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**Dog Tips**

# How Long Do Vaccines Really Last?

Is it necessary to regularly repeat parvovirus, distemper and adenovirus vaccines? Are there some pets who shouldn't receive them at all? Know why vaccinations aren't always protective against disease and what you need to know before you request another shot for your dog.

**Analysis by Dr. Karen Shaw Becker**

## STORY AT-A-GLANCE

- Recent research into antibody titer testing indicates that vaccine-induced immunity against canine parvo, distemper, and adenovirus is durable, and that these tests are valuable as a measure of immunity, especially in senior and geriatric dogs
- The results of one study showed that 50% of previously vaccinated elderly dogs were protected against the three core diseases; another study concluded that vaccines against these diseases confer immunity for at least 5 years in most dogs
- A positive titer means a pet is protected against disease; however, a negative titer doesn't necessarily mean a pet is vulnerable to disease
- Vaccinations don't always result in immunization — titer tests determine if an animal is protected or not

Two recently published studies highlight both the durability of core vaccine-induced immunity against **parvovirus**, distemper, and adenovirus in dogs, as well as the value of antibody titer tests to measure immunity, especially in older pets.

## Over 50% of Elderly Dogs Were Protected Against Core Diseases

In a **study** published in June in the journal Veterinary Sciences,[1] veterinary researchers in Italy set out to measure antibody titers against the three diseases listed above in elderly dogs using an in-house test called VacciCheck.

The study analyzed 350 elderly dogs whose ages ranged from 5 to 19 years, including 258 seniors (73.7%) and 92 geriatrics (26.3%). Of the 350, 97.4% were vaccinated at least once in their lives. The results showed that:

- More than half of the entire study population of many minimally vaccinated dogs (52.9%), including 80.5% seniors and 19.5% geriatrics, had positive titers simultaneously for all three diseases
- Specific positive titers were found in 88.6% of aging dogs for parvo, 82.3% for adenovirus, and 66.0% for distemper; these numbers demonstrate that aging dogs who are unprotected against these diseases are in the minority
- Larger elderly dogs were more protected than smaller ones for parvo
- Protection decreases over time, with geriatric dogs less protected than senior ones

The researchers concluded that positive antibody titers could represent "a good biomarker of protection and their titration could become a standard of care, especially in such a sensitive period of the dogs' life."

## Majority of Dogs Were Protected for at Least 5 Years

In the second **study**, veterinary researchers at the University of Georgia evaluated antibody titers against the same three diseases in dogs with known vaccination histories and lifestyles, analyzing the effect of life stage, exposure risk, and time since last vaccination (TSLV).[2]

The study analyzed 188 clinically healthy dogs representing a variety of ages, breeds, and vaccination history. The results showed that adenovirus and parvo titers decreased, while distemper titers had a decreasing trend with increasing time since last vaccination or vaccination interval. In addition:

- 62% of dogs had positive titers for distemper 5 years after their last vaccination
- 92% of dogs had positive titers for adenovirus and parvo 5 years after their last vaccination
- Both advanced age and life stage were associated with lower titers and thus, identify a canine population cohort likely at higher disease risk

Per the study co-authors:

> *"The results of this study revealed that patient duration of core vaccine-mediated immunity changes with a number of variables, with animal aging and time since vaccination influencing host humoral immunity. This provides further support for the performance of canine core antibody titers to assess whether a vaccine booster and/or specific type of booster is warranted."*

## What You Need to Know About Positive Titer Tests

As the studies above demonstrate, there are three canine core diseases for which a positive titer test can be considered a definitive indicator that the dog has protective immunity: distemper, parvovirus, and adenovirus.

It's important to remember these core vaccines are not required by law; they may be required by private companies (veterinary clinics, daycares, groomers, etc.) but they are not state mandated vaccines. I find many pet owners are afraid to titer because they think they're breaking the law; they aren't.

Rabies is the only required vaccine, legally. Unfortunately, because rabies vaccines are mandated by most countries, a positive rabies titer test can only be interpreted (under the law) as an indication of protective immunity for humans (like me and other vets who must be vaccinated against the disease), but not for pets.

With that said, this is a situation that must be addressed. Laws not based on scientific evidence force pet owners and veterinarians to repeatedly re-vaccinate animals who already have protective immunity against rabies. These re-vaccinations are not helpful (i.e., they don't make pets "more immune") and can be harmful to some animals.

Regarding the remaining core vaccines not required by law, there are two types of titer tests available — quantitative and qualitative. Quantitative titer tests are sent out to a laboratory and results are returned in a few days. The results are reported as a titer, for example, 1:1600, but **the number isn't important as long as it's positive** (indicating the body has made antibodies to that virus). An animal is either immune or not, so there's no need for veterinarians to scrutinize the numbers unnecessarily; any response means antibodies have been made.

Qualitative titers like the Vacci-Check mentioned earlier are performed in veterinary clinics as point-of-care tests that provide results ("yes" = positive; "no" = negative) within about 25 minutes. These tests have been validated, and a positive result correlates well with the results of quantitative tests.

