

Keeping Your Cats Healthy: Guarding Against Panleukopenia

By Nancy Lawson

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In a big city with a sizable cat population, in an animal shelter with caring staff and progressive programs, in a bright and cheery cat adoption room, in a freshly disinfected cage full of kittens, an enemy in disguise lies waiting.

It is tiny and unobtrusive, masking in the form of a leftover piece of litter wedged into a door hinge or a hardened bit of kibble crusted beneath the lip of a food bowl.

To the casual eye, it appears at most a nuisance, hanging out in innocuous-looking dirt particles—and even those are out of view, hiding in spots most likely to escape the wrath of the daily cleaning regimen. Everything sparkles and smells great, and besides, a little dirt never hurt anyone, right?



Wrong. Just put those dirtballs under a microscope, and you'll find it: a microorganism that has nothing better to do than wait around for some unsuspecting kitty to rub his whiskers against it. It could be a day, it could be a week, it could be a month; to a virulent little bug like the panleukopenia virus, time is not of the essence. The virus is so strong and so resistant to the ravages of time and disinfectants that it can live for a year or more on common surfaces—food bowls, litter pans, cage doors, gloves, toys, sponges.

A parvovirus similar to the one that infects dogs, panleukopenia can strike any member of the feline family, from a domestic cat to a panther, and can also attack wild animals such as raccoons and minks. The disease seems to have made itself more at home in shelters over the last several years, though no one is sure why. Although the virus has long been ubiquitous in the natural environment, effective vaccines and thorough cleaning have, until recently, helped to keep the bug at bay.

Some blame the apparent increase in shelter panleukopenia cases on pet owners who may be getting nothing more than the requisite rabies vaccinations for their pets. Others theorize that the problem derives from the mild winters of the late '90s; extreme temperatures can kill viruses or at least slow the reproductive cycles of their host populations. But a less crotchety Old Man Winter may actually have little to do with the recent outbreaks: While the panleukopenia virus is most comfortable at room temperature, it can survive a freeze and is resistant to heat up to about 133 degrees Fahrenheit.

Regardless of the cause, the effects can be deadly to animals and heartbreaking for staff and community members. "[In shelters] you have people who are really committed to not only taking care of these animals, but loving them and doing everything they can to help them become adoptable," says Kate Rindy, executive director of the Santa Fe Animal Shelter & Humane Society in New Mexico. "And then you have a disease that moves so rapidly, that is so difficult to treat. I think this disease—it shocks people. ...It's agonizing."

Even for shelter employees accustomed to dealing with painful losses, panleukopenia is particularly harrowing. It can come on fast and furious, and often without warning. In a common scenario, an animal care tech bids good night to some seemingly healthy kittens, turns out the lights, and goes home, only to return the next morning to find those same animals dead in their cages.

Read the other articles from the [May-June 2001](#) issues on guarding against panleukopenia.

[Panleukopenia—The Word of Choice?](#)

[Developing Immunity in the Shelter Community](#)

[The Question of Treatment](#)

[Feline Panleukopenia Fact Sheet](#)

"We struggled with it for a month and found it to be the nastiest thing we had ever dealt with and the most difficult to get rid of," says Deb Clark of her experiences with panleukopenia at the Kennebec Valley Humane Society in Augusta, Maine, where she worked for nine years before recently taking a position with the Animal Refuge League in Westbrook. "We literally had to stop adoptions because we didn't know when it was going to pop up, and we had to stop adoptions for a couple of weeks during the busiest time—which was the summertime, when we had so many kittens. So the first time [it happened], it was incredibly devastating."

And therein lies one of the greatest challenges presented by panleukopenia—the first time a shelter employee sees its symptoms, she may have no idea what she's looking at. Even veterinarians, who rarely see the disease in private practice, are often baffled when the virus rears its ugly head, says James Richards, DVM, director of the Cornell Feline Health Center at Cornell University.

Knowing Your Enemy

Without any prior experience with panleukopenia, people with veterinary backgrounds can indeed be blindsided by it. Twelve years as a head veterinary technician and manager in a private practice was still not enough to prepare Lou Garber for what he experienced in November 1999. Seven days into his new job as the director of clinical medicine and kennel operations for the Animal Rescue League of Western Pennsylvania in Pittsburgh, Garber faced a massive outbreak. Cats had diarrhea, and kittens were "fading off and dying on us," he says.



Kittens are especially susceptible to the panleukopenia virus, which may attach rapidly dividing cells in the cerebellum, the gastrointestinal tract, and the lymphoid tissues.

"I'd read about panleukopenia before ...but I'd never actually seen it," says Garber, who is now the manager of the Humane Society of Southern Arizona in Tucson. "Because of the inexperience [with the virus], I thought it might have been food problems or just coincidence. I just wasn't really a hundred-percent sure. And I got my doctors involved here, and we did some [necropsies], and we ...did some parvo tests on cats, and they were coming up positive."

The disease can thrive in confined environments with high volumes of animals, so proper disinfection and isolation procedures are critical to preventing transmission.

