Controlling Parvo: Real-Life Scenarios

In the November-December 2006 issue of *Animal Sheltering*, Dr. Hurley detailed the basics of parvo: how it's caused, how it's transmitted, and what to do about it. In this issue, she shares real cases sent to her by shelters and rescue groups—and provides potential solutions for controlling the spread of this often deadly disease.

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Parvo Puppies: The Road to Recovery

The Scenario: I have several parvo cases in the shelter that I am treating. All the puppies are doing very well and have no more symptoms. They have solid stools and are eating well. I would like to send them home. Can you tell me how long they are going to be shedding the virus and when I can consider them healthy?

The Recommendation: Luckily, prolonged shedding of parvovirus does not tend to be a problem. The majority of affected puppies will no longer be contagious by two weeks after recovery. To be on the extra-safe side, you could repeat the parvo "snap" test—if that is negative, it is very unlikely these puppies are a significant risk to others. By two weeks after recovery, their immune systems should also have recovered and be ready to face the world again. Remember to bathe them to remove any virus lingering on their fur. Beyond that, no special precautions are necessary—they can be spayed or neutered, vaccinated, and placed up for adoption as usual.

In the meantime, puppies should be kept in an easily disinfected environment and away from other puppies or unvaccinated adult dogs for a full two weeks after complete recovery. If they are placed in foster care or adopted out before this, be sure to let the caretakers know that these puppies should not go out and about, to the pet supply store, puppy class, or even to the veterinarian (unless they are sick). The last thing we want to do is contaminate our communities with this very durable virus.

Parvo in Adult Dogs: What Does it Mean?

The Scenario: We recently got in a neutered male fox terrier, about 4 years old. This afternoon he vomited multiple times. When I went to examine him, he just had that "parvo look," very lethargic and sad. No fever, but bloody diarrhea. So even though I was sure it would be negative (because of his age), I ran a fecal snap test. It came up positive! I was shocked. I have never seen a dog over a year old with parvo, and the fact that he was neu-

Because you can't blast them with bleach, outdoor areas like these present a dilemma for shelters, rescues, and foster homes. Ideally, puppies should be confined to disinfectable areas for at least a two-week quarantine period. INDIA LAWSON

tered makes me think he had probably been vaccinated at least once in his life. Does this indicate some sort of immune deficiency? Is there a new vaccine-resistant strain of parvo out there?

The Recommendation: Surprisingly, plenty of dogs make it to adulthood without ever encountering the virus through vaccination or exposure. In one survey, 95 percent of dogs coming into veterinary clinics in the U.S. and Canada tested positive for antibodies to parvo, indicating they were protected by prior vaccination or exposure. However, in two other surveys conducted at shelters, only 68 percent of dogs entering a Wisconsin animal shelter were similarly protected, and over 40 percent of dogs entering a Chicago shelter showed no evidence of ever having received a parvo vaccine. For a dog who's been kept in solitary confinement in a backyard all his life, the shelter may be his first exposure to a myriad of infectious organisms. That's why immediate vaccination is so important in the race to protect our animals.

Even an adult dog with a history of vaccination could come down with parvo. Probably the most common cause is maternal antibody interference with the final vaccine, usually administered before the puppy reaches 16 to 20 weeks. A bad batch of vaccine or failure to keep it refrigerated might also be to blame. And of course, a few dogs just don't have a good immune response to the vaccine. The good news is that, despite plenty of reports of parvo in adult dogs with variable vaccine histories, so far there is no evidence of a truly vaccine-resistant strain in the United States. If you think you have such a strain in your shelter—that is, if you see more than one case of parvo in a dog over 4 months old who has been vaccinated more than two weeks ago—follow these guidelines:

Double-check your cleaning program. What looks like vaccine failure is often a case of an animal being exposed before we've had a chance to vaccinate him. Make sure that animal transport vehicles are carefully disinfected, that dogs are being admitted to a clean intake area, and that intake staff are wearing clean clothes and handling animals with clean hands or gloves.

Double-check your vaccination program. Make sure all staff are handling and administering the vaccine correctly. If you think there may be a problem with a batch of vaccine, contact the vaccine manufacturer and report the possible problem.

Double-check your diagnosis. One shelter I know of euthanized more than a dozen dogs for parvo before realizing it was the test itself that was giving false positive results. Always double-check a suspicious diagnosis. Use a different

brand of test, use additional tests such as a white blood cell count, and/or get a definitive diagnosis by sending tissue specimens out to a diagnostic laboratory.

