

Canine Distemper in the Shelter

Lessons learned from a Chicago outbreak

BY KATE F. HURLEY, DVM, MPVM

Often it begins with an innocent little cough or runny nose, looking just like any other case of kennel cough. But instead of getting better with a bit of time and some antibiotics, it progresses to an illness that invades multiple body systems. It can scour the GI tract, infiltrate the lungs, skin and eyes, and destroy almost any part of the nervous system. Even after initial recovery, neurological signs can appear weeks or months later. When the staggering or seizures begin, the battle is almost always lost.

For some of you reading this article, it's an all-too-familiar scenario. For many of us, however, canine distemper has been little more than a legend, something we used to fear but have conquered with vaccination in recent decades. Until a few years ago, I was privileged to be part of this latter group. In fact, I've often said more dogs die of distemper misdiagnosis than succumb to the disease itself; the runny nose or even the pneumonia that looks so similar to early distemper is much more likely due to a variety of other infections common in shelters.

Alas, this devastating disease has not been eliminated, only held at bay by good vaccination practices. When large segments of the canine population are unvaccinated and come in contact with infected wildlife, it's only a matter of time before distemper rears its ugly head. And where are free-roaming, unvaccinated dogs most likely to end up? At the local shelter, of course.

The city of Chicago discovered this unfortunate truth last summer, when



they were hit by a major outbreak of canine distemper. As the shelter in the area that receives the majority of stray animals and wildlife, Chicago Animal Care and Control bore the brunt of the disaster. One of my hobbies is discovering the details of other shelters' misfortunes so I can pass them on to you in the hopes that we can all learn from the experience. In that spirit, several of those responsible for recognizing and controlling the Chicago outbreak graciously consented to a combined interview. Interviewees from Chicago Animal Care and Control included deputy director Sandra Alfred, staff veterinarian Katherine Bloomberg, and supervising veterinarian Marek Dygas. I also spoke with John Lednicki, assistant professor of pathology at Loyola University of Chicago.

What was going on at the shelter at the time of the outbreak? Was there any way you could have seen this coming?

Looking back, there were several contributing factors we can point to. One problem was that sick wild animals were transported in the same trucks and admitted in a common unloading area with domestic pets. There had been a few outbreaks of distemper in wildlife over

the last few years, but nobody had informed us of that because it is not a reportable disease.

The second problem was that we were overcrowded. This is a huge shelter, built 30 years ago basically to warehouse animals. Now we try to do much more in terms of adoption and treatment, but the shelter is not well-designed for this. We were holding more dogs than we are normally supposed to. We were dividing some cages to put a dog on each side; we no longer do that since the outbreak. Of course we were cleaning daily, but cages and buildings were not emptied and thoroughly disinfected on a regular basis. We also used to treat some dogs for kennel cough [while they remained] in





Disease name: Distemper

Type of agent: Enveloped, single-stranded RNA virus, genus Morbillivirus, family Paramyxoviridae. Human measles virus is in the same family.

Shelter species most commonly infected: Dogs, ferrets, raccoons, coyotes, skunks. (Although not necessarily “shelter species,” the latter three can be important carriers, as seen in the Chicago outbreak.) Domestic cats are not at risk; “feline distemper,” also known as feline panleukopenia, is unrelated.

Clinical signs: Distemper virus can invade the respiratory, gastrointestinal, skin, immune, and nervous systems. Consequently, signs are highly variable. As many as 75 percent of cases are subclinical or mild. The most common early signs are clear to green nasal and ocular discharge, loss of appetite, and depression, possibly followed by lower respiratory and gastrointestinal involvement. Neurological signs usually appear one to three weeks after recovery from GI and respiratory disease, but may develop at the same time or months later, even without a prior history of systemic signs. Remember: rabies should always be considered as a possible cause of neurological signs.

Diagnosis: Difficult in live dogs. Virtually all available tests are prone to both false negatives and positives. Recently vaccinated dogs will test positive on serology, and some dogs with distemper will test negative. Detection in conjunctival scraping is reliable if positive, but false negatives are very common. The most sensitive test is RT-PCR (see page 41) of blood during acute disease; in dogs vaccinated within the preceding four weeks, genetic sequencing is required to distinguish vaccine strains from field strains. The Merial Recombitek™ distemper vaccine will reportedly not cause false positives on RT-PCR testing. For more details on diagnosis, see the UC Davis Shelter Medicine Program website at www.sheltermedicine.com.