It was the beginning of a long and painful journey for Garber and his staff. Garber is still noticeably shaken when he describes those first few days he spent investigating the disease, seeking advice from other shelters, national animal protection organizations, and the Centers for Disease Control and Prevention. All of the Animal Rescue League's cats had been exposed, and many parvo tests were coming up positive; Garber wanted to find out if there was anything he could do for his cats besides euthanize them. But wherever he turned, he was met with the same answers: Even with supportive antibiotic therapy—which can be prohibitively expensive for shelters—cats and kittens with panleukopenia may still die. Furthermore, the contagiousness of the virus makes treatment in a shelter setting a risky proposition; it can move so fast through a feline population that drastic action is usually necessary. To break the cycle of rapid exposure, the staff had to euthanize 130 cats during the first week of the outbreak; they shut down adoptions and launched a major disinfection campaign that turned into a 44-day battle against the bug.

"The biggest part of the panleuk is to get the staff to understand what's going on, and to have them cooperate with you," says Garber. "It was just unbelievable how much everybody pulled together and worked as a team. ... I told them, 'It breaks my heart to do this. This isn't why we're here. We're here because we're compassionate people and we love animals, but this is the most compassionate thing we can do.' "

"Panleuko-huh?!"

Learning about the disease—its cause, symptoms, and means of transmission—can help your shelter pull together in a similar manner during those critical times when you've identified signs of a potential infection. Making sure your entire staff is aware of the warning signs can also improve the effectiveness of your prevention and monitoring protocols.

You'll never be able to guarantee that panleukopenia won't touch your facility: it's a disease that originates in the community at large and makes its way into the shelter. "There's no way that any shelter can manage...in a way that absolutely eliminates the possibility of panleukopenia," says Richards. "What we're talking about here is to try to minimize the problem, and to try to minimize the losses that [shelters] experience."

Understanding panleukopenia starts with understanding the word itself. "Panleukopenia" is an amalgamation of the Greek "pan," meaning every; "leuko," meaning white; and "penia," meaning a reduction in the circulating blood. Literally, the word refers to a reduction in the white blood cell count, and cats with the virus reach their lowest count about four to six days after initial infection; at this point their immunity is so diminished that they become highly susceptible to secondary bacterial infections.

The white blood cells are prone to such attacks because they are rapidly dividing, creating the perfect conditions for replication of the panleukopenia virus. Lymphoid tissues and cells that line the intestines are also vulnerable; damage to these cells can have profound effects on the gastrointestinal tract.

Sudden death results from the most severe form of the disease, or the "peracute" form; kittens with peracute panleukopenia may appear perfectly healthy until the final hours. "We were finding animals dead in the cage almost every morning," says Vanessa Beach, office manager of the Jersey Shore Animal Center in New Jersey, which experienced a bout of panleukopenia last summer. "It was awful. Animals [would] seem fine one day, then seem a little lethargic the next day, and then the next morning we would walk in and they were dead."

The shelter had to shut down adoptions for a month and euthanize about 40 animals, most of whom were kittens. Not all the animals had developed peracute panleukopenia; many suffered from the "acute" form of the disease, which is also deadly but gives itself away through noticeable symptoms first: fever of up to 104 degrees Fahrenheit or more, depression, vomiting, and sometimes diarrhea that is abnormally foul and even bloody. The fur of affected cats may become rough and dull, and enlarged lymph nodes in the abdomen may cause kitties to react in pain if someone touches their bellies.

Some kittens may appear to be trying to drink, albeit unsuccessfully. "They get extremely dehydrated," says Richards. "We can at that stage see these kitty cats with their heads hanging over the water dish ...and I think that's really just a manifestation of their severe dehydration and just feeling terrible."

Of all the symptoms, the most common is the vomiting, says Richards. "That's the thing that we were noticing most—[along with] vile-smelling diarrhea," agrees Beach. "And when we started taking temperatures, they would skyrocket one day, and the next day they would be low, and the day after that, they would zoom up again. And it was so quick. The cat would be fine one day and then the next day he would be really lethargic and he would vomit and have a fever."



Anything from the bottom of a paw to the bars of a cage can be a "fomite," a surface on which viruses and bacteria live. Left to its own devices, the panleukopenia virus can exist for a year or more on litter boxes, food bowls, and other common items, resisting almost everything but a solution of 1 part bleach to 32 parts water.

The Duel Between Vaccines and Antibodies

Although the virus can strike cats at any age, three- to five-month-old kittens are the most susceptible, says Richards. Vaccines for panleukopenia are some of the most reliable feline vaccines available, but they must be given in a series of boosters over an extended period; vaccines administered only once early in a kitten's life may be deactivated by the disease-fighting antibodies he has received from his mother's milk.

"One of the things that will happen is that people will say, 'You know, I've had these kittens vaccinated And yet they still came down with panleukopenia. How can that be?' " says Richards. "And the reason is that we can have maternal antibodies that are high enough that they will essentially gobble up the vaccine."

