature is above 53 degrees Fahrenheit during that time. The larva does not become infective for another animal until it reaches the L3 stage, which can be passed to another animal during a subsequent blood meal. It takes between seven and eight months after an infective bite for the L3 larvae to mature and migrate through the tissues of a cat and arrive in the heart and blood vessels of the lung (now called an L5, or mature adult).

Mature adult heartworms then begin producing microfilaria that, in the dog, are commonly found circulating in the bloodstream, where they can be ingested by a mosquito during a blood meal, thereby making that mosquito a vector for transmission of heartworms to other animals. A major difference between canine and feline heartworm disease is that in cats, microfilaria

are rarely found circulating in the bloodstream, perhaps because cats are not a natural host for heartworms, as dogs presumably are.

One phenomenon seen much more commonly in cats than in dogs is called aberrant larval migration, during which the *D immitis* larvae do not migrate to the heart but rather to other locations, such as the central nervous system. It has been speculated that the higher occurrence of aberrant larval migration in cats may also be because they are not the natural host for *D immitis*.

Mature heartworms can cause significant damage to the blood vessels leading from the right side of the heart to the lungs (the pulmonary arteries) and to the lungs themselves. This damage, called heartworm-associated respiratory disease (HARD), is mediated largely by inflammation associated with the immune reaction against the worms and may be exacerbated by the presence of a species of bacteria called *Wolbachia*, which can be harbored by the *D immitis* worm.

Although cats appear to be more resistant to heartworm infection than dogs (fewer adult worms in infection, lower incidence among cats and higher rate of spontaneous resolution of infection), heartworm infection can be life threatening in some cats. Treatment of adult heartworm infection in cats can be problematic, and in some cases, awaiting a spontaneous cure is elected. Many cats may benefit from supportive care and corticosteroid therapy to decrease inflammation in the lungs and pulmonary blood vessels, but there is no evidence that any therapy specifically targeted at killing the adult worms increases the survival of cats, unlike in dogs. For this reason, heartworm prevention is important in cats.

The American Heartworm Society recommends monthly prophylaxis against heartworm in cats, even if they are indoor critters. I recommend that you discuss these options with your cat's veterinarian.

I hope that this is helpful, and that you and your kitty both enjoy a wonderful summer. ♦

—Sincerely, Elizabeth

### PLEASE SHARE YOUR QUESTIONS

We welcome questions on health, medicine and behavior, but regret that we cannot comment on prior diagnoses and specific products. Please write CatWatch Editor, 535 Connecticut Ave., Norwalk, CT 06854-1713 or email [catwatcheditor@cornell.edu](mailto:catwatcheditor@cornell.edu).

### COMING UP ...

♦  
HIGH  
CHOLESTEROL

♦  
DEAFNESS IN  
WHITE CATS

♦  
KIDNEY DISEASE

♦  
DISASTER  
PLANS

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