

## Vaccine Information for Dogs, Cats, Puppies and Kittens

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### Why Do Baby Animals Need a Series of Shots and How Many do They Need?

When a baby kitten or puppy is born, its immune system is not yet mature; the baby is wide open for infection. Fortunately, nature has a system of protection. The mother produces a certain kind of milk in the first few days after giving birth. This milk is called colostrum and is rich in all the antibodies that the mother has to offer. As the babies drink this milk, they will be taking in their mother's immunity. After the first couple of days, regular milk is produced and the baby's intestines undergo what is called closure, which means they are no longer able to take externally produced antibodies into their systems. These first two days are critical to determining what kind of immunity the baby will receive until its own system can take over.

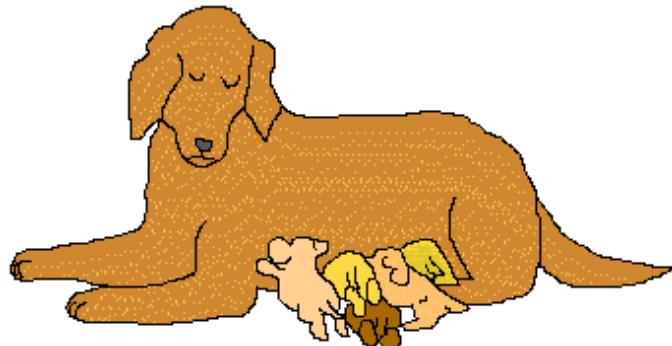


Illustration by MarVistaVet

How long this maternal antibody lasts in a given puppy or kitten is totally individual. It can depend on the birth order of the babies, how well they nursed, and a number of other factors. Maternal antibodies against different diseases wear off after different times. We DO know that by 14-20 weeks of age, maternal antibodies are gone, and the baby must be able to continue on its own immune system.

While maternal immunity is in the puppy's system, any vaccines given will be inactivated. Vaccines will not be able to "take" until maternal antibody has sufficiently dropped. Puppies and kittens receive a series of vaccines ending at a time when we know the baby's own immune system should be able to respond. We could simply wait until the baby is old enough to definitely respond, as we do with the rabies vaccination, but this could leave a large window of vulnerability if the maternal antibody wanes early. To give babies the best chance of responding to vaccination, we vaccinate intermittently (usually every 2-4 weeks) during this period, in hope of gaining some early protection.

When a vaccine against a specific disease is started for the first time, even in an adult animal, it is best to give at least two vaccinations. This is because the second vaccination will produce a much greater (logarithmically greater) response if it is following a vaccine given 2-4 weeks prior.

### If a Vaccine Lasts a Person for their Whole Life, Why do I Have to Vaccinate my Pet Annually?

In the U.S., vaccines are licensed based on the minimum duration they can be expected to last. It is expensive to test vaccines across an expanse of years, so this is not generally done. If a vaccine is licensed by the USDA for annual use, this means it has been tested and found to be protective to at least 80% of the vaccinated animals a year after they have been vaccinated. Some vaccines are licensed for use every three years and have been tested similarly. Do these vaccines last a lifetime? We cannot say that they do without testing and this kind of testing has yet to be performed.

It is also important to realize that some diseases can be prevented through vaccination while others do not. For a vaccine to generate solid long-lasting immunity, the infection must be fairly generalized to the entire body (such as [feline distemper](#) or [canine parvovirus](#)) rather than localized to one organ system

(such as [kennel cough](#) or [feline upper respiratory viruses](#)). Vaccination for localized infections tends to require more frequent boosting, whereas there is potential for vaccination for systemic disease to last for many years.

Since the mid-1990s most veterinary teaching hospitals have restructured their vaccination policies to increase the duration of some vaccines from one year to three years based on independent studies rather than on the studies used by the USDA for vaccine licensing. The American Association of Feline Practitioners has [vaccination guidelines for cats living in different exposure situations](#), and the American Animal Hospital Association has [guidelines for dogs](#).