Contact an expert. If you're seeing unexpected levels of parvo infection in adult or vaccinated dogs in spite of a good cleaning and vaccination program, it's time to get help. You can always contact the UC Davis Koret Shelter Medicine Program at www.sheltermedicine.com. You can also try contacting infectious disease experts at your local veterinary school, state veterinarian's office, or state diagnostic laboratory.

Littermates: Bathe, Disinfect, Isolate

The Scenario: Our shelter has been struggling with a parvo outbreak for the last few weeks. One puppy from a litter of seven came down with parvo six days ago. She tested positive and we euthanized her. A bigger, stronger puppy got sick and tested positive yesterday, but that one is receiving treatment and doing well so far. Are the other puppies all going to get sick eventually? If they don't, should we go ahead and vaccinate them as usual?

The Recommendation: Not all parvo-exposed puppies suffer the same fate. Because of varying levels of maternal antibodies that are either low enough to allow the vaccine to take effect or high enough to block the vaccine but not infection, some puppies might get severely ill, some can be mildly affected, and some may never get sick at all. Once puppies are protected by vaccination, they have no further worries. But remember that maternal antibodies dwindle over time, so pups who were naturally protected on Monday might not be protected by the following Friday. That may be why you saw a second puppy get sick five days after the first. Her maternal antibody levels may have finally dropped down low enough to permit infection, and parvo still hanging around the environment—even on the puppy's fur from exposure to the first affected littermate—was right there waiting to attack.

If you are going to quarantine littermates of a parvo puppy, all members of the litter should be bathed, placed in a freshly disinfected environment, and carefully isolated for 14 days. Each time a new member of the litter breaks with parvo, you will need to repeat the bathing and disinfection and start the 14-day quarantine period over again. To further decrease the risk of spread, you can split the litter into pairs; the mental health benefits of companionship likely outweigh the risk of being housed with a littermate. During and after quarantine, puppies should continue to be vaccinated according to your usual schedule. Even puppies who have recovered from parvo should continue their vaccine series on schedule. Although they are no longer at risk for parvo, they still need protection from the other diseases we vaccinate against.

Pre-Adoption Dogs: To Screen or Not to Screen?

The Scenario: I'm a vet who works with my local animal shelter. The shelter is interested in attempting early detection of parvo cases. The shelter would like to be able to catch some of the cases that become clinical one to three days after they move them out to the adoption ward. I have in my mind that affected dogs can shed the virus for a brief time prior to the onset of clinical signs. Based on this premise, would it be "crazy" to consider simply running a fecal parvo test on every puppy before it is placed for adoption? Vaccination would be performed either at the same time as the test or seven days prior, and we are aware some might have interference with false positives from vaccination.

The Recommendation: Because of the likelihood of false positives in low-risk populations, blanket testing of asymptomatic puppies is not an effective use of resources for most shelters. The benefits of detecting a few cases a day or two earlier are offset by the time and money it takes to run all those tests—and by the needless worry (and even euthanasia) caused by false positives. However, some circumstances warrant testing certain puppies, even if they aren't overtly ill. It's a good idea to test them when they've been transferred from a shelter that has frequent parvo problems, when they just "don't look right," or when they've been brought in from an area of town known for incubating a high number of parvo cases. One shelter I visited had a map of the area they served in their intake room and marked the location of all cases. In this way, they were able to identify high-risk neighborhoods and focus their testing on the puppies most likely to come in already infected.

If you do decide to test high-risk pups, do it at intake rather than just prior to placement. This has a double benefit: you don't have to worry about vaccine interference, and you catch the disease before it has a chance to spread. If your shelter has the resources for additional testing and the ability to isolate healthy pups who test positive, clearly this would be preferable to euthanasia based on a single test result in an apparently healthy pup.

Decontamination: Cleaning Foster Homes and Outdoor Areas

The Scenario: Three weeks ago, our small rescue group picked up three dogs and a couple of four-month-old puppies from a local shelter. Two days later, the puppies developed parvo, and we treated them with subcutaneous fluids and antibiotics. The adults never got sick. All five dogs have been healthy and active for about a week now. As soon as the parvo was diagnosed, we isolated all five dogs in the garage and changed shoes and clothing between handling them and our resident dogs. However, before this, they were in the house and yard with our resident dogs (all vaccinated, luckily). Also, while they were in isolation, they used a small outdoor potty area. We've heard different things about how soon it will be safe to rescue puppies again—anywhere from a month to a year or more! There aren't many groups in our area able to rescue puppies, so we'd like to reopen as soon as possible. Is there anything we can do to get rid of the parvo faster?

