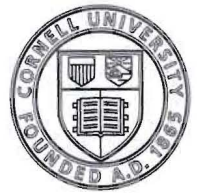




# Cat Watch

December 2019 - Vol. 23, No. 12



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

## THIS JUST IN

### Cats and Bonding

*They're definitely attached*

**A** study reported in *Current Biology* shows that most cats are securely attached to their owner and use them as a source of security.

Researchers set up a test with cats to mimic tests previously done with infants to test bonding. During the test, the feline spent two minutes in a novel room with their caregiver followed by two minutes alone. Then they had a two-minute reunion. The cats' responses to seeing their owners again show that cats bond in a way that's similar to infants. In humans, 65 percent of infants are securely attached to their caregiver. Amazingly, the researchers classified about 65 percent of both cats and kittens as securely bonded to their people.

The findings show that cats' human attachments are stable and present in adulthood. This social flexibility may have helped facilitate the success of the species in human homes. The researchers are now exploring the importance of this work in relation to the thousands of kittens and cats that wind up in animal shelters. ■

Vitale, KR, et al. Attachment bonds between domestic cats and humans. *Current Biology*, 2019; 29 (18): R864 DOI: 10.1016/j.cub.2019.08.036

Science Daily.

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## 5 Things: Cold-Weather Watches

*Your cat will seek out warm spots, which must be safe*

**1** Drafty, cold houses and shelters can be difficult for cats, especially young kittens and seniors used to a nice warm home. Make use of warm air rising, and consider higher retreats for your kitty. Bedding options that are off the floor will be especially appreciated, as long as they're within jumping distance. If she usually enjoys looking out the window, add a towel to the windowsill for added comfort.



Warm spots will attract your cat.

**2** Cold, arthritic joints become more stiff when it's cold, says Elisa Mazzaferro, MS, DVM, Ph.D., ACECC, Staff Criticalist, Cornell University Veterinary Specialists Adjunct Associate Clinical Professor of Emergency-Critical Care, Cornell University College of Veterinary Medicine. Many cats enjoy a heated pad. Choices include electric pads, microwaveable pads, and thermal pads, which are designed to capture the cat's own body heat to make the pad warmer. If you do opt for an electric pad, be sure it won't overheat, which can cause thermal burns, and always test the microwaved pad before giving it to your cat. If it's hot to you, it will be too hot for your cat. As you work to keep kitty warmer, remember that a space heater may be attractive to your cat. Be sure he can't inadvertently knock it over (some come with a safety switch that turns off if it falls). If you build a fire in your fireplace, use a fire screen to keep your cat from getting too close. Candles don't give off much heat, but they're used a lot during holidays and may attract your cat. "Cats may want to play with the flickering flame," Dr. Mazzaferro says. "They can singe their whiskers and get second or third-degree burns on their paws. Candles can be knocked over, and melted wax can also cause serious burns."

**3** Consider where you've placed the litterbox. Many of us prefer to put the cat's box in an out-of-sight location and, really, the cat prefers that privacy as well. But basements and garages can become chilly and damp, making your cat less inclined to use the litterbox. If you're finding messes, give the litterbox location some thought.

**4** Carbon monoxide can kill in less than five minutes. "Like people, cats are highly sensitive to carbon monoxide poisoning. Signs of carbon monoxide intoxication include stumbling, nausea, vomiting, lethargy, and unconsciousness," says Dr. Mazzaferro. "Know these signs and have a working carbon monoxide detector and alarm in your home."

