

# Parvovirus: Serious Diarrhea in Puppies & Dogs

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Canine parvovirus (CPV) disease is currently the most common infectious disorder of dogs in the United States.

'Parvo' is a highly contagious disease characterized by diarrhea that is often bloody. Prior to 1980, most canine parvovirus that caused disease was Type 2 (CPV-2). After 1980, CPV-2 was replaced by CPV-2a became more common and in 1986, another variation called CPV-2b appeared. In the past few years, a new strain, CPV-2c has been detected. Today, CPV-2b has largely replaced the previous strains as the most common parvovirus causing disease in the dog. There is currently some discussion that there may be other strains that are beginning to emerge and have yet to be formally identified. Current vaccinations have helped to control the spread of this disease but despite being vaccinated, some dogs still contract and die from parvo. There is much that we do not know about the virus or the best way to control the disease, but we are learning new information daily. Misinformation about the disease, its spread, and vaccination is widespread. We hope that with a better understanding of the disease, pet owners will be able to make good health decisions for their dogs that will help prevent and reduce the spread of this disease.

How is parvovirus spread?

Parvovirus is spread through contact with feces containing the virus. The virus is known to survive on inanimate objects - such as clothing, food pans, and cage floors - for 5 months and longer in the right conditions. Insects and rodents may also serve as vectors playing an important role in the transmission of the disease. This means any fecal material or vomit needs to be removed with a detergent before the bleach solution is used. The bleach solution should be used on bedding, dishes, kennel floors and other impervious materials that may be contaminated.

The normal incubation period (time from exposure to the virus to the time when signs of disease appear) is from 7-14 days. Virus can be found in the feces several days before clinical signs of disease appear, and may last for one to two weeks after the onset of the disease.

What are the symptoms of parvovirus infection?

There is a broad range in the severity of symptoms shown by dogs that are infected with parvovirus. Many adult dogs exposed to the virus show very few, if any, symptoms. The majority of cases of disease are seen in dogs less than 6 months of age with the most severe cases seen in puppies younger than 12 weeks of age. There are also significant differences in response to parvovirus infections and vaccines among different breeds of dogs, with Rottweilers, Doberman Pinschers, and Labrador Retrievers being more susceptible than other breeds.



The most common form of the disease is the intestinal form known as enteritis. Parvovirus enteritis is characterized by vomiting (often severe), diarrhea, dehydration, dark or bloody feces, and in severe cases, fever and lowered white blood cell counts. Acute parvovirus enteritis can be seen in dogs of any breed, sex, or age. The disease will progress very rapidly and death can occur as early as two days after the onset of the disease. The presence of gram negative bacteria, parasites, or other viruses can worsen the severity of the disease and slow recovery.

A less common form of the disease causes myocarditis (inflammation of the heart).

How is parvovirus infection diagnosed?

Not all cases of bloody diarrhea with or without vomiting are caused by parvovirus and many sick puppies are misdiagnosed as having 'parvo.' The only way to know if a dog has parvovirus is through a positive diagnostic test. In addition to the more time consuming and expensive traditional testing of the blood for titers, a simpler test of the feces with an enzyme-linked immunosorbent assay antigen test (ELISA), commonly called the CITE test, is also available through most veterinary clinics. Testing of all suspect cases of parvo is the only way to correctly diagnose and treat this disease. A complete physical exam and additional laboratory tests such as a [CBC](#) and [chemistry panel](#) help to determine the severity of the disease.

How is parvovirus disease treated?

The treatment of parvovirus is fairly straightforward and directed at supportive therapy. Replacing fluids lost through vomiting and diarrhea is probably the single most important treatment. Intravenous administration of a balanced electrolyte solution is preferred, but in less severe cases, subcutaneous or oral fluids may be used. In severe cases, blood transfusions may be necessary. Antibiotic therapy is usually given to help control secondary bacterial infections. In those dogs who have severe symptoms, antiserum against endotoxins may be given. Corticosteroids may be given if the animal is in shock. In cases of severe vomiting, drugs to slow the vomiting may also be used. After the intestinal symptoms begin to subside, a broad spectrum de-worming agent is often used. Restricting the food during periods of vomiting is also necessary and parenteral nutrition (providing nutrients intravenously) may be necessary.