Not all parvo-exposed puppies suffer the same fate. Because of varying levels of maternal antibodies that are either low enough to allow the vaccine to take effect or high enough to block the vaccine but not infection, some puppies might get severely ill, some can be mildly affected, and some may never get sick at all. Once puppies are protected by vaccination, they have no further worries.

The Recommendation: This is a common dilemma for rescue groups, and one that shelters face as well when dealing with contaminated play yards, staff offices, foster homes, or any place that's not particularly amenable to being blasted with bleach. While we hate to put puppies at risk, eliminating foster homes for months at a time is quite a hardship, and even closing exercise areas for prolonged periods can be a real problem when dogs have no other place to go. Obviously it's best to prevent contamination of hard-to-clean areas in the first place. That means whether in a shelter or foster home, puppies should be confined to disinfectable areas for at least a two-week quarantine period. (Assuming you do not transmit parvo to them once they are in your care, this period should be sufficient to screen out those puppies that come to you already infected.) Potty breaks should take place in an area with a disinfectable or replaceable surface.

But what do you do if quarantine precautions fail and a home or outdoor area becomes contaminated with this durable and deadly virus? Unfortunately, there's no foolproof method to guarantee safety of some of these areas once they've been contaminated. Just waiting for the virus to die off on its own accord is not an option; when not chemically inactivated, parvo can last for a year or more. Scientists working to reintroduce wolves in northern Wisconsin found infectious doses of parvo surviving in a wolf den two years after a sick litter of cubs resided there. This represents a worst-case scenario; contamination levels in the den were probably high, and the virus was protected from light, heat, and drying. Parvo, like most pathogens, survives better in cool, moist conditions. Lower levels of contamination would be expected in a home that housed a sick puppy only briefly. That said, you will still need to take some steps to maximize your chances of safely caring for puppies again:

Take an inventory. Think of everything the parvo puppies may have contacted starting three days before they got sick. Were they in a personal car or animal transport vehicle? Did they touch clothes, towels, or blankets? Play with toys and lie in crates and on beds? In a shelter, think about every kennel and area the puppies may have passed through—intake kennels, get-acquainted areas, offices, play yards, exam rooms, etc.

Clean, rinse, and repeat. If you can't kill the virus, in some cases you might just be able to wash it away. Even in areas such as kennel runs that are pretty easy to disinfect, wash and scrub first to make sure there's no organic matter to inactivate your disinfectant. In outdoor areas (weather permitting), flush with plenty of water, allowing the areas to dry thoroughly between bouts of irrigation. In carpeted areas, thoroughly clean and vacuum, making sure to get under furniture and into nooks and crannies popular with curious puppies. Although steam-cleaning is unlikely to attain sufficient temperatures to kill parvo, it can help mechanically remove yet more contamination. Soiled laundry should be washed in hot water and bleach and dried in a hot dryer. If machines are functioning correctly and are not overloaded, this should be sufficient to get rid of the virus. Stainless steel dishes and cages can be disinfected and kept, but other items such as toys, plastic food dishes, and crates should be discarded.

Kill what you can. For mop-friendly surfaces, disinfection of parvo is actually a fairly simple matter. Just clean the surface completely, then apply a parvocidal disinfectant such as bleach or potassium peroxymonosulfate (marketed as Trifectant in the United States for small animal use) for a sufficient contact period (generally at least ten minutes). Areas where organic matter contamination is inevitable—such as yards, wooden surfaces, or old, cracked concrete—present a bit more of a problem. While bleach is a fine disinfectant, it doesn't do well in the face of dirt and debris. Potassium peroxymonosulfate has much better activity under these circumstances, and is a good product to have on hand for just such an occasion. It can be mixed at normal strength (1 percent) and applied via a pesticide-type sprayer, or mixed at 10 percent concentration and applied through an applicator system set at a 1:10 dilution. There is no guarantee you will eliminate every last particle of parvo by this method, as it is unlikely you will be able to fully coat every surface of a grassy yard. However, reducing the amount of contamination will likely help. Because prolonged contact time may be helpful, allow at least a couple of hours after application before irrigating an outdoor area. Potassium peroxymonosulfate can even be used to disinfect carpets; test in an inconspicuous area first to make sure it doesn't stain.