**5** Check the garage. We know cats will seek warmth from a warm engine. Be sure you don't run your car in the garage, and always check for your cat before you start the car if he has access to it. Be sure winter chemicals like antifreeze, de-icers, and cleaning fluids are away from the cat. Check to be sure your car doesn't have an antifreeze leak. Antifreeze tastes sweet and tempting but is deadly poison. "It takes less than a teaspoon of antifreeze to intoxicate a cat. The minimal lethal dose for a cat is one-fourth teaspoon per kilogram (2.2 pounds) of weight," Dr. Mazzaferro says. ■



## New Way of Evaluating Feline Pain

### The Feline Grimace Scale uses facial expressions

At the 2019 AVMA Convention in August, Dr. Paulo Steagall, an associate professor of veterinary anesthesia and analgesia at the University of Montreal, presented the Feline Grimace Scale or FGS, which is a method of evaluating a cat's pain using facial expressions.

Using the FGS, researchers looked at ear position, tightening of the eyes, tension of the muzzle, how whiskers were held, and head positioning to see if they varied with pain status. The status of each of these five features was rated 0 to 2, with 2 indicating an obvious problem and 0 meaning none.

Any cat with a score over 4 was determined to be showing discomfort. A cat in severe pain would hold her ears flattened and out to the side, squint her eyes tightly, keep her muzzle tensed and tight, maintain her whiskers straight out to the side and tipped a bit forward, with her head down below her shoulder height.

Use of this new scale will require some careful observation for consistent evaluations and additional research. Still, this could be an easy way for veterinarians and veterinary technicians to evaluate hospitalized cats without adding the stress of handling. Since cats are notorious for hiding signs of pain or illness, the more ways we can use to evaluate them, the better. For more on pain, see "Your Guide to Pain in Cats," May 2019, at [catwatchnewsletter.com](http://catwatchnewsletter.com). ■



## Bacteria May Be Source of Scent

### Cats may be communicating by bacterial secretions

Domestic cats, like many other mammals, use smelly secretions from anal sacs to mark territory and communicate with other animals. A new study from the Genome Center at the University of California, Davis, shows that many odiferous compounds from a male cat are made not by the cat but by a community of bacteria living in the anal sacs.

"Cats use a lot of volatile chemicals for signaling, and they probably don't make them all," said David Coil, one of the researchers.

Many species—including cats, dogs, bears, pandas, skunks, and hyenas—use anal sac secretions as a chemical language. Skunks, of course, also use them as a means of defense.

The researchers obtained anal sac secretions from a single male Bengal cat volunteered to participate by its owner. They extracted DNA for sequencing to identify types of bacteria and took samples for chemical odor analysis.

Sequencing showed that the microbial community was not very diverse and dominated by a small number of bacteria. The most abundant bacteria from the screen were grown in culture. A postdoctoral researcher analyzed the volatile chemicals given off by the bacteria, using a lab that focuses on technology for detecting and characterizing low levels of volatile organic compounds that can be markers of health and disease, from influenza to citrus greening in fruit trees.

The researchers detected 67 volatile compounds released by the bacterial cultures. Of these, 52 were also found directly in the anal sac secretions.

The results support the idea that the bacterial community, not the cat itself, produces many of the scents used by the cat to communicate. Coil and colleagues want to follow up by looking at more cats. If these scents are made by bacteria, why do cats smell different to each other? How do cats acquire the bacteria and do they change over life? Understanding how microbes influence their scent could have wide implications for understanding scent communication in animals. ■

Yamaguchi, M.S. et al. Bacteria isolated from Bengal cat (*Felis catus* × *Prionailurus bengalensis*) anal sac secretions produce volatile compounds potentially associated with animal signaling. *PLOS ONE*, 2019; 14 (9): e0216846 DOI: 10.1371/journal.pone.0216846



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CatWatch is an independent  
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**Subscriptions:** \$39 per year (U.S.) • \$49  
per year (Canada). For subscription and  
customer service information, visit  
[www.catwatchnewsletter.com/cs](http://www.catwatchnewsletter.com/cs)  
or write to: CatWatch, P.O. Box 8535,  
Big Sandy, TX 75755-8535. **800-829-8893**



CatWatch\* (ISSN: 1095-9092) is  
published monthly for \$39 per  
year by Belvoir Media Group, LLC,  
535 Connecticut Ave., Norwalk,  
CT 06854-1713. Robert Englander,  
Chairman and CEO; Timothy H. Cole,  
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# Feeding the Cat with Cancer

*Decreased appetite and weight loss are expected*

**T**reating a cat with cancer takes a whole-health approach. It's more than treatments. It's your attention to your cat's daily life. One area that needs extra attention is decreased appetite.