It is important to realize that these are just guidelines and different regions and different pet lifestyles will justify modifications. For example, Leptospirosis vaccination is generally considered "non-core," but the Los Angeles County Health Dept has recommended that it be considered "core" for Los Angeles County after the substantial 2021 outbreak.

### What Do I Do if My Pet Skips a Year of Vaccination?

It depends on the vaccine and the hospital. Hospitals are likely to have different recommendations as vaccination policy tends to be individualized to the practice and its geographic location. At some hospitals, recommendations for adult animals who skip an annual vaccine include:

- [Feline distemper](#) (or feline panleukopenia, FVRCP) - Vaccinate normally. It is not necessary to restart the initial series.
- [Feline leukemia](#) (FeLV) - If an adult cat has skipped an annual booster, it is not necessary to restart the initial series and vaccination can simply pick up where it left off.
- [Rabies](#) - A three-year vaccine can be given any time after the initial one-year vaccine. This means that if a year is skipped, the next rabies vaccine given will still be a three-year vaccine. One-year vaccines can be boosted at any time and will be good for one year from the time they are given.
- [Canine distemper](#), [canine parvovirus](#), [nasal Bordetella](#) (kennel cough) - Vaccinate normally. You do not need to restart the initial series as though the pet is starting over from the beginning.
- [Canine Influenza](#) - The series should be restarted if longer than 18 months have passed since the last dose.
- [Canine Leptospirosis](#) - If longer than 18 months have passed since the last dose, the series should probably be restarted.
- [Lyme disease](#) - Should a dog in a geographically affected area skip a year with this vaccine, some veterinarians recommend restarting the initial series.
- [Rattlesnake bite vaccination](#) - Because of the complex nature of snake venom, vaccination is recommended every six months. If you have skipped an entire year, it would be wise to restart the initial series of two vaccines. Initial vaccination is given in 2 doses 3-6 weeks apart. Dogs over 100 lbs and dogs under 30 lbs in body weight need 3 doses 3-6 weeks apart. Puppies must be at least 4 months old.

### What Vaccines Should I Get for my Pet?

What vaccines are recommended to an individual pet depends on many factors: what kind of exposure to disease the animal has, what diseases are common in the area, what kind of stress factors are present, etc. When you consider the multitudes of vaccine types and combinations and the many different situations dogs and cats live in, it is not too surprising to find that almost every veterinarian recommends a different group of vaccines. The best advice is to establish a relationship with a veterinary facility that you trust and go with their recommendation.

## What Vaccines Should I Get if my Pet is Indoors Almost Completely?

Both the [American Association of Feline Practitioners](#) and the [American Animal Hospital Association](#) have published guidelines for vaccination. Vaccinations are divided into "core" vaccines that every pet should have, and "non-core" vaccines that a pet should have depending on exposure risk.

For cats, core vaccines are the basic distemper shot: [feline distemper \(panleukopenia\)](#), feline herpes, and feline calicivirus. Rabies vaccination is core except in Hawaii where rabies has been eradicated. Many people are surprised that rabies is often considered a core vaccine and is considered important even for indoor-only cats, but when one considers the consequences of rabies exposure (which can certainly happen indoors) and the legal consequences of owning a biting animal (what happens to the animal generally is dependent on its vaccine status), it is not hard to see why this vaccine is important. The feline advisory board does not consider feline leukemia virus vaccination to be core, but they strongly encourage every kitten to be vaccinated against this infection with a re-assessment of risk factors when the kitten is grown. This is because young kittens frequently live indoors only, but this often changes when the kitten matures regardless of the original intentions of the owner.

For dogs, core vaccines are the basic distemper shot (DHPP) and the rabies vaccine. Since dogs go outside for walks, for grooming, to the vet's office, etc., we recommend vaccinating against [kennel cough](#) for all our canine patients though these are not listed as "core" by the aforementioned organizations. Recently, [canine influenza](#) has become a concern in the United States. Dogs that rarely contact other dogs probably do not need vaccination for this but dogs that go to daycare, grooming, or boarding facilities should be vaccinated.

## What is the Difference Between a Live and a Killed Vaccine?

These terms apply to vaccines against viruses.



