

Introduction

Before reading this article, I would like to give you our thoughts about vaccinations spacing and frequency. We believe that although it is important to make sure your puppy is properly vaccinated, we agree with UC Davis – less is more. The reason for this opinion is that it is our opinion that too many shots and shots spaced too close together damages the immune system of the dog and is one reason for the rise in cancer in our dogs.

We never vaccinate our puppies until they are 8 weeks old. The first shot is a 4-way DHPP (Distemper, Hepatitis (also called Canine Adreino Virus-2 or CAV-2), Parvo and Parainfluenza) in modified live virus form. We do not insist on Parainfluenza but as of today, we have been unable to find only a 3-way shot. Never add Corona or Leptospirosis to this shot. Corona is not life threatening and Leptospirosis should not be given to a young puppy. The second shot is Rabies in killed virus form. Below is our recommended schedule:

Week 8 – DHPP or DHP (your breeder should be responsible for this shot)

Week 12 – DHPP or DHP

Week 16 – DHPP or DHP

Week 20 – Rabies

1 year after week 16 – DHPP or DHP booster

1 year after week 20 – Rabies booster

Once your dog has received its 1-year booster of DHPP or DHP, we recommend have a titer performed going forward. This is a blood test that measures the immunity level against these diseases within your dog's system. It has been found that after the 1 year booster, a dog could easily remain protected for a minimum of 3 years of age. Titers prevent over-vaccinating your dog, resulting in a healthier animal for life. Unfortunately it is required by law that rabies must be given every three years. We look forward to the day when this timeframe is extended.

Bordetella should be given if you are planning to participate in activities where your dog will be in close contact with other dogs (i.e. dog shows, boarding, kennels and perhaps dog parks).

UC DAVIS VMTH CANINE VACCINATION GUIDELINES (Revised 11/12)

Introduction

The UC Davis VMTH vaccination guidelines below have been based on recently published studies and recommendations made by task forces (including the AAFP/AFM Advisory Panel on Feline Vaccines, AAHA Canine Vaccine Task Force, and the AVMA Council on Biologic and Therapeutic Agents), which include representatives from academia, private practices, governmental regulatory bodies, and industry. These groups have evaluated the benefits versus risks of the vaccines currently available on the market. Interested readers are referred to documents published by these groups for further information (see References and Resources listed at the end of this document). The document below has been generated by a group of faculty and staff at UC Davis School of Veterinary Medicine for the purposes of VMTH veterinary student education and as a reference for referring veterinarians. *These are only general guidelines*, as the vaccine types recommended and the frequency of vaccination vary depending on the lifestyle of the pet being vaccinated, i.e. indoor vs outdoor pets, travel plans, kennel/boarding plans, and underlying disease conditions such as immune-

mediated diseases or pre-existing infections such as FIV infection. Because these factors may change over time, we recommend the vaccination plan for each individual pet be decided by the owner at routine annual examinations, following a discussion between the veterinarian and the client regarding the animal's lifestyle in the year ahead. Guidelines for vaccination in shelter situations can be accessed at the [Center for Companion Animal Health's shelter medicine website](#). A previous history of vaccination reactions in an individual pet will also affect recommendations for vaccination. For all vaccines given, the product, expiration date, lot number, route and location of injection is documented in the record.

It should also be noted that much research in the area of companion animal vaccinology is required to generate optimal recommendations for vaccination of dogs and cats. As further research is performed, and as new vaccines become available on the market, this document will be continuously updated and modified.

I. Canine Vaccination Guidelines

Canine Core Vaccines

Core vaccines are recommended for all puppies and dogs with an unknown vaccination history. The diseases involved have significant morbidity and mortality and are widely distributed, and in general, vaccination results in relatively good protection from disease. These include vaccines for canine parvovirus (CPV), canine distemper virus (CDV), canine adenovirus (CAV), and rabies.