Despite their ability to unleash a Pac Man-like prowess on the vaccine, maternal antibodies may at some point be less bold when it comes to attacking the real virus. Kittens absorb the antibodies during the first 24 hours after birth, and the antibodies can protect them from disease for a number of weeks. The trouble is, that number varies from kitten to kitten; maternal protection can begin waning anywhere between the sixth and twelfth week of the kitten's life. But shelter staff responsible for vaccinations don't have to leave everything up to guesswork; administering boosters at regular intervals can help ensure ongoing protection of kittens.



Even though shelter employees confront illness and death nearly every day, most find panleukopenia to be a particularly devastating disease; in some cases, kittens look fine or just a bit lethargic one day—and are dead by the next morning. Learning a bit about the disease helps staff members identify potential cases and take precautions that can prevent further transmission.

Unlike kittens, unvaccinated older cats who have spent time outdoors have a good chance of surviving infection and may not even show signs of the disease after exposure; the virus is so prevalent in the environment that most cats will have built up their own resistance to it. In fact, about 80 percent of unvaccinated cats will have developed antibodies for the virus by the time they are a year old, says Catherine Sayler, DVM, of the Santa Fe Animal Shelter & Humane Society.

"They'll either have gotten it as a kitten and been the one in three who survived it, or they will have gotten it at six or eight months of age and had what we call a subclinical infection, where they get next to nothing happening and survive," says Sayler. "But we know that in unvaccinated cats, in a barn setting or in a feral cat population—anywhere where we are sure they're unvaccinated—the [panleukopenia] has infected their system by that time. And that's why we say it's ubiquitous in the environment, outside of the shelter or anyplace else. ...If you go to a barn, you'll find the virus everywhere. You could pick it up, you could culture it, you could find it all over. And it's just been there for 50 years, or however long the barn's been built."

While the virus is everywhere in nature, it can be much more concentrated in confined environments like barns and shelters—and it is those high concentrations that are the most worrisome, Richards says. Infection occurs when cats ingest the virus through their mouths; infected cats then shed the virus prolifically—through saliva, urine, and other excretions. "The virus is shed in just humongous quantities in these cats that are infected and showing signs of disease," Richards says. "So these little guys who are vomiting or who have diarrhea—there's just a gazillion viruses in that."

Equally disconcerting is the fact that animals who show few if any signs of infection can also be contagious. "You could get a six-month-old cat in who just didn't eat one day, who was really dealing with the [panleukopenia] virus, and we wouldn't be able to pick up on that," says Sayler. "Otherwise, he seems fine and just seems like he was depressed because he was brought into the shelter. And yet he could keep shedding the virus for two to four weeks."

That's what happened when the Santa Fe shelter suffered a panleukopenia outbreak three years ago, says Rindy. "The most challenging thing is that

we would send out animals who were showing absolutely no clinical signs, who seemed healthy," she says. "And then we'd hear that they had gotten sick, and very often they'd die. And I think we lost probably at least 10 cats then. It was one of the most painful experiences our staff had ever been through."

Washing Everyone's Hands of It—Literally

That kitten who appears healthy could be shedding the virus onto his litter box, his food bowl, his cage, his towel, his toys. And, depending on the policies and setup of the shelter he's in, adopters, volunteers, and staff could potentially be spreading that virus from cage to cage with their hands, scrub brushes, and clothing.

"You can't breathe it in by standing next to a cat," says Sayler, "but it lasts on what we call 'fomites,' which is just any surface—a bowl that didn't get washed well, [cage bars] if a cat sneezed on the bars and a little bit of virus got stuck down between the bars and didn't get sprayed off. ... You can find it on surfaces up to a year after the cat [vomited] or had diarrhea."

These "fomites" are like free rides for viruses, giving bad bugs a taxicab from cage to cage, hand to paw, food bowl to kitty tongue. Anything from the thumb on your hand to the button on your coat to the plastic toy in a cage can be a fomite. And while many viruses and bacteria will succumb to ordinary disinfectants, a bug like panleukopenia is often able to evade even the virucidal solutions, clinging stubbornly to surfaces unless subjected to bleach and a strong and unforgiving scrub of military precision.

Before the Kennebec Valley Humane Society was hit with panleukopenia for the first time in 1998, Clark couldn't understand why other Maine shelters were having such difficulties controlling the virus. "I was somewhat judgmental in hearing about another shelter that had had it the previous year—I was judgmental about how long it took to get rid of it," says Clark. "But if I hadn't had Dr. Bergman's advice, we would have been in very much the same situation, just desperately trying to figure out where we were going wrong and not knowing how to fix it."

Clark is referring to Andrea Bergman, DVM, who manages the Franklin County Animal Shelter in Farmington, Maine. Initially, it took local veterinarians two weeks to help Clark determine the cause of the unusually vile vomit, the incredible listlessness, the lack of appetite, and the "inexplicably dead kittens" at the Kennebec Valley Humane Society, she says. But once Clark and her staff knew they had panleukopenia on their hands, it was Bergman who helped them free their shelter of it. Her suggestions for disinfecting were, without a doubt, what saved the shelter from a protracted outbreak, says Clark.