Photo courtesy of CDC

The goal of vaccination is to give the virus in question to the patient's immune system in as natural a way as possible; the hope is to best mimic the stimulation obtained by natural infection yet skip the illness.

There are two ways to achieve this goal. One way is to use a killed vaccine. Here, large amounts of dead virus are injected into the patient. They filter into the immune system and lead to stimulation. The other way is to use a live virus that has been modified such that the actual disease does not result in infection. The live vaccine is able to travel through the body in the same sequence as the naturally occurring virus would, creating immune stimulation in the same way the street virus would. An immunity similar to that created by a real infection is produced.

In general, the live virus vaccine is preferred as the most thorough immune stimulation will occur with it, but there are some circumstances where killed is better. A killed virus vaccine can never revert to virulence, which means there are no circumstances under which the vaccine can produce the disease it is trying to prevent. If the virus in question is particularly deadly (such as rabies), it is not worth taking any chances with a live virus vaccine even for superior immunity.

## What is a Recombinant Vaccine and is it Really Better than the other Available Vaccine Types?

Recombinant vaccines represent the cutting-edge of vaccine technology in both veterinary and human medicine. For generations, we classified vaccines as either "killed" or "modified live" (see above). With the advent of genetic engineering, there are now new vaccines that do not fit this classification: the recombinant vaccines. While the USDA recognizes four categories of recombinant vaccines, only the "Vectored Virus" Category is commercially available for pets.

With vectored virus vaccines, the viral DNA responsible for stimulating the patient's immune system is cloned into a harmless live virus. The harmless virus is injected into the patient where it travels innocuously within the body, stimulating the patient's immune system to respond to the cloned viral DNA.

In this way, the benefits of a live vaccine can be realized for a virus that is normally considered too dangerous for a modified live vaccine. Presently, recombinant vaccines are available for feline rabies, feline leukemia, Lyme disease, and canine distemper.

So are these vaccines better than the traditional ones? The chief benefit seems to be fewer vaccine reactions since there are fewer extraneous proteins to cause unnecessary immune stimulation when compared to killed virus vaccines. Since the virus used in recombinant vaccines is alive, there is no potentially harmful adjuvant included in the product (see below). There is also a zero chance of the vaccine virus reverting to virulence and causing infection.

### **Why do Vaccinated Pets still get Sick?**

There are several reasons why a pet might get sick from a disease it is vaccinated against. Not every pet is able to respond to vaccination due to inherent individual immunological issues. Some vaccines are not intended to prevent infection but are intended to blunt the symptoms of the disease should infection occur, as with the feline upper respiratory infections.

In most cases, the pet got sick because of incomplete vaccination. This situation generally involves a puppy that did not finish its puppy series of shots or got exposed to infection before the shot series could be completed. True vaccination breaks are extremely rare but if you think your pet may have experienced one, your veterinarian will need to issue a report to the manufacturer.

### **Can a Pregnant Pet Be Vaccinated?**

It is important that live vaccines (see above) NOT be used in pregnant pets. This is because a "modified" virus that will not cause illness in the mother may still be strong enough to infect the unborn puppies or kittens. Killed vaccines may be given during pregnancy though, as a general rule, it is best not to give any medical treatments during pregnancy if it can be avoided. While giving killed vaccines is commonly done in large animals and food animals, it is not routine for dogs or cats.

### **What is an Adjuvant?**

An adjuvant is a material added to a killed vaccine to assist in generating immunity. When a killed vaccine is injected, the body recognizes a foreign substance and begins to break it down and remove it. If this process happens too quickly, the viral proteins will not be present long enough to generate an immunological response. Adjuvants help hold the killed virus in place and stabilize it so that its presence can be prolonged and provide a more complete stimulation of the patient's immune system.

Adjuvants have become controversial in cats especially and may be associated with [tumor \(especially fibrosarcoma\)](#) formation. It appears to be desirable to avoid the use of adjuvanted vaccines in cats. Neither modified live nor recombinant vaccines use adjuvants.