Canine Parvovirus, Distemper Virus, and Adenovirus-2 Vaccines

For initial puppy vaccination (≥ 16 weeks), one dose of vaccine containing modified live virus (MLV) CPV, CDV, and CAV-2 is recommended every 3-4 weeks from 6-8 weeks of age, with the final booster being given no sooner than 16 weeks of age. For dogs older than 16 weeks of age, two doses of vaccine containing modified live virus (MLV) CPV, CDV, and CAV-2 given 3-4 weeks apart are recommended. After a booster at one year, revaccination is recommended every 3 years thereafter, ideally using a product approved for 3-year administration, unless there are special circumstances that warrant more or less frequent revaccination. Note that recommendations for killed parvovirus vaccines and recombinant CDV vaccines are different from the above. These vaccines are not currently stocked by our pharmacy or *routinely* used at the VMTH. We do not recommend vaccination with CAV-1 vaccines, since vaccination with CAV-2 results in immunity to CAV-1, and the use of CAV-2 vaccines results in less frequent adverse events.

Canine Rabies Virus Vaccines

In accordance with California state law, we recommend that puppies receive a single dose of killed rabies vaccine at 16 weeks or 4 months of age. Adult dogs with unknown vaccination history should also receive a single dose of killed rabies vaccine. A booster is required one year later, and thereafter, rabies vaccination should be performed every 3 years using a vaccine approved for 3-year administration.

Canine Non-Core Vaccines

Non-core vaccines are optional vaccines that should be considered in light of the exposure risk of the animal, ie. based on geographic distribution and the lifestyle of the pet. Several of the diseases involved are often self-limiting or respond readily to treatment. Vaccines considered as non-core vaccines are canine parainfluenza virus (CPiV), canine influenza virus, distemper-measles combination vaccine, *Bordetella bronchiseptica*,

Leptospira spp., and *Borrelia burgdorferi*. Vaccination with these vaccines is generally less effective in protecting against disease than vaccination with the core vaccines.

Canine Parainfluenza Virus and *Bordetella bronchiseptica*

These are both agents associated with kennel cough in dogs. For *Bordetella bronchiseptica*, mucosal vaccination with live avirulent bacteria is recommended for dogs expected to board, be shown, or to enter a kennel situation within 6 months of the time of vaccination. We currently stock the intranasal vaccine containing both *B. bronchiseptica* and CPiV. For puppies and previously unvaccinated dogs, only one dose of this vaccine is required (recommendations differ for the parenteral, killed form of this vaccine). Most boarding kennels require that this vaccine be given within 6 months of boarding; the vaccine should be administered at least one week prior to the anticipated boarding date for maximum effect. Although some kennels require immunization every 6 months, annual booster vaccination with *B. bronchiseptica* vaccines is considered adequate for protection.

Canine Influenza Virus (CIV)

Canine influenza virus (H3N8) emerged in the United States in greyhounds in Florida in 2003. The virus is now enzootic in many dog populations in Colorado, Florida, Pennsylvania, New Jersey and New York. The virus causes upper respiratory signs including a cough, nasal discharge, and a low-grade fever followed by recovery. A small percentage of dogs develop more severe signs in association with hemorrhagic pneumonia. A vaccine is commercially available, which at the time of writing has a 1-year conditional licensure. Based on evidence provided by the manufacturer, the vaccine may reduce clinical signs and virus shedding in dogs infected by CIV. It may be useful for dogs traveling and intermingling with other dog populations in areas where the virus is enzootic. The performance of the vaccine and its duration of immunity in the field are unknown. At the time of writing, only a few cases of CIV infection have been documented in northern California and the infection has not been widely documented in the general dog population, so we do not recommend routine vaccination for dogs expected to board, be shown, or enter a kennel situation within northern California. Vaccination may have the potential to interfere with the results of serological testing, which in non-endemic areas are useful to assist diagnosis. The UC Davis VMTH does not stock the CIV vaccine or recommend it for use in dogs residing solely in northern California.

Canine Distemper-Measles Combination Vaccine

This vaccine has been used between 4 and 12 weeks of age to protect dogs against distemper in the face of maternal antibodies directed at CDV. Protection occurs within 72 hours of vaccination. It is indicated only for use in households/kennels/shelters where CDV is a recognized problem. Only one dose of the vaccine should be given, after which pups are boosted with the CDV vaccine to minimize the transfer of anti-measles virus maternal antibodies to pups of the next generation. The AAHA Canine Vaccination Guidelines state that 'recent unpublished studies have shown that the recombinant CDV vaccine immunizes puppies in the face of passively acquired maternal antibodies. Therefore, the distemper-measles vaccine is no longer the preferred option'. The UC Davis VMTH does not stock these vaccines as situations requiring their use do not arise commonly in our hospital population.

