

# Variables of Vaccinations in Dogs

W. Jean Dodds, DVM :: Hemopet :: 11561 Salinaz Avenue :: Garden Grove, CA :: 92843

Companion pet caregivers have stated, “The vaccine didn’t work.” It could be so, although unlikely – depending on the vaccine given. Before we start assuming this to be true, several variables need to be considered. Let’s review some of the most common reasons. Bear in mind, these reasons could be *THE* reason, *OR* a factor in a larger, complex situation.

## Timing

### **Parvovirus/Distemper**

The minimal vaccination protocol – which I recommend – calls for distemper and parvovirus vaccines to be administered at 9-10 weeks and 14-15 weeks of age. Then, a single parvovirus vaccine at 18 weeks of age to protect against the virulent Parvovirus 2-C strain. The current parvo vaccines cover this and other strains because they are made against the viral core and not the viral envelope that mutates.

Why is this? Maternal antibodies are predominantly conveyed through colostrum. Antibody-rich colostrum is produced and secreted in the dam’s milk within 36 hours of birth; regular milk production starts after that. However, the maternal antibodies conveyed to puppies in colostrum start to diminish over the next several weeks, and have typically waned by about 12-14 weeks of age. When they begin to wane, we need to give distemper and parvo vaccines to protect against these two virulent diseases. At least two doses are needed 3-4 weeks apart and should not be started before 8 weeks, as vaccines given earlier are not only mostly neutralized by the pup’s residual maternal immunity but also expose these young pups to all the extraneous other components of modified-live vaccines (e.g. tissue culture remnants, fetal calf serum).

Are there exceptions? Yes, but they *rarely* occur. Exceptions are:

- An impregnated rescue dog that has no known exposure to distemper or parvovirus. Vaccination history is unknown.
- The mother rejected the litter and pups did not nurse.
- The mother died during birth.

In these instances, I generally recommend a single parvovirus-only shot at six weeks as a prophylaxis. At nine weeks, the puppies can start the minimal vaccination protocol mentioned above. **Note:** canine distemper vaccines should never be given to pups at or less than 6 weeks of age as they can cause post-vaccinal encephalitis (PVE ) that resembles natural distemper.

Parvovirus and distemper vaccines generally produce lifelong immunity. However, I recommend serum antibody titer testing for these diseases every three years. Most (more than 97%) of fully immunized dogs have antibody titers that persist for life. Despite the fact that some people believe that vaccines titers can be present one day and wane the next, or that they do not necessarily correlate with protection from disease – in fact, for three canine viral diseases, namely canine distemper, canine parvovirus and canine adenovirus -2 for hepatitis, there is a direct correlation between the titer levels in serum and protection. [The same applies to feline panleukopenia virus, which by the way is a parvovirus of cats.]

# Variables of Vaccinations in Dogs

W. Jean Dodds, DVM :: Hemopet :: 11561 Salinaz Avenue :: Garden Grove, CA :: 92843

## Leptospirosis

Leptospirosis vaccines – which I usually do not routinely recommend – have to be timed correctly too. Unlike distemper and parvovirus viruses, leptospirosis is a type of spirochete bacteria so it requires a different protocol. Leptospirosis vaccines are all killed, inactivated bacterin or the newer recombinant products, and cannot shed vaccine strains, unlike the modified-live distemper and parvovirus vaccines.

The vaccination protocol for leptospirosis is an initial shot and a booster given three weeks later. After that, the vaccine must be given annually to maintain efficacy. If the annual booster lapses, your dog will need to start the protocol again from the beginning. To emphasize this point:

1. Your dog was vaccinated against lepto for the first time in May 2016, **BUT** did not have the booster three weeks later. Your dog is **not** protected.
2. Your dog was vaccinated against lepto for the first time in May 2016 **AND** received the booster three weeks later. Your dog was vaccinated again in August 2017, **BUT** did not receive the lepto booster within a year. Your dog may **not** be protected.
3. Your dog was vaccinated against lepto for the first time in May 2016 **AND** received the booster three weeks later. Your dog was vaccinated again for lepto in May 2017. Your dog **is** protected.

## Non-Responders

**Any** measurable titer to a vaccine including distemper and parvovirus means that the dog has specific committed immune memory cells to respond rapidly and afford protection upon natural exposure. It really doesn't matter how high the titer result is as long as it measures something.

If your dogs consistently have no measurable titer to canine distemper virus or canine parvovirus, it likely means that they are distemper or parvovirus “non-or low-responders”; both heritable traits where they will never mount immunity to either virus and will always be susceptible. These dogs should **not** be used for breeding.

As non-or low-responders to distemper and parvovirus are rare (1:5000 and 1:1000 cases, respectively), my suggestion is that you retest the serum titer on these dogs at Hemopet, or another veterinary diagnostic lab that offers quantitative titer results rather than just a negative or positive reading.

## Protection

### Lyme Disease

Like leptospirosis, Lyme disease is caused by a bacteria (*Borrelia burgdorferi*). The Lyme and lepto vaccines are highly specific to particular bacterial strain(s) causing the diseases.

Let's pretend your veterinarian diagnoses your dog with Rocky Mountain Spotted Fever, a different tick-borne bacterial disease. He might say, “It's like Lyme Disease,” to give you a baseline. Now, you might say to yourself, “But my dog had the Lyme vaccine...”

