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# Vaccination and Changing Protocols – Part 1

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Integrative veterinarians have long suspected that chronic disease can result from vaccines. It's not surprising, then, that pet owners are now questioning the number of vaccines their animals are receiving, especially after a recent 20/20 episode on ABC. The show, which aired on November 24, 2013, chastised veterinarians for recommending annual revaccination for dogs. Pet owners across North America raised concerns and veterinarians responded on the internet.

"It's true," said Dr. Patricia Kuhly. "Our track record on vaccination policies is embarrassing. According to some vaccine manufacturers, including Dr. Mark Kimsey, senior brand manager for canine biologicals (vaccines) with Boehringer Ingelheim, a full 60% of us (veterinarians) are still vaccinating our patients annually in spite of long standing, evidence-based recommendations to the contrary…"1. I and my colleagues, Dr. Skip Carmichael and Dr. Max Appel (both canine vaccine experts), and Dr. Fred Scott (feline vaccine expert), have been researching vaccine issues for over 40 years.2 As early as 1978, we published that many canine and feline vaccines need not be given annually.3 I have been speaking and "preaching" since then on these issues, and have participated in all the Vaccine Task Forces both in the US and worldwide.

This article covers the key issues a practicing veterinarian needs to understand to make educated decisions about vaccination. Holistic methods of prevention are beyond the scope of this article and are, in my opinion, not acceptable – this opinion comes from studies I performed many years ago with nosodes for CDV and CPV-2. Neither provided any protection from challenge.

## UNDERSTANDING THE IMMUNE SYSTEM

The innate, natural or nonspecific immune system is present from birth. It is generalist, protecting against any substance, and is not enhanced by prior exposure. Stomach acid, cough reflex, fevers, gut microflora, and even age are all examples of the innate immune system.

The acquired, adaptive or specific immune system is highly specific or tailored to a certain organism, and is enhanced by prior exposure. It is subdivided into the humoral (antibody mediated system we measure with titers) and cellular (cell mediated) immune systems. In the humoral system, bone marrow-derived B cells contact specific antigens in the spleen, lymph nodes and elsewhere, which induce the B cells to produce antibodies. The cells of the thymus

become differentiated into a variety of T cells with a range of helper and effector functions. The T cells play a key role in humoral and cellular immunity.

Immunologic memory allows the immune system to remember the antigens or organisms to which it has previously been exposed. A dog's memory effector B cells (long-lived plasma cells) and memory T-cells specific to canine distemper virus, canine parvovirus, and canine adenovirus, guarantee long-term immunity against these diseases.

Although vaccines are designed to stimulate long-lived responses of the acquired immune system, vaccines (especially bacterial) can enhance non-specific immunity as well, giving some immediate short-term, non-specific protection.

# TYPES OF VACCINE

Infectious/MLV (modified live virus) vaccines are the oldest and most common. They are made by altering or attenuating a disease-causing virus into a non-disease-causing virus that is still capable of immunizing. Because natural infection or recovery from disease is the best kind of immunity, although not the safest, these vaccines most resemble natural immunization.

Vector vaccines (VV) are similar to MLV, but are produced by genetic engineering that usually incorporates DNA from more than one species of organism – recombinant DNA technology. In the case of canarypox virus as a vector, two genes from the canine distemper virus (CDV) are genetically engineered into the viral vector. The canarypox vector then expresses the hemagglutinin and fusion proteins of distemper virus particles, to protect against CDV without the entire live distemper virus present in the vaccine. This makes for a safer vaccine.

Genetically engineered vaccines have advantages and they will be more common in the future. They are one of the ways many new vaccines will be developed, because we can better control what we do to the particular virus or bacteria, and we can make a very safe and effective vaccine.

Non-infectious (inactivated or heat killed) vaccines are made by treating a disease-causing virus or bacteria with a chemical or radiation to kill it. The organism must retain its important antigens, and its ability to induce an immune response.

Adjuvants to improve the immune response are sometimes needed with these vaccines.