Weight loss can be tough to see because it's so gradual. You should weigh your cat every week if possible. The sooner you recognize she's losing weight, the sooner you can address the problem.

Like people, many cats with cancer suffer from muscle wasting and weight loss even if they eat normally. This condition is called "neoplastic cachexia." In a cancer state, a cat's energy needs are usually increased and glucose production increases. Muscle and fat breakdown may occur simultaneously, as the cancer competes for energy.

## Adjusting the Diet

In some cases, the physical nature and location of the tumor cause the cat to become anorexic, while in others the tumor affects the cat's desire to eat and/or utilize nutrients.

"If the cancer involves the gastrointestinal (GI) tract, a cat may have trouble absorbing nutrients," says Margaret McEntee, DVM, DACVIM, DACVR, professor of oncology at the New York State College of Veterinary Medicine at Cornell. "Or if it has oral cancer, it may have trouble eating. It's not uncommon that a cat with cancer will not eat well and will lose weight," she says.

Tumor cells preferentially use carbohydrates to promote their growth. As a result, dietary recommendations for feline cancer patients are for foods with a high fat content and no more than 25% carbohydrates on a dry matter basis. These properties can be difficult to find in most adult cat foods, and there are no cancer-specific diets on the market. Your best bet is kitten food. Many meet this nutritional recommendation and can be used for your adult cat with cancer.

Making nutrients easily available to the digestive system will improve absorption. For example, cobalamin (vitamin B12) deficiency commonly occurs with gastrointestinal lymphoma, the most common feline cancer. To combat this, your veterinarian may supplement your cat's vitamin B12 with under-the-skin injections.

## Managing Pain

A cat in pain may hide and refuse to eat. Gabapentin (a medication frequently used to treat neuropathic pain) can help, as can opioids like buprenorphine and tramadol or an anti-inflammatory drug like robenacoxib (Onsior).

## Managing Appetite

Obviously, a highly palatable and digestible food is important, but the cat needs to want to eat it, too. Encourage your cat by using the juice from a can of tuna mixed with her regular diet or diluted with some water to drink.

Almost any meat or fish choice that is warmed up slightly will give off strong odors to help entice the cat. Sick cats often have an impaired sense of smell, so "stinky" foods may get their attention. "You will become a good customer of all those tiny, expensive cans of cat food," says Katherine Houpt, VMD, Ph.D., ACVB, Cornell University Emeritus Professor of Behavior Medicine. "Do not stock up on one flavor; for example, feed salmon on Monday, turkey on Tuesday, beef on Wednesday." Adding bits of meat can also make mealtime more exciting.

## Treatment Side Effects

Managing side effects is critical to maintaining appetite. Radiation and chemotherapy can cause nausea, vomiting, diarrhea, oral ulcers, and anorexia. Medications to combat

these include ondansetron (Zofran), metoclopramide (Reglan), and maropitant (Cerenia). Each of these drugs works in a different area of the body, and they can be used together to manage severe GI symptoms. They can be given by injection if a cat is unwilling to take oral medications or is vomiting.

Prebiotics and probiotics may help reestablish disrupted intestinal bacterial populations that lead to diarrhea. Metronidazole (Flagyl) has immunomodulating effects in the gastrointestinal tract and can improve diarrhea.

In cats suffering from oral ulcers, "Magic mouthwash" can help. This is a compounded slurry often containing lidocaine, diphenhydramine (Benadryl), and sucralfate, a coating agent, to soothe oral and esophageal burns.