## What About Negative Titer Test Results?

When a titer test for a core disease produces a negative result, neither you nor your vet should assume an adult dog who has been vaccinated in the past is not protected against that disease, or is a **non-responder** (which is very rare). As veterinarian Kate Boatright explains in an article for veterinary journal dvm360:

> *"Over time, antibody levels circulating in the blood will decrease in the absence of exposure, but the immune system possesses memory that can produce an immune response should it encounter the disease. A negative titer in a puppy undergoing its initial vaccine series indicates that the immune system has not yet responded to vaccinations or may be unable to respond."*[3]

According to the American Animal Hospital Association (AAHA) guidelines for dogs published in 2017:

- A "negative" test result does not always correlate with susceptibility. Antibody may fall below detectable levels in the absence of exposure, including re-vaccination. For adult dogs which have been shown to have had protective titers against CDV (distemper), CPV (parvo) and CAV2 (adenovirus) in the past, exposure to pathogenic virus is likely to induce an **immune memory response** resulting in a rapid, anamnestic protection, even years following the last vaccination.
- A "negative" or "weak" response indicates that further vaccination may be of benefit to re-establish humoral response above the sterile immunity threshold, or rarely, that the individual is incapable of making antibodies against the disease.
- In effect, documentation that an individual patient has ever had a "positive" antibody test result for canine distemper, parvovirus, and/or adenovirus denotes that immune memory exists and the patient, if exposed, is expected to mount a rapid, protective response whether or not detectable levels of antibody were present at the time of the exposure.
- False negative test results are uncommon and can be associated with low test sensitivity, insufficient time following vaccination for a detectable antibody response to develop, procedural errors, etc.

Astonishingly, the above bullet points have been removed from the 2022 guidelines and replaced with information that discourages the use of antibody titer tests.[4] It's so discouraging that AAHA has taken a step backwards when it comes to helping hospitals cultivate individualized medical protocols tailored around the unique needs of each animal family member.

Cookie-cutter medicine is de-evolution in our profession and embarrassing for an organization encouraging better medical standards and protocols for hospitals.

## Vaccinations Aren't Always Protective

Just because a pet is vaccinated doesn't mean he has been immunized against disease. The purpose of vaccines is to trigger an immune system response that confers protection against disease.

However, according to veterinarian **Dr. Richard Ford**,[5] research shows that at 12 weeks, only 50% of puppies have been immunized against distemper and parvo, likely due to interference from maternal antibodies. That's the reason puppies (and kittens) receive a series of vaccines — so that at least one vaccine is given after maternal antibodies have disappeared.

Per Ford, at 16 weeks, 15% of puppies are still not immunized. Owners who need or want to know definitively that immunization has been achieved can ask for titer testing two to four weeks after completion of the vaccine series. This is a crucial step in determining whether your puppy is protected against parvo, distemper, and adenovirus, or not.

I have strongly advocated for more bio-individualized vaccine protocols for the last 20 years, including the use of **vaccine nomographs** to correctly time puppy vaccines. Dr. Ronald Schultz was the immunologist who introduced me to this invaluable tool in 1999 to assess when puppy vaccines are best administered. Titering pregnant dogs to determine when maternal antibodies will dwindle in her litter is a wise strategy to avoid unnecessary and ineffective inoculations.

By knowing when maternal antibodies wane, proactive wellness vets don't have to guess at when to initiate effective puppy vaccines. This easy and elegantly simple approach to accurate vaccine timing prevents the administration of unnecessary vaccines when the puppies are too young (and maternal antibodies are high) and offers litters the potential of avoiding ineffective vaccinations.

There is one caveat all pet parents should be aware of, and that's the rare possibility their pet is a "non-responder." A small number of dogs are genetic non-responders to the parvovirus vaccine (but do respond to vaccines against other diseases). These dogs will not produce antibodies, no matter how many times they are vaccinated, and are at high risk for parvo, especially as puppies, so it's extremely important to minimize their exposure to prevent infection.

If you have been revaccinating your pet every 1-3 years and then decide to titer and the titer is negative, you can assume he or she is a non-responder.

If you've just rescued an animal who has no measurable antibody response, the general recommendation for healthy adult dogs with a negative titer is to administer a booster, then titer two to four weeks later to see if the vaccine produced measurable antibodies.

However, the decision to vaccinate a dog with no titer depends on a number of factors. Animals must be healthy to be vaccinated for anything. Animals with a history of adverse vaccine reactions, an autoimmune disease, a chronic illness (including organ disease, thyroid/adrenal disease, and cancer), or who are taking immunosuppressant drugs should not be vaccinated at all.

## Sources and References


[1] Dall'Ara, P. et al. Vet Sci. 2023 Jun 23;10(7):412

[2] Gonzalez, S. E. et al. Vet Immunol Immunopathol. 2023 Aug;262:110630

[3,5] dvm360, May 4, 2020

[4] AAHA Guidelines: Utilization and interpretation of serologic titers