Like other shelters that have done battle with the virus, Kennebec Valley revamped its regular routine. Clark had to add more staff hours just to accommodate the more stringent cleaning regimens. Among other new procedures, employees removed cage doors and soaked them in a bleach solution between animals, and they donned fresh disposable gloves each time they handled a new cat. It was time-consuming and a bit more costly, but well worth the investment, Clark says. "It's more labor-intensive," she says, "but when you develop a routine, it's manageable."

At the Animal Rescue League of Western Pennsylvania, panleukopenia probably spread so quickly because the shelter staff and volunteers were not knowledgeable about the disease and the critical need to clean thoroughly, says Garber. "We changed every cleaning procedure that was done before I got there—everything, 100 percent," he says. "Nothing is done the



way it used to be."

Following the outbreak, Garber began devoting a special volunteer orientation specifically to disease and disinfection, explaining the shelter's past history with panleukopenia. "I've found through experience that your biggest problem with this is volunteers," says Garber. "Any volunteer group, like a cat-snuggling group or a college group, they just don't realize the importance of washing your hands.

If you aren't lucky enough to have Plexiglas cage fronts that show off your kitties but keep them safe from the fingers of an adoring public (top), you should ask visitors to refrain from touching kitties or to wash their hands before and after petting each animal.

"People go from cage to cage, and it's really hard to control people from putting their fingers on a kitten and then moving on to the next one and petting the next kitten," he says. "The techniques of my staff are right where they should be, but whenever you deal with the public, it's just hard to keep them under control."

Please DO NOT put your fingers in cages because you may spread upper respiratory infections from one cat to another.

To help ameliorate the dangers of transmission by the adoring hands of potential adopters, Garber had 17 antibacterial soap stations installed throughout the building, with signs requesting that people wash their hands every time they touch a new animal. Antiseptic mats—or mats that look like mini-swimming pools and wash the bottoms of shoes as people step onto them—were placed at entryways throughout the facility. (An alternative to purchasing antiseptic mats is to cover the bottom of a pan with about an inch of dilute bleach solution; employees can step in and out of these pans as they move from room to room.)

If you DO put your fingers in a cage (we know it's hard to resist), PLEASE WASH your hands before handling another cat.

—A big thank you from the animal care staff and the kitties!

Friendly signs with wording like the one above help explain why touching the animals can lead to infection.

When employees in the Santa Fe shelter were trying to wage an offensive strike against the panleukopenia virus, they not only halted adoptions but also policed the stray areas to make sure visitors kept their hands to themselves. "We had a general rule not to touch any of the animals when looking for a lost animal," remembers Rindy. "We had monitors to make sure that people weren't coming into contact with them."

The War on Bugs

Through better oversight, proper cleaning techniques, and the right disinfecting solutions, every shelter can become a clean, mean, bug-battling machine. Doing things right sometimes takes longer, but if the end result is less disease and less death, shelters will have saved a bundle in every respect.

Sometimes all the Bug-Be-Gone solutions and cleansing gizmos in the world won't help if you aren't being meticulous about the manner in which you use them; how you go about the cleaning process can be as critical as which products you use. Pointing a hose at a pile of feces and squirting it till it goes away may make employees feel as if they're washing their troubles down the drain—but they're probably only compounding them. In general, sanitation is a multi-step process, beginning first with the removal of debris such as feces, leftover kibbles, litter crumbs, and shredded newspaper. These organic materials may look like trash, but they should always be viewed as potential contaminants.

"What happens so often when you get into sheltering is staff just take the water hose and spray the manure down the drain," says Becky Rhoades, DVM, an HSUS consultant who is also serving as the interim executive director of the Kauai Humane Society in Hanapepe, Hawaii. "Sometimes they'll do the same thing with cat cages—someone will just take a hose through and clean cat cages with the hose. Then they proceed to just break up the manure and just put it all over the place, and it's up in the air, it's up on the walls, it's up on the ceiling. Even though they think they're directing the hose to shoot down, they've got it all over the place, and they've got it all over their boots, and they've got it all over themselves."

To prevent this invisible paintball effect, shelters need to set aside enough time for staff to completely scoop out debris before cleaning and disinfection—in kennels, cages, field services vehicles, and any other areas where cats may be placed, says Rhoades. At the Kauai Humane Society, Rhoades and her employees scrub and scrub prior to disinfection; the metal carriers from trucks sit in disinfectant for up to half an hour, but not before a vigorous scrub session. "If you've got hard manure on them, then you've really got to scrub it out before you disinfect them," says Rhoades. "If you just stick them in that soap bucket with a lot of manure on them, then your bucket is contaminated after two or three carriers, and then it's not going to do you any good."



Removing every last bit of debris from cages and kennels is the first step in the cleaning process. Bleach and disinfectants won't be nearly as effective if they have to do battle with leftover feces, scattered litter, and bits of kibble.

Rhoades's regular disinfectant of choice is a quaternary ammonium compound—commonly called a "quat." But whenever she identifies a potential disease problem, she follows the routine disinfection with a bleach rinse. When dealing with panleukopenia, this is especially important, say many veterinarians; nothing should be left to chance when combating a virus of such strength.