## As the Cancer Worsens

Feeding tubes may become necessary. Esophagostomy tubes are placed via an opening in the neck and advanced to the end of the esophagus. Food and medications can be placed into them. These tubes can be left in place for months and can help prevent food aversion while a cat undergoes chemotherapy and/or radiation.

A feeding tube is not an easy decision, and quality of life considerations and long-term goals are important to assess. If the tube is a temporary bridge, it may be an excellent option. If all other options have been exhausted, and a patient still refuses to eat, reevaluation of goals is worth considering.

Managing a cat with cancer can be challenging, even with close attention to the cat's eating. Keeping your cat comfortable, well fed, and pain-free should be your goal. ■

## GI Side Effects of Cancer Treatments

Treatment	GI-specific side effects	Management
Chemotherapy: targets rapidly dividing cancer cells but also affects/damages rapidly dividing GI cells	Nausea Vomiting Diarrhea Little-to-no appetite	Antiemetics Appetite stimulants Feeding tubes Dietary modification
Surgery: somewhat dependent upon where surgery is performed	Pain Anxiety	Anti-Inflammatory drugs Opioids Gabapentin
Radiation: collateral damage can occur to nearby organs such as salivary glands, GI tract	Oral ulcers Nausea Vomiting Diarrhea	"Magic mouthwash" Pain relief Feeding tubes



# Rabies Cases in Cats

*It's far more prevalent than most people believe*

**W**e tend to associate rabies with dogs, but rabies cases reported to the Centers for Disease Control and Prevention (CDC) show that far more cats than dogs contract rabies. In 2015, 67 rabid dogs and 244 rabid cats were reported to the CDC; in 2017, rabies was found in 62 dogs and 276 cats.

"Cats were the most frequently reported rabid domestic animal in the United States during 2017 and have been so since 1992," says the *Journal of the American Veterinary Medical Association*. "The percentage of tested cats found to be rabid in 2017 was the highest it has been since 2008. Most of the rabid cats were reported from states where the raccoon rabies virus was considered enzootic."

Rabies is deadly, and even minor exposure can result in infection. The rabies virus travels along nerve pathways to the brain in mammals. A diagnosis can only be confirmed after death, with an examination of the brain, which is why it's so important to catch a suspected rabid animal.

Animals with rabies show varying symptoms, including:

- ▶ Aggression
- ▶ Drooling
- ▶ Fear
- ▶ Paralysis

- ▶ Seizures
- ▶ Staggering
- ▶ Swallowing problems

But odd symptoms are known to occur, too. Rabid cats may begin to act vicious, scratching and biting, but some individuals instead become affectionate. Wild animals may lose their fear of humans. Nocturnal animals may be seen in daytime.

## Why Cats?

Obviously, outdoor cats and cats living in feral colonies or working as barn cats are at a higher rabies risk, but even indoor cats can be exposed to rabid bats that get into the house. Still, despite a nearly 100% effective rabies vaccine, many cat owners neglect this shot and there's little to stop them. Few communities license cats the way they do dogs, requiring a rabies vaccine. Even fewer have feline leash laws. Cats who are allowed outside access commonly roam about freely, making the likelihood of close contact with wildlife higher than with dogs.

Cat and raccoon encounters are the most common way for rabies to be transferred to a cat. The virus can enter the cat via infected raccoon saliva when the cat is bitten. The virus will often replicate in muscle cells but then travels

## Vaccine Laws Vary Among States

Regulations regarding rabies vaccination of cats vary among US states, and many rely on the guidance of the "Compendium of Animal Rabies Prevention and Control" presented by the National Association of State Public Health Veterinarians (see <http://bit.ly/rabiescompendium>). For instance, Hawaii only requires vaccinations for dogs (and possibly other animals) entering the state. Georgia leaves decisions about resident pets to the individual counties. You can review the list of regional regulations by downloading a PDF from the AVMA at <http://bit.ly/rabieslaw>.