Subunit vaccines are produced by growing the infective organism, inactivating it with a chemical, and then concentrating or separating out the portion of the virus/bacteria that is most immunogenic. Recombinant subunit vaccine is made by genetically engineering an organism to produce a protein that can provide protection. For example, the OspA (outer surface protein A) gene of Borellia burgdorferii is placed into E. coli to make the OspA subunit Lyme vaccine. This has the advantage of providing protective immunity without having other Borellia antigens present which can potentially cause immune mediated (hypersensitivity) reactions.

# CORE VACCINES

Core vaccines are those that effectively protect against life-threatening disease, and are essential for every pet.

For the dog they are canine distemper virus (CDV), adenovirus (CAV-2), parvovirus (CPV-2), and rabies virus. For the cat, they are feline parvovirus (panleukopenia – FPV), calicivirus (FCV), herpesvirus (FHV-1) and rabies.

These are all viral diseases for which vaccines are proven to be very effective, often giving up to lifetime protection.

# NON-CORE VACCINES

While some animals in some areas of the country may need some non-core vaccines, they should never be automatically given to all animals because they are usually not necessary for every one. The decision to give these vaccines should be based on the lifestyle of the pet, where he lives, what risks he may encounter, his medical history, etc.

**1. Lyme disease** is not prevalent in many areas of the US, and dogs living in these areas do not need to be vaccinated for it. Outside certain Northeastern and Midwestern states that have very high levels of Lyme disease, there may be select areas in a few other states – "hot spots" where infection is very high and vaccination would be indicated. For example, in Wisconsin, infection occurs at a low level (approximately 4%) in the eastern half of the state. Conversely, in the western and especially northwestern parts of Wisconsin, we see infection in 80% to 90% of dogs. In those high infection areas, vaccination is beneficial in reducing clinical disease. However, some vaccinated dogs can still develop disease since efficacy of the product is about 80%.

**2. Leptospirosis** has diffuse symptoms and can cause liver and kidney failure and death. It is difficult to treat conventionally or holistically unless caught early. The fourway vaccine (which covers the L. icterohaemorrhagiae, L. canicola, L. grippotyphosa and L. pomona serovars – the four that cause disease in dogs) should be first given at 14 to 18 weeks of age (but not before 12 weeks), and repeated three to six weeks later. If the second dose is given more than six weeks after the first one, the two dose series should be repeated. Subsequent doses are administered at one year, then annually or semiannually thereafter, as the duration of immunity is relatively short-lived, at probably less than one year. If a dog fails to receive an annual booster for two or more years, re-vaccinate with two doses two to six weeks apart, and then re-vaccinate annually. Although positive MAT (Microscopic Agglutination Test) serovar titers commonly develop to the L.autumnalis and L. Bratislava servoars, these do not produce clinical disease. The current leptospirosis vaccines provide immunity to the four serovars that cause disease in the US.

Leptospira and Lyme vaccines cause more adverse reactions than the viral vaccines. I don't recommend leptospirosis vaccines be combined with viral vaccines, and they should not be administered before 12 weeks of age, because of the more immediate need for viral immunity. I

prefer keeping the core viral vaccines separate from the bacterial vaccines. When the viral and bacterial vaccines are given at the same time, I prefer they are given at separate sites on the body.

**3. Bordetella bronchiseptica, canine parainfluenza and canine adenovirus type 2** are only a few of the agents associated with kennel cough, but are the most important. We have found the intranasal and oral bordetella vaccines are the most effective.

**4. Rattlesnake vaccine** has been found to be helpful, but the vaccine buys time, not immunity, so immediate treatment still needs to be sought.

**5. Canine coronavirus vaccine** is not needed by any dog.

**6. Feline coronavirus vaccine (FIP)** is not needed by any cat.

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# ALTERNATIVES to current vaccine practices

If you are questioning your current vaccine practices, here are a few recommendations to consider.