Transmission and control: Distemper can be shed in all body secretions of acutely infected animals. It can be spread by direct contact, aerosol, or respiratory droplet exposure. Virus does not survive more than a few hours in the environment, but it can be transmitted by fomites such as hands, feet, or contaminated surfaces over a short time/distance. Mildly affected animals can play an important role in maintaining the virus in a shelter population. Careful isolation of all dogs with upper respiratory signs is especially important in a shelter where distemper is common. Inactivated by all commonly used disinfectants.

Treatment: Supportive care, symptomatic treatment, and treatment of secondary bacterial infections. Prognosis is very poor once neurological signs develop.

the general population. Now we always isolate dogs under treatment.

The third big problem was that we didn't vaccinate dogs on arrival. Because of cost, we used to wait until a dog had been determined adoptable after a five-day stray hold. We didn't realize how many stray dogs were coming in unvaccinated. According to testing done by Dr. Schultz from the University of Wisconsin, about 65 percent of incoming dogs had never been vaccinated. There are no low-cost vaccine clinics in the part of Chicago where we got the most cases of distemper. Not only are these dogs at risk for distemper; we worry about what it means in terms of rabies risk for our human population.

When did you first realize there was a problem?

We first saw it in late April of 2004 in dogs that had been adopted and returned because of illness. Some of these dogs just looked like they had a typical upper respiratory infection; others had pneumonia. We treated the dogs in our facility (our usual policy) until one case developed neurological symptoms. We tested for rabies and distemper, and got our first positive distemper diagnosis on May 9. We began calling recent adopters, and put out a news release for pet owners on May 24. Over the next few months we saw over 100 cases.

How did you confirm the diagnosis?

The first cases were diagnosed by serology and IFA (immunofluorescent antibody testing) on conjunctival scrapes. Some cases were confirmed by examination of tissues on necropsy. We discovered that diagnosis can be very difficult. Vaccinated dogs often have positive titers, and some dogs with distemper have negative titers, because this disease suppresses the immune system. Once we got in touch with Dr. Lednicky at Loyola



University we switched to RT-PCR on white blood cells for most of our diagnostic testing for acute cases. [RT-PCR (reverse transcriptase polymerase chain reaction) is a method used for detecting and amplifying genetic material, and is used to test for many different diseases.] This is the most sensitive test, but unfortunately the virus has to be genetically sequenced to distinguish field distemper from vaccine strain in any recently vaccinated dog. Apart from detecting field strains of canine distemper virus in dogs with acute distemper, we detected vaccine strain virus in healthy dogs from two days to as much as three weeks after vaccination.

A lot of us have seen distemper only rarely, if ever. Can you tell me about the clinical presentation of the affected dogs?

They looked absolutely different than we expected. First and most common was upper respiratory signs: sneezing, coughing, discharge from the eyes. Some completely recovered after that, and we would never have known they had distemper if we had not done the RT-PCR testing. Some dogs developed diarrhea and vomiting; a few had a pustular rash, but many had no gastrointestinal or skin signs. We did not see any hard pad disease. It sometimes took a long time to see distinctive symptoms, even as long as four or five weeks. A few animals were asymptomatic at the time they tested positive but developed signs later.

We think a lot of cases of distemper get missed because it doesn't always cause classic signs, and we don't teach enough about it because of the opinion that it doesn't exist anymore.

I heard that vaccinated dogs were affected in this outbreak. Was that confirmed?

We had some dogs that were recently vaccinated and tested positive for distemper or developed symptoms within a few weeks of vaccination. We suspect they were already incubating at the time of vaccination. There were a few cases in dogs that had been in the shelter long term and were vaccinated at least twice. However, right now we can say that vaccination of each animal on arrival has absolutely worked to stop the spread in the shelter. We'd all heard that you have to wait two weeks to receive full immunity from a vaccine, but we learned that it's a much different story now. Like Dr. Schultz told us, even 30 minutes after vaccination you have some immunity.

What steps did you take to communicate with other shelters or veterinary clinics? Who else got involved in helping you find solutions?

As soon as we realized we had a problem, we established a task force to look for solutions. The task force included staff from other shelters, scientists, and representatives from the Brookfield Zoo, the Chicago Veterinary Medical Association, and the AVMA. Members of the task force were kept informed on a daily basis.

How did you manage to get the outbreak under control?