Although some state laws are more lenient regarding vaccination requirements for other animals (cats, ferrets, horses), if all pets were vaccinated, people would be less likely to contact a rabies-infected animal. To try to control rabies in wildlife, a highly specialized oral rabies vaccine can be used to reach susceptible populations of raccoons, coyotes, and other wildlife in some instances.

along neural pathways to the brain. In cats, symptoms may take as long as a month or longer to become evident, depending upon the severity of the bite wound, how much virus was transmitted, and how far the bite wound is from the brain. Once signs appear, the disease progresses rapidly and is fatal.

## Incubation Period

The rabies virus is always present in the saliva of an infected cat. If that cat bites a person, that person will be infected.

Rabies incubation times vary for a cat who has been bitten by an infected wild animal. The average is about two months, but the scientific literature suggests a range from two weeks to months or even years in rare cases. This variability can result from the amount of virus transmitted to the cat as well as the severity and location of the bite wound.

During this time the virus is migrating to the brain and salivary glands. The rabies virus is already present in the saliva before the cat will start to show signs of illness, so if that cat bites a person the person will be infected. The



Cat and raccoon encounters may occur in the most unlikely places. Vaccination is your rabies defense.



## What You Should Know

- ▶ An unknown animal should be handled as if rabies is a possibility, especially if it shows any signs of illness or odd behavior.
- ▶ If you're bitten, the animal should be quarantined for 10 days, according to the Centers for Disease Control and Prevention (CDC), even if it appears healthy. Local laws may be more strict.
- ▶ If you genuinely cannot afford a rabies vaccine, some local animal charities and towns offer free clinics.

cat will show clinical signs within 10 days of the virus being shed in the saliva.

### Symptoms

Rabid cats tend to show the "furious" form of the disease—aggression with vicious biting, clawing, and attacks—about 90% of the time. While any change in behavior can indicate rabies infection, the furious form is divided into three sets of clinical signs.

**The Prodromal Phase.** In this first phase, signs can be mild and nonspecific, lasting 12 to 48 hours. Your cat might have a fever, miss her meals, and show some gastrointestinal upset. Changes in behavior, such as aggression, avoidance of contact with people, or unusual affection, may appear but can be easily overlooked.

**The Furious Phase.** In this second phase, cats may suddenly attack, demonstrate increased vocalizations or aimless pacing, and may experience seizures. If the infecting bite is near the head, problems swallowing, unusual eye movements, and tongue paralysis may be observed. Bites on the legs may first manifest as an ataxic gait or seizures.

**The Paralytic Phase.** About five days after the first clinical signs, the third and final phase usually begins. It involves paraparesis (partial paralysis of the lower limbs), incoordination, generalized paralysis, coma, and death. While most cats die in three to four days, the clinical span of the illness can range from one to 10 days.

### Vaccinate

Keeping your cat indoors may help protect your cat from rabies, but cats can and do escape, and bats will enter houses. The ideal protection is vaccination.

The American Association of Feline Practitioners does not currently consider rabies to be a core vaccine, meaning it is suggested only for cats whose lifestyles may expose them to other rabid animals. Rabies vaccination of cats is, however, required by law in some states. Other veterinary organizations believe rabies should be a core vaccine.

Vaccine options include killed virus vaccines or a recombinant canary pox virus vaccine. Kittens may have maternal antibodies for rabies present from colostrum (first milk) from their queens until 12 to 16 weeks of age, and since these may interfere with the effectiveness of vaccines, vaccination schedules usually extend beyond this period (i.e. older than 16 weeks of age). Most commonly, a booster will be given one year later and then boosters every three years. Vaccine-induced antibodies reach a peak about four to eight weeks after vaccination.