- Be certain that every cat (kitten) and dog (puppy) receives the core vaccines.
- Avoid unnecessary vaccines or boosters.
- Use caution with vaccinating sick or febrile animals.
- Tailor specific minimal vaccine protocols for dog/cat breeds or families at risk for adverse reactions.
- Start the vaccination series no earlier than six to eight weeks for dogs and cats.
- Be certain that the last puppy/kitten vaccines are given at 14 to 16 weeks of age or older.
- Measure serum antibody titers to be certain the animal has developed an immune response to core vaccines.
- Alert caregiver to watch puppy/kitten behavior and health after vaccines.
- Avoid re-vaccination of those with prior adverse events rather than using immune suppressants like prednisone or antihistamines. The latter are generally not effective!

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# ADVERSE EFFECTS

Many veterinarians assert there are minimal adverse effects from vaccines. They therefore feel it is best to vaccinate annually so clients will come in for “wellness visits” and pets who visit infrequently will get as many vaccines as possible. Vaccines do cause adverse effects, however, so they need to be given as minimally as possible to provide protection with the least risk of causing illness.

Immediate hypersensitivity reactions are those most frequently reported by veterinarians and owners. Canine Type I Hypersensitivity reactions typically occur within minutes to 72 hours after vaccination and include anaphylaxis, hives, swelling, irritation at the injection site and local swelling.

Hypersensitivity (adverse) reactions are genetically driven, and thus certain animals are predisposed to experience them. If a sire or dam has adverse reactions to specific vaccines, allergens, etc., then there is a high probability that the offspring will also have reactions.

Vaccines do not cause autoimmune disease except in genetically predisposed animals. Vaccines, like many other factors, may trigger thyroid disorder, joint disease, autoimmune hemolytic anemia, neurological diseases, asthma, epilepsy, and cancers or tumors at the injection site in genetically predisposed animals.

One reason to not give unneeded vaccines is that the fetal bovine serum components and other extraneous proteins in all vaccines, and adjuvants in some vaccines, can cause hypersensitivity reactions, especially in animals that are genetically predisposed to adverse reactions. The genetic component is readily demonstrated in animals because of multiple births. For example, we recently saw three pups in a litter of five develop allergic neuritis after vaccination. However, in the general population of dogs, only one out of 5,000 to 10,000 dogs develops vaccine induced allergic neuritis.

Clients must be diligent and report any possible adverse effects following vaccination to their veterinarian, the USDA, or the vaccine manufacturer. Real data is needed to make improvements. No vaccine manufacturer wants to have a vaccine that causes significant numbers of adverse reactions.

A very large retrospective cohort study of the adverse effects of canine vaccines was done by Moore in 2005.4 Looking at 1.25 million dogs vaccinated at 360 hospitals, they found 38 adverse events per 10,000 dogs vaccinated. A genetic predisposition to adverse events was documented. They also found that reactions:

- Were inversely related to weight (small breed dogs vs. large breed dogs)
- Increased for dogs up to two years of age, then declined.
- Were greater for neutered versus sexually intact dogs.
- Increased as number of vaccines given together increased.
- Increased after the third or fourth vaccination.

The same group did a retrospective cohort study of adverse effects from feline vaccines. They studied .05 million cats at 320 hospitals and found 51.6 adverse events per 10,000 cats vaccinated. Lethargy with or without fever was the most common sign. The adverse effects were:

- Inversely related to weight.
- Increased for cats about one year of age
- Greater for neutered versus sexually intact cats.
- Increased with number of vaccines given together.

In Part II of this article (Fall issue) we will go into more detail about titer testing, dosage and duration of immunity, and the latest research projects on vaccination.

*Acknowledgement: I wish to thank my colleague Dr. Laurie Larson for her help with the many studies we have done during the past 23 years, and for her assistance with this article.*

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*1. Kuhly, Patricia. veterinarypracticenews.com/vet-practice-newscolumns/reality-check/12-things-wrongwith-abcs-report-onhonesty-in-veterinary-medicine.aspx.*

*2. Kirk, Robert F., Editor. Current Veterinary Therapy VI – Small Animal Practice, WB Saunders Co., 1977.*

*3. Veterinary Clinics of North America, 8(4) 755-768, 1978.*

*4. Moore, et al, JAVMA, 227:1102-1108, 2005.*