"Still the best disinfectant is one of the cheapest, but it stinks: the dilute chlorine bleach solution," says Richards, who recommends mixing 32 parts water with one part bleach—the equivalent of about four ounces per gallon. "I'm always skeptical of claims that a disinfectant will kill parvovirus. ... I know that in studies that have been done in the past of various kinds of disinfectants ... the disinfectant that was certainly the most reliable, and actually the only one that worked in these studies, was the chlorine bleach and water."

In fact, in recent years, some disinfectant manufacturers have had to relabel their products after tests have indicated that they don't kill certain bugs they were once purportedly able to eradicate. In a study called "Virucidal Efficacy of the New Quaternary Ammonium Compounds" (Journal of the American Animal Hospital Association, May-June 1995, Vol. 31), none of the four disinfectants tested had a significant effect on canine parvovirus, which is very similar in genetic structure to feline panleukopenia. Only two of the disinfectants significantly inactivated feline calicivirus, a common cause of upper respiratory infections; none of them actually completely inactivated it.

But even though bleach is often said to be the only foolproof solution for nasty viruses and bacteria, it has its downsides as well. Too much bleach may be irritating to the nasal passages of cats, and cages still wet with bleach can burn their little paws. Over time, bleach can also corrode inorganic materials, even metal cages. It can irritate human noses and stain clothes.

"One of the only things panleukopenia is really susceptible to is bleach, but it's really hard to work with bleach," says Bergman. "I don't own any clothing that doesn't have bleach stains on it. And your shoes start to fall apart when you step into the [bleach] foot baths."

The debate over bleach versus other disinfectants is longstanding. "Ask 10 people and you'll get 12 opinions," quips Rhoades. Garber, for example, has stopped using bleach almost entirely; he uses it only in his antiseptic foot mats, preferring a commercial virucide with residual effects for the cages and other surfaces in his shelter.

But despite the disadvantages of both bleach and non-bleach solutions, you can use them all to your shelter's advantage. By disinfecting with

For more information about controlling diseases through cleaning and prevention, see [Managing URI and Kennel Cough](#) in the January-February 1997 issue of *Animal Sheltering*.

For more information on cleaning cages and kennels, see [How to Clean a Cat Cage](#) in the May-June 1997 issue of *Animal Sheltering* and [How to Clean a Dog Kennel](#) in the July-August 1997 issue.

quaternary ammonium compounds every day and then reserving use of the bleach solution for every other day or every few days, you can lessen the surface damage and nasal irritation caused by bleach but still put bugs on notice that they are not welcome in your shelter.

Even though bleach is the most reliable killer of panleukopenia, when purchasing quats, shelters should still choose products that are labeled to kill strong viruses, says Rhoades. While Richards says he's not aware of a bug developing resistance to disinfectants, some shelters still play it safe by rotating the brands they use. If the disinfectant products you're using do not already contain degreasers, purchase a separate degreasing solution that will help you clean the filmy grime left behind by wet noses and sticky paws. Follow preparation instructions listed on product labels; mix solutions correctly and allow adequate contact time. Also be sure to rinse thoroughly so tender footpads don't suffer; some manufacturers may claim that rinsing is unnecessary, but don't buy it, says Rhoades. Animals have been known to develop mouth ulcers and contract scrotal dermatitis and other skin irritations through contact with disinfectant residue.

When using bleach solutions, you can follow similar guidelines; mixed and used appropriately, bleach is not toxic, says Richards. Play it safe by sticking to the 1:32 mixture ratio, avoiding the temptation to treat a problem with straight bleach or with a bleach solution that is too strong; more is definitely not better. Use the solution shortly after preparation so the bleach doesn't sit for too many hours and lose its effectiveness. Allow adequate contact time of up to 10 minutes or more. Rinse thoroughly, and make sure animals aren't being put back into water puddles. "With most disinfectants, you want to have the stuff dry before you put before you put the kitty cat on it, because it can be pretty irritating to their feet," says Richards. "So with any disinfectants, you want to apply them to the complete surface, you want to let them sit on the surface as long as you can, and then make sure it's completely dry before you put an animal in there."

Avoiding Plastic Perils

If you attack from all sides, disinfecting and bleaching and scrubbing, that bug under the lip of the food bowl or in the litter crumb has little chance of survival. It will be crying for mercy in a place like the Franklin County Animal Shelter, where Bergman and her staff routinely place food bowls, water bowls, litter pans, and cage doors in a tub of bleach solution. And they also scrub—a necessary step if you really want to get at all those renegade organisms hiding in little nooks and crannies such as metal cage card holders, says Bergman.

But it's the nooks and crannies in materials like plastic that are less noticeable and therefore more sinister; you may scrub and scrub but never be able to get at all the bugs. One innocent claw can be enough to break the smooth seal of a plastic litter pan or food bowl, creating tiny grooves where particles can take up residence. "One of the most common things you see in shelters are the ... plastic litter boxes that everybody uses at home," says Rhoades. "And they just don't work because they get a cat scratch when [the cats] cover the manure, so they break the surface of that plastic, and you just can't get that clean. ... Then you're really in trouble, so we really encourage people not to use plastic."