Vaccinations are considered a potential cause of feline injection site sarcomas (FISS), a relatively rare but aggressive form of cancer that occurs in approximately 0.001 % of cats that are vaccinated. Due to the risk of FISS, rabies vaccines are most commonly administered either below the stifle (knee) in the right hind limb or in the tail to facilitate easier surgical tumor removal in the unlikely event that FISS develops.

It is important to remember that the incidence of FISS is not high, and



*The most common location for a rabies vaccine is the rear hind limb, although some veterinarians choose the tail.*

that the risk of not vaccinating a cat for rabies is almost always greater than the risk of FISS developing. A cat who is bitten by a rabid animal and not current on vaccinations may be required to be boarded securely under quarantine for 10 days (depending on law) or to be euthanized. If an unvaccinated cat with the potential for being rabid bites a person, many areas will require euthanasia so tissues can be tested for rabies to determine if human post exposure vaccination is required.

If a cat not up to date on rabies vaccination dies within 10 days after biting a person, regardless of the context of the bite, testing of the brain may be required by law (and at your expense). This is because the cat cannot complete the quarantine period.

Rabies is virtually 100% fatal, so vaccination simply makes sense. ■

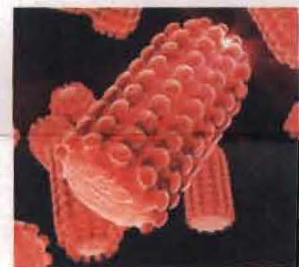
## What Is Rabies?

Rabies is a lethal *Lyssavirus* virus that causes encephalomyelitis, which attacks the nervous system of mammals. It is spread in saliva, usually through a bite, but it can also be transmitted via an open wound or sore. Carnivores and bats are considered reservoir-host species. Cases in humans have been noted as far back as 1800 BC.

Rabies is a serious zoonotic disease (animal disease that can be passed to humans), with 59,000 people dying of rabies each year, according to the World Health Organization. People can become infected via bites, scratches, and saliva from a rabid animal contacting broken skin.

According to the American Veterinary Medical Association, most animal cases occur in skunks, raccoons, bats, coyotes, and foxes. Cats are the most common domestic animal to be infected, but bats are the most likely overall carrier, says the Centers for Disease Control. Vaccines are available for humans, dogs, cats, ferrets, horses, cattle, and sheep.

Researchers can identify different strains of rabies, i.e. skunk vs. bat vs. raccoon, but all strains can infect cats, dogs, and people.



*Rabies in the blood looks like a bullet-shaped rod. It has RNA (ribonucleic acid) as its genetic material.*



# Managing Rival Cats

*Keeping the peace requires adequate resources*

Just like people, not all cats like each other. Maybe your cat is not thrilled about the latest feline addition to the family, or two long-time housemates are no longer seeing eye to eye. Whatever the cause, there are some things you can do to manage rival cats and prevent rivalries from escalating.

## Notice the Signs

Prevention is the best medicine. Every once in a while, really watch what your cats are doing and how they interact with each other. "Obvious behaviors displayed by cats who are not getting along well include growling, hissing, swatting, chasing, and attacking," says Pamela Perry, DVM, PhD, ACVB Behavior Resident at the New York State College of Veterinary Medicine at Cornell University. But just because there are no active fights doesn't mean that all is well in the kingdom.

Dr. Perry says, "More subtle signs that may go undetected include staring and posturing. For example, [one] cat may have his ears turned back and stare intently at the other cat. He also may block access to parts of the house, thus forcing the 'victim' cat to make a wide arc around him."

These small slights can add up



*The sitting cat's backward ears and pointed stare are telling the orange and white kitty, "Move! I want this spot!"*

and cause increasing stress to the cats involved. Everyone has off days, but if you notice these behaviors happening on a regular basis, some changes may need to be made to prevent the cats from escalating to full-on fights.

Other signs that may indicate your cats are not getting along well include eliminating outside the litterbox and/or urine marking. This can be because one cat is preventing the other from accessing the litterbox, or because the two cats are marking out their "territory" in the house. If one cat is being picked on by another, he or she may frequently hide.