True: Lyme Disease and Rocky Mountain Spotted Fever are both tick-borne bacterial diseases, present similar symptoms, and are treated with similar antibiotics. However, the vaccine against Lyme Disease does **NOT COVER ANY** additional tick-borne diseases, such as ehrlichiosis, babesiosis, and anaplasmosis.

# Variables of Vaccinations in Dogs

W. Jean Dodds, DVM :: Hemopet :: 11561 Salinaz Avenue :: Garden Grove, CA :: 92843

## Canine Influenza

Prior to the H3N2 influenza virus strain outbreak a couple of years ago, one flu vaccine was available to dogs, which covers the H3N8 influenza strain and does not provide cross-protection for H3N2. Now a combination vaccine of the two strains exists on the market. On a side note, I do not routinely recommend the flu vaccines, for healthy pups or adult dogs, as these highly contagious viruses produce a mild kennel cough-like transient condition or no symptoms at all. However, dogs that are immune compromised for whatever reason or taking chemotherapy are at greater risk for more serious effects, as are those few dogs that harbor *Streptococcus* bacteria in their respiratory tracts.

The best way to *clinically* distinguish canine influenza from kennel cough is:

- Kennel Cough typically does not produce a fever unless it subsequently leads to pneumonia in debilitated dogs
- Canine Flu usually presents as a fever with a cough in the early stages. If the fever is mild (102-103 ° F) no treatment is needed. If serious (above 104 ° F), then secondary pneumonia can result and should be treated promptly with antibiotics and supportive care.

## Leptospirosis

Finally and importantly, ***the currently available canine leptospirosis vaccines only protect against 4 serovar strains of the disease***, when 7 strains are currently causing this disease in various parts of North America. The vaccine strains are: *Leptospira canicola*, *L. icterohemorrhagia*, *L. pomona* and *L. grippityphosa*. There are no vaccines available specifically for *L. hardjo*, *L. autumnalis* and *L. bratislava*. Further, as leptospirosis is a zoonotic, reportable disease to which all mammals including humans are susceptible, contacting your local public health or veterinary associations will identify any documented clinical cases in your area and the strain(s) involved.

## Symptoms

When you look up symptoms for each disease, the results can be confusing and frustrating, as many of the same symptoms occur for all of the diseases. In general, if your dog is unusually lethargic or loses appetite, definitely schedule an appointment with your veterinarian.

Based on your geographical area and the disease prevalence in your area, your veterinarian will ask you several questions about what you and your dog have been doing to narrow down to the exact disease and run tests. For instance:

1. Did you walk through a wooded area?
2. Did your dog get into anything?
3. Did your dog eat a foreign object?
4. Did you find any ticks on your dog?
5. Did you go to the dog park or to a doggie daycare?
6. Did your dog walk through standing water?
7. Did your dog drink standing water or drink from a communal water bowl?

Please be honest and think carefully when answering the questions.

# Variables of Vaccinations in Dogs

W. Jean Dodds, DVM :: Hemopet :: 11561 Salinaz Avenue :: Garden Grove, CA :: 92843

Regarding leptospirosis, the most common diagnostic tool is the Microscopic Agglutination Test (MAT), this titer test measures the antibody increase against leptospirosis.

At this time MAT is still considered by many to be the “gold standard”. It is fraught with errors – and can provide false positives. Furthermore, true clinical cases of leptospirosis have MAT serological titers of at least 1:1600 or higher, and an 8 to 16-fold rise in titer three to four weeks later is typically expected to confirm the disease. Unfortunately, this is too long a time lapse to verify a true clinically significant strain – which as Dr. Katharine Lunn of North Carolina State University points out – the MAT test does not reliably predict the infecting serovar strain.

Another more definitive diagnostic tool is the DNA-PCR, which detects the DNA of the actual bacteria in whole blood or urine.

DNA-PCR tests also have their drawbacks, but when used in combination with the MAT test, we get closer to a more accurate diagnosis. Remember that the results of all diagnostic tests should be interpreted in conjunction with your companion dog’s vaccination history, clinical signs, and clinicopathologic findings.

## Efficacy

This section of the discussion addresses the statement that: “the vaccine didn’t work”.

“Efficacy” here refers to how well a vaccine protects against diseases or viruses.

Mind you -- while most vaccines are highly efficacious, the Lyme vaccine is only 60-70% efficacious. The parainfluenza vaccine has barely been studied and the results are all over the place due to the inconsistency between various challenge studies and other factors. Yes; the symptoms of kennel cough were reduced across populations in many of the studies, but that does not indicate the level of the parainfluenza virus clinical disease nor the vaccine’s efficacy.

Other exceptions to watch for might be the two canine influenza vaccines: H3N2 and H3N8.

When the H3N2 influenza vaccine was released on the market, no clinical trials had been conducted. Rightly so, many veterinarians were hesitant to give the vaccine. Since then, clinical trials have proven its efficacy.

However, influenza viruses can rapidly mutate. So, if the vaccine for H3N2 was isolated from the Chicago outbreak in 2015, it can possibly lose its efficacy over time and location.

Case in point, Pfizer Animal Health released a 2012 study it had funded of its H3N8 vaccine, which was isolated from dogs in Iowa in 2005. The researchers found that the Iowa vaccine was effective against more recent strains isolated from other parts of the country. However, the researchers noted, “The greatest amount of divergence correlated with the more recent isolates.” Would the H3N8 vaccine still be efficacious in 2017 and beyond? We do not know. We would need to complete studies such as this one regularly.