### **Why is a Feline Leukemia Test Required Prior to Vaccination?**

The feline leukemia virus has the potential to be latent in a carrier cat without any signs of illness, and this carrier state can persist for years. During this time, the cat is contagious and at risk for numerous problems. Many people want to skip the test to save money but, in fact, it is of great importance to know if a cat is harboring this infection. Knowing that a cat is positive allows you to save money by not unnecessarily vaccinating for feline leukemia. Further, if an owner is aware of a cat's positive status, the pet can be kept away from other cats, thus preventing the spread of the disease. An owner can prepare financially for the expected treatments needed for this cat. Testing is important when a new pet cat is obtained.

### **What is a Vaccine Titer?**

Antibody levels against certain infections can be measured in a patient's blood sample. These antibody levels are called titers.

The idea is to measure a titer and determine whether or not a patient is protected against the infection in question so that unnecessary vaccination can be avoided. There is some controversy associated with this procedure.

- Blood testing (titering) is frequently more expensive than simply getting the vaccines in question.
- Blood testing is only available for a few infections.
- Antibody levels are only a small piece of the protection puzzle and it may not be correct to say that a certain antibody level "equals" protection.
- Risks associated with giving vaccines to patients that are already protected are not clearly defined. Exactly what the risks are, or if there are risks at all, has not been determined.

Titering is available at many hospitals and if you are concerned about whether your pet is already protected, ask your veterinarian about it.

### Can Vaccines Hurt my Pet?

Some muscle soreness, lethargy and mild fever persisting for a day or two are considered common (normal) reactions stimulating the immune system. Occasionally a firm swelling temporarily develops at a vaccine site, especially with killed vaccines. Vaccine reactions beyond this are unusual but possible. [Allergic reactions](#) characterized usually by facial swelling and hives are a strong sign that special care should be taken in administering vaccinations. Vomiting can be a sign of impending shock and should be taken seriously after vaccination. Since allergic reactions can potentially become worse with each episode, it is important to take heed of these signs as severe reactions can result in shock or even death.

Another reaction that has received tremendous press lately is vaccine-induced fibrosarcoma, a form of cancer in cats. See the next question.

### Can Vaccines Cause Cancer?

Fibrosarcoma is an especially aggressive form of cancer that can affect cats spontaneously or by viral induction via the feline sarcoma virus. Recently, fibrosarcomas have been removed from areas of the body typically used for vaccination and, to the surprise of the veterinary profession, particles of aluminum-based vaccine ingredients (called adjuvants) were discovered within the tumor. The working theory is that [vaccination may induce this form of cancer](#) in rare cases (between 1 in 1,000 and 1 in 10,000 cats). The killed feline leukemia vaccine and the killed rabies vaccine have been implicated as being more likely to be involved. The problem is definitely not a matter of simply changing to non-aluminum-based adjuvants but is more complicated. A list of preventive measures has been issued by most veterinary associations.

### Can Over-Vaccination Cause other Diseases?

As mentioned, in the mid-1990s recommendations for annual [canine distemper](#) and [feline distemper](#) vaccination shifted to every three years for these vaccines. The reason for this is not that annual vaccination was found to be harmful; it simply became accepted as unnecessary.

Many people have speculated that annual vaccination is responsible for cancer, immune-mediated diseases, kidney disease, and the most common ailments of senior dogs and cats. So far, there is no clear evidence that annual vaccination has increased the incidence of any specific health problems.

### How Can I Have my Pets Vaccinated at a Low Cost?

Vaccination is an important part of a pet's health, and it should not be skipped. If cost is a problem, there are several approaches you can take, but each has advantages and disadvantages.