Undertaking the treatment of affected dogs and puppies without professional veterinary care is very difficult. Even with the best available care, the mortality of severely infected animals is high. Without the correct amount of properly balanced intravenous fluids, the chance of recovery in a severely stricken animal is very small.

All parvoviruses are extremely stable and are resistant to adverse environmental influences such as low pH and high heat. Exposure to ultraviolet light and sodium hypochlorite (a 1:32 dilution of household bleach - ½ cup bleach to 1 gallon of water) can inactivate parvovirus. The bleach solution can be impaired by organic matter and needs to have adequate exposure time and proper concentrations to work effectively.

#### Immunity and vaccination

If a puppy recovers from parvovirus infection, he is immune to reinfection for probably at least twenty months and possibly for life. In addition, after recovery the virus is not shed in the feces. There are many commercially prepared attenuated (modified) live CPV-2 vaccines available. The current vaccines protect against all strains of the canine parvovirus, including the relatively new parvovirus-2c strain. Although some people have expressed concern about the possibility of modified live vaccines reverting to a virulent strain after being given and then causing disease, studies have repeatedly shown that this does not occur. Commercially prepared vaccines are safe and do not cause disease.

The primary cause of failure of canine parvovirus vaccines is an interfering level of maternal antibody against the canine parvovirus. Maternal antibodies are the antibodies present in the mother's milk during the first 24 hours after the puppy's birth. The age at which puppies can effectively be immunized is proportional to the titer of the mother and the effectiveness of transfer of maternal antibody within those first 24 hours. High levels of maternal antibodies present in the puppies' bloodstream will block the effectiveness of a vaccine. When the maternal antibodies drop to a low enough level in the puppy, immunization by a commercial vaccine will work. The complicating factor is that there is a period of time from several days to several weeks in which the maternal antibodies are too low to provide protection against the disease, but too high to allow the vaccine to work. This period is called the window of susceptibility. This is the time when despite being vaccinated, a puppy can still contract parvovirus. The length and timing of the window of susceptibility is different in every puppy in every litter.

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In one study of a cross section of different puppies the age at which they were able to respond to a vaccine and develop protection covered a wide period of time. At six weeks of age, 25% of the puppies could be immunized. At 9 weeks of age, 40% of the puppies were able to respond to the vaccine. The number increased to 60% by 16 weeks, and by 18 weeks of age, 95% of the puppies could be immunized.

When we examine all of the information about maternal derived antibodies, windows of susceptibility, breed susceptibilities, the possibility of unidentified strains, and the effectiveness of different vaccines, we begin to see why there are so many different vaccination protocols and why some vaccinated animals still develop the disease.

Vaccination protocols have been developed that will help protect the widest range of dogs. In using these protocols, we understand we will be vaccinating some dogs that are not capable of responding and we will be revaccinating some dogs that have already responded and developed a high titer. But without doing an individual test on each puppy, it is impossible to determine where the puppy is in its immune status. We also realize due to the window of susceptibility, some litters will contract parvovirus despite being vaccinated. By using quality vaccines and an aggressive vaccination protocol, we can make this window of susceptibility as small as possible. The generally recommended protocol is to vaccinate puppies against parvovirus beginning at 6-8 weeks of age, and revaccinating every 3 weeks until the puppy is 16-20 weeks of age. A booster is given at one year of age and every 1-3 years thereafter.

#### Conclusion

In summary, parvovirus is a very common problem that is a huge killer of puppies. Due to its ability to be transmitted through hands, clothes, and most likely rodents and insects, it is virtually impossible to have a kennel that will not eventually be exposed to the disease. Modified live vaccines are safe and effective, but despite the best vaccination protocol, all puppies will have a window of susceptibility of at least several days where they will be at risk. In addition, the newer CPV-2c strain presents new challenges since it is less detectable in laboratory tests and current vaccines may not be as effective in providing protection against it. Prompt treatment by a veterinarian will increase survivability in infected puppies and working with your veterinarian on a vaccination program that is best for your puppy is important.