## Stepping In

Whether you can let the cats work things out on their own or need to step in depends on the severity of the rivalry and the frequency of issues. Dr. Perry says, "Mild agonistic encounters, such as an occasional spat that ends quickly without injuries, usually do not need owner intervention, especially if there are enough perches and hiding spots available so that the cats can avoid each other until the conflict is resolved." These little spats can sound terrifying due to the noise, but only some hair will be ruffled.

"If two cats are overtly fighting, they should not be allowed to work things out on their own," advises Dr. Perry. "In addition, if one cat frequently blocks access to areas of the home or persistently ousts the other cat from a resting area, then intervention may be necessary." For cats who are seriously fighting and at risk of harming each other, separation is in order, either temporarily or permanently.

You can step in to stop bullying early. "If owners notice one cat staring at the other or blocking access to an area, they can calmly redirect the aggressor by tossing a toy or treat nearby or by calling him away from the area and engaging him in an appropriate behavior," Dr. Perry says. Distracting the cat who is being a jerk relieves the tension of the situation, whereas correcting the cat for his poor behavior (by spraying him with a squirt water bottle, for example) could cause redirected aggression toward the other cat.

## Strategies for Success

Resource management is the best way to keep rival cats happy and out of each other's hair. "Both cats should have separate but equal areas in the home so that they can 'time-share' their environment," says Dr. Perry. "These areas should have separate resources, such as food, water, resting areas, perches, scratchers, and litterboxes, to allow the cats to co-exist without needing to encroach upon the other's space."

Physical barriers are often not necessary as long as resources are located throughout the house so that one cat can't block the other cat from something he or she needs. For example, a single feeding station located in a bathroom is easy for one cat to block off. Setting up two food bowls (or more depending on how many cats you have), each located in separate parts of the house, ensures that each cat can always access food even if a bully has claimed one spot.

Also, make sure that each cat gets some one-on-one attention from you every day. Cats can consider their owners coveted resources, too! Petting and grooming can help to enforce your bond with your cat, and playtime is both fun and good exercise—and a tired cat will have less energy to put toward harassing a feline rival.

Dr. Perry warns, "If there is frequent aggression between the cats, they should be separated completely until a program of systematic desensitization and counter-conditioning can be implemented (with the help of a veterinary behaviorist)."

Behavioral management and training take time, but it is well worth the effort to ensure your cats' safety and well-being. In the meantime, use closed doors to keep the rival cats apart so that they can't stress out or harm each other. In extreme cases, it may be necessary to place one cat in a new home. ■

## What You Can Do

- ▶ Pay attention to your cats' body language and watch for signs that they aren't getting along
- ▶ Set up food, water, popular perches, and litterboxes in multiple areas of the house to reduce resource guarding
- ▶ Give each cat one-on-one playtime with you for exercise and attention
- ▶ If you notice posturing or blocking behaviors, distract the aggressor with a toy or by calling him/her away to do something else
- ▶ Never break up a cat fight with your hands. Use a broom or towels so that you don't get bitten or scratched by accident



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# Nicotine, Vaping, and My Cat

*Elizabeth tackles a timely health topic*

**Q** My 8-year-old domestic shorthair panther, Max, has lost his appetite and is losing weight. Kidney values/bloodwork are normal, so the vet is looking at environmental factors as a possible influence. My neighbor uses an electronic nicotine delivery device (e-cigarette) extensively, to the extent that I feel that it may be affecting my health. Is there any research involving vaping and cats, particularly the influence of neonicotinoids on appetite?

**A** I am very sorry to hear of Max's problems. Of course, there are many reasons that a cat might lose his appetite and weight, from dental disease to kidney disease (perhaps not supported by bloodwork in your case thus far) to various forms of gastrointestinal disease, so the most important thing is for you to continue to work with your veterinarian to rule out the more common and well understood causes of these signs in cats and to address any that may be identified.