Better options include stainless steel litter boxes and food bowls; the litter boxes can be purchased from restaurant supply companies that sell them as cafeteria-style hot pans. But it can be difficult to find pans that are deep enough, says Rhoades; if they are too shallow there'll be cat litter all over the cage. To avoid these problems, especially during an outbreak, it may be easiest and least risky to use litter boxes and food bowls that are totally disposable.

For food bowls, Rhoades' shelter routinely uses cardboard boxes available from restaurant supply companies—cats' meals are served up in the same little containers you might get at the deli when you order a



Disease prevention doesn't have to mean a cold and barren environment; carpet strips, shoe boxes, and other cardboard containers can be very comforting to cats—and are totally disposable. By providing a few items like these for your kitties, you can help prevent the kind of

sandwich. For litter boxes, Bergman and Clark suggest using the sturdy rectangular flats that hold soda cans; cats need something large like this in order to comfortably conduct their stinky business. "We worked with and begged local establishments like the Shop 'n Save supermarkets, the Pepsi distributor, and a number of other businesses," says Clark. "We asked them to collect those for us, and we would pick them up once every couple of days. It was a free resource."

Each of these items is used once by one cat, and then thrown away along with all the germs it may have been harboring. Such anti-communal property rules would seem unenlightened in many environments, but the shelter is the perfect arena for the kitty capitalist. In fact, cats who enjoy toys can make out like bandits in Bergman's shelter. "You never share toys," says Bergman. "If one cat has a toy, then that's his toy forever. The toy stays with that animal." If the toy is still in good shape at the time of adoption, Bergman is happy to send it home with the kitty.

The practice of providing each cat with his own belongings should also be extended to his temporary housing. Some shelters transfer cats from cage to cage while cleaning, moving a cat from his own dirty space to a freshly washed one. But if a spot was missed in the new cage or a disinfectant didn't do its job completely, these cage swaps may further spread the very diseases employees are trying to combat. For this reason, Clark and her staff decided to assign individual cardboard carriers to each cat, to be used for the duration of that cat's stay at the shelter. Marked with the kitty's name and number and stored atop his cage, the carrier becomes a temporary hotel during daily cleaning. Whenever a kitty is ready to leave with his new adopters, he goes back into the same carrier for the ride home. "Those were permanent changes," says Clark, "that really helped to control the spread of all diseases."

Another way to cut down on disease transmission is to install antibacterial hand dispensers throughout your shelter, as Garber did, and rub the evaporative product all over your hands after the cleaning of each cage. Or, employees can use disposable gloves as they did at the Kennebec Valley Humane Society, donning new ones before the handling of each cat. Although gloves, sponges, cloths, or rags can be disinfected in a bucket between cleanings, that bucket will become tainted after repeated dipping. "[The bucket] gets overloaded with debris, and by your second or third cage, the disinfectant just can't adequately disinfect," says Rhoades. "[Disinfectants] work, but they only work when you don't have a lot of other stuff in the bucket. It gets quickly contaminated." Instead, Rhoades recommends using paper towels between each cage, along with spray bottles. For serious scrubbing, paper towels won't do, but you can do the scrubbing first with a brush and then soak cages in disinfectant afterward; the brushes themselves can also be disinfected between cages.

Seemingly harmless donated materials can harbor loads of bugs, so Bergman subjects even the bright and fragile knitted items to intense sanitation scrutiny. While Bergman tries not to hurt the feelings of people who give such items to the shelter with the best of intentions, she still warns them that the laundry bleaching process will probably detract from the appearance of their donations. "You donate something to us," she says, "and I'll have it beige in no time—I don't care what color it came in."

The cats don't care either, but they will notice the blankets and toys and shoe boxes you place in their cages. Creature comforts like these will help cats not only behaviorally and emotionally but also physically—by guarding against the stress that can weaken little immune systems. Shelters trying to maintain a clean environment don't have to forgo these softer offerings; they can just play it safe by using disposable hiding boxes, sending donated toys home with cats, and disinfecting blankets and other cuddling items.



They may not stay the same bright colors they were when donors brought them to you, but blankets and towels and little knitted items are more likely to stay disease-free if you bleach them between uses. And kitties like this one

By taking precautions like these, many shelters have found they have not only been able to stave off further panleukopenia outbreaks, they've also been more successful at minimizing the spread of upper respiratory infections and the like. Meticulous sanitation procedures just make sense—whether you're experiencing an outbreak or not, says Richards. "You never really know when you're going to have an outbreak, and all of a sudden you have got this real problem," he says. "Cleanliness is next to godliness, and that's really very much the case in shelters. Disinfection is a major part of that as well. So that should be an ongoing thing."

Keeping Tabs on the Tails

While cleaning and disinfection will help get rid of the unwelcome microscopic visitors to your shelter, observation of your animals will help keep the invisible invaders away in the first place, says Rhoades. "You can clean till you're blue in the face, but what is just as important is the management of how you've got your animals mixed and how you're moving them and monitoring their attitudes, appetite, stools," she says. "And I think that we get so overwhelmed with so many numbers—we go through and we feed and we clean—but nobody's really watching to see if the cat's eating, to check for diarrhea or sneezing and coughing, those types of things. Sick cats need to be removed from the general population immediately and provided with medical treatment or pulled for euthanasia—whatever your process is."