We completely stopped adoption for five weeks. We sent rabies-quarantine dogs to private vets instead of holding them at the shelter, and became very selective of which dogs we held for adoption once we reopened. For a while we tested every animal we put up for adoption by RT-PCR; at the worst part of the outbreak, we were having so many returns for distemper that we couldn't justify adopting out dogs without this precaution. At the same time the number of incoming strays was increasing because other shelters were becoming more cautious about what they took in. Because we are a public shelter, we were still required to admit all strays. We euthanized all sick dogs, and at first we also euthanized all exposed. Later, we established a three-week quarantine for all exposed dogs and tested twice by RT-PCR before we considered them clear. We never had a case in a dog that had tested negative, or that tested positive for vaccine-strain canine distemper virus only.

We began vaccinating dogs immediately on arrival, almost before they hit the ground. We don't have enough technicians and doctors to keep up with it, so almost everyone is trained to vaccinate now; anyone who has been trained for euthanasia by injection can vaccinate.

Because infected wildlife can be part of the problem, we stopped taking wildlife into the same unloading area as dogs. We made sure each

Before the outbreak, the Chicago Animal Care and Control facility was overcrowded. Now, a single dog occupies each double-sided unit in the shelter's seven separately ventilated kennel areas, a setup that allows employees to move dogs to one half of the unit while they clean and disinfect the other half.

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truck was disinfected after being unloaded, whether or not there was a suspect case transported. We had to go over these new policies many, many times in meetings with staff. Training was very important.

Have you made any permanent changes as a result of your experience?

We are keeping a lot fewer animals. The kennels are not at maximum capacity anymore. We changed rotation of dogs through the facility so that each building is regularly emptied and totally disinfected. We are set up with seven separately ventilated kennel areas ("pavilions") for dog housing. Each one holds about 40 dogs. We now accumulate dogs in one pavilion at a time. Once a pavilion is filled, which takes three to four days, we hold those dogs for the

remainder of the stray period. Every day some dogs become available, and on that day they are either moved to the adoption or rescue pavilion, reclaimed by their owners, or euthanized. After the stray period there's a few left still waiting for owner contact, so we combine those in a smaller building and completely clean the pavilion before admitting a new group. After big adoption events, we also empty and completely clean the adoption pavilion.

We're still very careful about disinfection. We use A-33 (a quaternary ammonium disinfectant) and bleach every day. There are gowns, bleach foot baths and mops in front of every pavilion. Each pavilion also has a table with its own cleaning supplies. Each person entering the pavilion has to wear protective clothing. People don't complain because they

Endnotes from Dr. Hurley

Those of you who read the article about the Idaho Humane Society *Salmonella* outbreak in the July/August 2004 issue of *Animal Sheltering* might notice some similarities. Both that shelter and the Chicago facility featured in this column reached out to multiple allies from the academic, veterinary, and public health communities for help with investigating and controlling the outbreak. This undoubtedly saved thousands of dollars in testing costs and most likely saved many lives as well. Even so, both shelters needed to temporarily halt adoptions and reduce intake to get the situation under control.

Most striking to me were the similarities in what was going on at each shelter just before disaster struck. Both shelters were holding more animals than they were ideally designed to house, and in both cases, sick animals were being treated for seemingly minor infections in the general population. In neither case did this reflect sloppy practices or a lack of caring; rather the shelters were responding to external and internal pressure to do *more*—hold more, treat more, all in the hopes of saving more lives. After all, that's why most of us got into this field. However, when we overextend the capacity of our facility, staff, or resources, the effect can be devastating for the very populations we are trying to help. Not only are animals' lives lost, but the injury to community trust and support can cause an even bigger wound in the long run.

On a positive note, both shelters mentioned that the precautions implemented to control the outbreak led to an overall reduction in shelter disease. So take their advice—and mine: look around and ask yourself whether your shelter might be vulnerable to a major disease outbreak. What can you do today to make sure you are not the one I'm calling a few months from now for a feature "outbreak" article in *Animal Sheltering*? And what can you do to make your animals a little bit healthier and safer today? 🐾

know now why this kind of precaution is so important.

We've gone back to treating some kennel cough cases, but we now treat them in the medical center isolation runs, rather than the general pavilions. If a dog doesn't respond to an initial five-day course of antibiotics, we switch. If there's no response to the second antibiotic, that's often a sign there's something more serious going on. By this time the dog will have been RT-PCR tested for distemper.

These changes not only helped control the spread of distemper; we also observe lower numbers of parvo and kennel cough. We think that we're free of distemper now, but there are still ongoing sources. It's been seen in puppies brought in from other states, and recently it was seen in ferrets at local pet stores. In the long run, low-cost vaccinations as well as low cost spay/neuter are absolutely necessary. 🐾

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