#### *Option One: Omit the Examination and Choose Vaccination Only. Prices Vary from Veterinarian to Veterinarian*

Some veterinarians are not comfortable administering vaccinations without completely examining the pet first. Others allow you the option of coming in for "vaccination only." Annual examination is recommended as part of basic care for any pet. The physical examination not only involves a professional assessment of the pet's condition but it is your opportunity to learn about what new products, technology, or services are

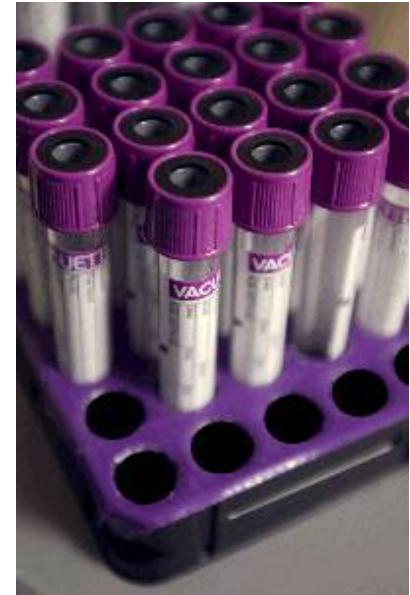


Photo courtesy of CDC

available that you might otherwise never hear about. The importance of this cannot be over-emphasized, but if vaccinations are needed, they may not need to be given in conjunction with a complete examination. In some states, "vaccination only" is not an option or there may be restrictions.

#### ***Option Two: Vaccination Clinic***

These clinics are springing up everywhere to provide streamlined "shots only" service. These clinics may be mobile (traveling monthly or weekly to your local feed or pet supply store) or may be located in your own regular veterinarian's office. Here are some tips on what to look for in a clinic:

- *Are they using disposable needles?* You do not want to have your pet experience a needle that has been dulled on a previous patient or possibly inadequately re-sterilized.
- *Is the clinic using the latest guidelines to avoid vaccine-induced fibrosarcomas?* This might be a good indicator of whether the clinic is up-to-date in its quality control. See more information on the prevention of vaccine-induced fibrosarcomas.
- *Do they seem simply interested in selling you the maximum number of vaccines or do they seem genuinely interested in informing you on which vaccines you do and do not need?* Many vaccine clinics pay their staff commission for the number of vaccines sold.
- *Is your regular veterinarian's office sponsoring the clinic?* If they are, this will solve a lot of confusion about keeping vaccine records straight at your vet's office and will avoid the confusion of getting vaccine recommendations from different veterinarians.
- *Are the vaccines already drawn up or are they mixed fresh while you are present?* Modified live vaccines are sensitive about storage, especially after they are reconstituted. A mobile clinic must contend with the inherent difficulties of refrigeration. You do not want to use a vaccine that may have been reconstituted perhaps hours before.

#### ***Option Three: Vaccinating your Pets Yourself***

It is physically possible to give vaccines yourself if you know how to give a subcutaneous injection. In many areas, pet vaccines are considered over-the-counter medications and you can get them from your local pharmacy or by mail order. ***Most veterinarians do not recommend this practice for the following reasons:***

- It may be difficult for you to properly dispose of the needles. (In California, for example, it is illegal to dispose of needles in the regular trash.)
- If there is any type of acute allergic reaction, you will not be prepared to address it.
- In cats, there are specific guidelines regarding where vaccines should be placed. This makes the process trickier, especially with uncooperative cats. You may get bitten. It is also very important to know where to give each type of vaccine, as giving multiple vaccines in the same area causes increased inflammation, which can lead to vaccine-site tumor formation.
- You may not have kept proper records of vaccination should proof of vaccination be needed. Facilities requiring proof of vaccination may be unwilling to accept your own word that your pet is vaccinated adequately.
- Modified live vaccines are somewhat sensitive to proper storage. They cannot be mixed up in advance and their components must be kept at the proper temperature. This may be difficult depending on how the vaccine is transported to your home.
- It is illegal for anyone but a veterinarian or licensed person to give a rabies vaccine.

If you are looking for a low-cost method of vaccination, consider a low-cost vaccination clinic rather than trying to give vaccines on your own.

#### ***Option Four: Pet Insurance***

A pet insurance wellness plan will cover vaccination at least in part. Not all pet insurance companies offer wellness coverage, but many do with a great deal of variability in how vaccination is covered (some cover a straight percentage of your expense, some reimburse a specific amount for vaccination services, etc.) If you would like more information on how to choose a pet insurance plan, click [here](#).

**A pet insurance wellness plan will cover vaccination. Learn more about [how to choose a pet insurance plan](#).**

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