Because most infectious diseases unmask themselves within 10 to 14 days, it's a good idea to quarantine incoming animals as long as possible. Quarantining for at least a few days also gives time for newly administered vaccines to take effect, says Richards, who recommends vaccination of every animal coming into a shelter. (For more on vaccination, see *Developing Immunity in the Community*.)

Better quarantine procedures could have helped prevent or at least contain the panleukopenia outbreak at the Jersey Shore Animal Center last summer, Beach says. "We think it probably came in with a feral cat," she says. "Normally we keep the feral cats isolated from the owned cats and friendly strays, but during that period of management, they were in the same room. So, since panleukopenia is so contagious, we're suspecting that it got spread that way—[and] through some careless cleaning."



Rindy can attest to the difference a bit of knowledge and observation can make: Her shelter was totally caught by surprise when the virus struck a few years ago, but because of that experience, the Santa Fe staff were well-prepared when two kittens recently came down with the disease. "We took decisive action immediately," Rindy says. Employees quarantined exposed animals. They euthanized very young stray kittens at the end of their holding periods to avoid potential cross-contamination. They removed all the cats out of stray and adoption holding areas and conducted a thorough steam-cleaning. "It's the best hope [you have]—to quarantine any animals that you even think may have gotten exposure," Rindy says, "and to really thoroughly clean everything."

If kittens are from the same litter or the same household, they can be housed together; otherwise, cats should be placed in individual cages to prevent the spread of disease. The panleukopenia virus can take more than a week to unmask itself, so a cat could be harboring the disease for days without showing symptoms.

Cleaning during an outbreak can be made more difficult by the fact that, as an animal shelter with a mandate to protect all the animals in your community, your facility still has an obligation to take in any stray or surrendered animal who shows up at your door. Bringing more animals into an infected environment can be like adding "firewood to the fire," says Richards, but by keeping them segregated and keeping the numbers in each cage and each room to a minimum, you can lower the risk.

"I kept them limited to one part of the building, and we did the best we could to find the owners of the cats," says Garber of his experience with

panleukopenia in Pittsburgh, where the Animal Rescue League also shelters animals for the city's animal control department. "We held every animal to the time that we were obligated to hold them. ... We held to that part of our contract with the city and the promise we had made to the public, but after that, if the cats weren't claimed within 10 days, they were euthanized."

Altogether, 336 cats had to be euthanized during the 44 days the Animal Rescue League was coping with the outbreak. For a month and a half, employees cleaned and re-cleaned, twice a day, the same cages day after day. When the temporarily quarantined area was re-opened to the public after the first two weeks, the staff proceeded to another area—the one where all the cats had been held during the quarantine—and followed the same disinfection procedures in that part of the building as well. But they quickly learned that the panleukopenia virus had not yet left the building, and Garber had to quarantine for another month, shutting down cat adoptions once again.

Even though Garber took great pains to explain the problems to the public, it was "a public relations nightmare" for the shelter, he says. "We told them we had a panleuk problem—actually, I didn't use the word 'problem'; I used the word 'epidemic'—and that if they did surrender their cats, it was guaranteed that they were going to be euthanized," Garber says. "Public opinion of us dropped tremendously, and we had to make a lot of different statements [explaining] that the reason why we did this was so we didn't lose a thousand cats."

A Community Concern

Since cats sometimes harbor panleukopenia for a little while without showing symptoms, the Animal Rescue League had already placed infected animals with new companions; a handful of those animals died after going home with adopters. "If they quarantined their cats, then at the end of six months, we allowed them to come back in and we gave them ... another cat at no charge," says Garber. "And we also gave them instructions on how to clean their homes and how to disinfect."

Many shelters ask pet owners in this situation to quarantine for up to a year before getting a new cat, because there's simply no way to disinfect all the comforts of home. You may be able to bleach your linoleum, but it's a little harder to bleach the recliner, the bed, the carpets, the wood trim. Alternatively, some shelters, such as the Santa Fe Animal Shelter & Humane Society, suggest that people whose kittens have died of the virus adopt an adult cat who's been vaccinated and boosted against panleukopenia.



Even after the Jersey Shore Animal Center lifted a month-long lockdown on cat adoptions in the aftermath of the shelter's panleukopenia outbreak last summer, Beach and other employees alerted every visitor to the situation that had just occurred. Already for an entire month, the staff had been cleaning, sterilizing, and calling adopters who had adopted kittens before the outbreak to make sure those animals were seeing veterinarians. Now, even though the shelter was reinstating cat adoptions in a room of adult cats where there'd been no cases of infections, employees weren't taking any chances.

When a shelter is recovering from an outbreak, employees should alert potential adopters to the recent problems and explain the causes and symptoms of the disease. Follow-up phone calls to adopters will help ensure that animals are seeing veterinarians and lend peace of mind to staff who are trying to keep tabs on whether or not the disease has been eradicated.