Assess the risk. Animal sheltering and rescue is all about balancing risks and benefits—it's rare that we get to choose a "no-risk" scenario. Risk of reopening an

area to puppies is lower if contamination was relatively light to start with—from, say, a pre-clinical pup visiting the area briefly instead of a sick litter spewing diarrhea or vomit into every corner. Risk is also likely to be lower if the area is uncluttered and relatively easy to clean, even if it cannot be completely disinfected. Risk is lower in areas exposed to sunlight and drying, and conversely higher in moist, damp, or cold areas. Also consider the risk of not reopening the area. If puppies will be euthanized for lack of foster care, that's obviously a bigger deal than just closing off a play yard for a month or two.

Apply tincture of time? I have heard from fosterers who cleaned carefully, disinfected where they could, and brought puppies in again after only a one-month waiting period—and did just fine. I have also heard about places having problems even after several months of cleaning and waiting. Once you've done your best to clean and disinfect, and considered the risks from every angle, you may decide to leave an area or foster home closed to puppies for a time (usually one to six months is sufficient, unless the area you're working with is a wolf den or other dark, moist environment impervious to disinfection). There is no absolute guarantee that the virus will die off even if you close off an area for a year or more. However, repeated cleaning and exposure to sunlight and the elements will gradually reduce contamination. Vaccinated adult dogs are at very low risk of contracting parvo, so foster homes closed to puppies could concentrate on helping older dogs for a time. Because of the possibility that canine parvo can infect cats, any place closed to puppies should also be off limits to kittens.

Read Our Online Extras!

Do you **experience frequent cases of parvo** among puppies but **lack adequate facilities** for quarantine? Are you unsure about whether you can reopen disinfected kennels following a parvo outbreak? Visit www.AnimalSheltering.org/diseasecontrol for answers to these and more questions about parvo, vaccination, and disinfection.

To read a **parvo information sheet** prepared by UC Davis, visit www.sheltermedicine.com/portal/is_parvovirus_canine.shtml#top3.

Quarantining Puppies: Consider the Risks

The Scenario: We vaccinate all puppies at intake, then hold them for two weeks to allow the vaccine to take effect. We then revaccinate them and put them up for adoption. Recently we had a puppy break with parvo three weeks after intake. Should we extend our quarantine period?

The Recommendation: Intake quarantine of puppies for parvo (or any disease, for that matter) is not as simple a matter as it may seem. As I said before, we have few "zero risk" options in the world of sheltering, and this is a good example. The risk of not quarantining puppies on intake is pretty clear: some puppies may come in already infected and spread parvo within the shelter or even get adopted before they break with disease, leading to expensive vet bills, contaminated homes, and understandably upset adopters. Quarantining puppies, however, also presents risks:

Puppies cannot be reliably protected by vaccination, so they will be at risk of infection the entire time they are in the shelter. Several studies have shown that increasing time in a shelter is the single biggest risk factor for a variety of infections. Although the idea that puppies will be better protected once they have received two or more vaccines is common, this is actually not true. The very first vaccine that slips past maternal antibodies will work within five to seven days; in the meantime, no amount of vaccinating will provide protection. The longer puppies stay in the shelter, the greater the chances their maternal antibodies will drop below the protective level, leaving them vulnerable to parvo and other diseases. This may account for the puppy who got sick after three weeks in your shelter. (Remember that there is a time period—up to two or three weeks—when maternal antibodies can block the vaccine without protecting against infection).

Puppies need socialization. As a behaviorist friend often reminds me, behavioral problems can lead to death just as surely as any infection. A puppy who misses out on socialization during this key developmental period could end up with behavior issues later in life that lead to relinquishment or worse. It's awfully hard to provide adequate socialization while maintaining good isolation/quarantine precautions. If quarantine must be done, provide for socialization as best you can. House puppies with littermates when possible. Create or designate an easily disinfected area to allow play and interaction, and permit contact with well-vaccinated adult dogs. Encourage staff or trained volunteers to put on protective gear and spend time with the puppies.

Quarantine costs time and money that might be better spent elsewhere. Let's face it—puppies are messy, and doing quarantine right takes a lot of effort in the best of circumstances. Careful isolation precautions need to be followed to prevent the spread of disease between quarantined puppies and to keep disease contained within the quarantine area. Unless the shelter was designed for quarantine to start with, precious isolation space may be taken out of circulation, leaving no place to house ill animals.

All this is not to say that quarantine is never indicated, just that the risk/benefit ratio should be carefully considered on a case-by-case basis. When puppies or unprotected dogs have suffered a known exposure to parvo, a 14-day quarantine is certainly in order (if sufficient facilities exist). Quarantine, like testing of healthy-appearing pups, may also be a good idea for puppies transferred from shelters with known parvo problems, or from high-risk neighborhoods. AS