Your question regarding the effects of e-cigarettes is certainly timely, as this relatively new technology has received significant attention from public health officials (and the media) with respect to potential negative health effects on the people that use them.

The short answer to your question is that there is very little published



*Many things can affect your cat's willingness to eat. If he stops eating with his normal enthusiasm, talk with your veterinarian.*

scientific data regarding the effects of the nicotine vapor that is produced by these products on the health of cats (and pets in general), but perhaps a review of the effects of nicotine on animals may be a reasonable place to start this discussion.

The physiologic effects of nicotine (whether inhaled or ingested) are caused by its binding (attaching) to receptors (called nicotinic receptors) in the central nervous system.

These receptors are important for the normal function of what is called the autonomic nervous system, which is that part of the nervous system that functions to control things like blood pressure, respiratory rate, heart rate, temperature regulation, and circadian rhythms (physiologic changes that are synchronized to daily light cycles).

The autonomic nervous system functions without us (or our pets) being aware of it, as opposed to the

cognitive function (thinking, reasoning, remembering) of our nervous systems, which can also be affected by nicotine. Of course, nicotine is also highly addictive, and this addiction is likely caused, at least in part, by mechanisms that are distinct from its physiologic and cognitive effects on the nervous system.

Signs of nicotine toxicity in people may include high heart rate, high blood pressure, indigestion, nausea, dizziness, insomnia, nervousness, headache, diarrhea, and an unpleasant taste in the mouth; and those of these signs that we can document in animals are also commonly seen in animals with nicotine toxicity. Interestingly, there are also studies showing that nicotine exposure may change the behavior of animals.

While I do not know about the proximity and physical arrangement of your home with respect to that of your neighbor, it is likely that for your neighbor's use of e-cigarettes to affect Max's exposure to nicotine, this use would have to be extreme and prolonged. Interestingly, there are published studies investigating the use of feline hair nicotine concentrations as a potential assay for nicotine exposure in cats, but these are pilot studies that require follow-up work to validate their accuracy and potential application.

It is probably more likely that Max's problems are due to other health issues, so please continue to work with your veterinarian to rule these out. Of course, doing whatever you can do to minimize any exposure to nicotine vapor (i.e. air purification) could not hurt in the interim, and I hope that this discussion has been helpful.

Best of luck, and please send us an update when you can.

All my best,  
Elizabeth

Elizabeth works with the Cornell Feline Health Center to provide answers on this page (vet.cornell.edu/fhc/). Write to her at catwatcheditor@cornell.edu or CatWatch

535 Connecticut Ave., Norwalk, CT 06854. We welcome digital photos of your cat to consider for use with your question.



## Coming Up ...

- ▶ Life for the Cat Without Teeth
- ▶ What You Should Know About TNR
- ▶ Laryngeal Diseases in Cats
- ▶ Sources for Building or Buying a Catio

## © HAPPENING NOW...

**Whoops**—WBIR-TV in Knoxville, TN, reports that a local animal lover was caring for a bobcat kitten, not realizing it wasn't a lost domestic kitten. She had no idea the tiny bobcat, named Arwen, was a wild animal. The kitten is now being cared for by a wildlife shelter.

**FPV Outbreak**—Longbeach, CA, news outlet Patch reports that Long Beach Animal Care Services officials are working to combat a feline panleukopenia virus, or FPV, out

break among shelter cats. The virus can be fatal for unvaccinated cats.

**Pillows for Cats**—Bertha Singer, 88, is making pillows for the Meshoppen Cat Rescue, combining her love of cats and sewing, reports WNEP-TV in Moosic, PA. She learned there were about 100 cats at the shelter who needed spots to snooze. "She has early-onset dementia, and it keeps her hands busy and her mind active," said her daughter Ethel Singer Walter. ■



Konstantyna Oljko | iStock photo