"Every person who looked at cats was given sort of a disclaimer saying that ... we've had an outbreak of [panleukopenia] in the shelter, and that they should know that these cats could possibly have been exposed," says Beach. "We had to let them know—that's our policy. They should be aware of everything—the cat's medical history, anything we've observed about them. ... We weren't just going to adopt them out and not tell people."

While some people were turned off, others asked questions, inquiring about the nature of the disease and wondering how they could be sure the

cats they were interested in would be safe from infection. Employees explained that all the cats in the shelter had received booster vaccinations, and they outlined common symptoms of the disease. "Once we had explained it to them, they were okay; they were reassured," says Beach.

In general, it's always helpful to issue advisories and press releases to make the public aware of the problem. "I think what you're doing with the public is trying to assure them that you are doing everything you can to contain the disease," says Rindy, "while reminding them that disease is always [present] within a community and it comes into the shelter-and encouraging people to take their animals to a veterinarian for care."

If everyone followed your advice, you could turn your shelter's guerilla warfare on bugs into an all-out eradication by an entire community full of pet-owning soldiers. Until that time, though, there are ways to win the fight against feline panleukopenia and its evil twin, canine parvovirus, in your own shelter. Just ask Lou Garber's employees back in Pittsburgh, who have been warding it off for almost two years now in a facility that takes in 10,000 animals a year. "It was terrible," Garber says repeatedly as he relives the experiences he had in his first month on the job. But, he adds with relief, "We have not had a panleuk case [there] since November 24, 1999."

For Further Information...

The Cornell Book of Cats contains detailed information about causes, symptoms, treatment, and prevention. The book is available through the [Cornell Feline Health Center](#) website.

The Cat Fanciers' Association Health Committee includes a [fact sheet about panleukopenia](#) on its website.

The American Veterinary Medical Association posts [information about panleukopenia](#) on the pet owner section of its website.

[Vetcentric.com](#) describes the basics of panleukopenia in the "Encyclopedia" section of its site.



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Home > Resource Library > Magazine Articles > May-Jun 2001 > Feline Panleukopenia Fact Sheet

FELINE PANLEUKOPENIA FACT SHEET

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What is panleukopenia?

Panleukopenia, which is sometimes mistakenly referred to as "feline distemper," is a parvovirus very similar in structure to canine parvovirus. It is highly contagious and extremely resistant to disinfectants and temperature extremes. Strains of the virus can infect not only domestic cats but also all other members of the feline family as well as raccoons and minks.

How is it transmitted?

Transmission of the panleukopenia virus occurs either through direct contact between cats or through contact with "fomites," common surfaces where the bug can survive for a year or more. Litter boxes, food bowls, cages, and hands are all fomites, and infected cats can shed the virus through vomit, feces, and other bodily secretions. Proper scrubbing and disinfection can help ensure that the virus will not be passed on to other cats through contaminated items.

What are the signs?

The panleukopenia virus attacks and destroys white blood cells, weakening the immune system and putting the cat at great risk of contracting secondary infections. Rapidly dividing cells in the gastrointestinal tract, lymphoid tissues, and cerebellum can also succumb to the virus. While some cats die suddenly without showing any signs of the disease, others suffer severe symptoms, including fever, fluctuating temperatures, depression, lack of appetite, vomiting, diarrhea, and dehydration. Lethargy is a big warning sign, and infected cats often droop their heads over their water bowls, thirsty but unable to drink.

Which cats get it?

Kittens aged three to five months are the most susceptible to the panleukopenia virus, although it can strike cats at any age. Generally, adult cats are more resistant, having either received vaccinations or developed their own immunity through exposure to the virus in the natural environment. Kittens infected in utero or up to two weeks after birth can suffer permanent damage to their nervous systems; if they survive, they may have difficulty walking and keeping their balance.

How is panleukopenia treated?

Treatment is restricted to supportive therapy in the form of antibiotics, fluids, and sometimes even blood transfusions. Isolation of infected animals during treatment is critical; otherwise, they could contaminate the general environment, putting other animals at risk of contracting the disease.

Read the other articles from the May-June 2001 issues on guarding against panleukopenia.

Keeping Your Cats Healthy: Guarding Against Panleukopenia

Panleukopenia: The Word of Choice?

Developing Immunity in the Shelter Community

The Question of Treatment

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How is panleukopenia treated?

In diagnosing panleukopenia, veterinarians look for symptoms of the disease and a low white blood cell count. It's also possible to detect the virus in a cat's feces; kits are available for fecal testing.

How can panleukopenia be prevented?

Vaccination and meticulous disinfection are the best ways to prevent the spread of the panleukopenia virus. While many shelters like to use quaternary ammonium compounds for routine disinfection, experts say the only foolproof way to kill the panleukopenia virus is to apply a dilute bleach solution (1 part bleach to 32 parts water) to food bowls, litter pans, cages, and other surfaces during cleaning. Whenever possible, those items should be made of stainless steel; plastic food bowls and litter pans are too difficult to disinfect after repeated use. Requiring staff, volunteers, and visitors to wash hands before and after the handling of each animal can also reduce the spread of disease.

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