Canine *Leptospira* Vaccines

Multiple leptospiral serovars are capable of causing disease in dogs, and minimal cross-protection is induced by each serovar. Currently available vaccines do not contain all serovars, efficacies against infection with the

targeted serovar are between 50 and 75%, and duration of immunity is probably about 1 year. However, leptospirosis is not uncommon in Northern Californian dogs with exposure histories involving livestock and areas frequented by wild mammals, the disease can be fatal or have high morbidity, and also has zoonotic potential. Therefore, we suggest annual vaccination of dogs living in/visiting rural areas or areas frequented by wildlife with vaccines containing all four leptospiral serovars (*grippityphosa*, *pomona*, *canicola* and *icterohemorrhagiae*), ideally before the rainy season, when disease incidence peaks. The initial vaccination should be followed by a booster 2-4 weeks later, and the first vaccine be given no earlier than 12 weeks of age. In general, leptospiral vaccines have been associated with more severe postvaccinal reactions (acute anaphylaxis) than other vaccines. Whether the recent introduction of vaccines with reduced amounts of foreign protein has reduced this problem is still unclear. Vaccination of dogs in suburban areas with minimal exposure to farm animals or forested areas is not recommended. Anecdotally, the incidence of reactions has been greatest in puppies (< 12 weeks of age, and especially < 9 weeks of age) and small-breed dogs. A careful risk-benefit analysis is recommended before considering vaccination of small breed dogs at risk of exposure to leptospire.

Canine *Borrelia burgdorferi* (Lyme) Vaccine

The incidence of Lyme disease in California is currently considered extremely low. Furthermore, use of the vaccine even in endemic areas (such as the east coast of the US) has been controversial because of anecdotal reports of vaccine-associated adverse events. Most infected dogs show no clinical signs, and the majority of dogs contracting Lyme disease respond to treatment with antimicrobials. Furthermore, prophylaxis may be effectively achieved by preventing exposure to the tick vector. If travel to endemic areas (ie the east coast) is anticipated, vaccination with the Lyme subunit or OspC/OspA-containing bivalent bacterin vaccine could be considered, followed by boosters at intervals in line with risk of exposure. The UC Davis VMTH does not stock the Lyme vaccine or recommend it for use in dogs residing solely in northern California.

Other Canine Vaccines

Several other canine vaccines are currently available on the market. These are vaccines for canine coronavirus, canine adenovirus-1, and rattlesnake envenomation. The reports of the AVMA and the AAHA canine vaccine task force have listed the first three vaccines as not generally recommended, because 'the diseases are either of little clinical significance or respond readily to treatment', evidence for efficacy of these vaccines is minimal, and they may 'produce adverse events with limited benefit'. Currently, information regarding the efficacy of the canine rattlesnake vaccine is insufficient. The UC Davis VMTH does not stock or routinely recommend use of these vaccines.

Canine Enteric Coronavirus Vaccine

Infection with canine enteric coronavirus (CCV) alone has been associated with mild disease only, and only in dogs < 6 weeks of age. It has not been possible to reproduce the infection experimentally, unless immunosuppressive doses of glucocorticoids are administered. Serum antibodies do not correlate with resistance to infection, and duration of immunity is unknown. In mixed infections with CCV and canine parvovirus (CPV), CPV is the major pathogen. Vaccination against CPV therefore protects puppies from disease following challenge with both canine enteric coronavirus and CPV. Thus, the UC Davis VMTH does not routinely recommend vaccination against canine enteric coronavirus and the vaccine is not stocked by our pharmacy.

Canine Rattlesnake Vaccine

The canine rattlesnake vaccine comprises venom components from *Crotalus atrox* (western diamondback). Although a rattlesnake vaccine may be potentially useful for dogs that frequently encounter rattlesnakes, currently we are unable to recommend this vaccine because of insufficient information regarding the efficacy of the vaccine in dogs. Dogs develop neutralizing antibody titers to *C. atrox* venom, and may also develop antibody titers to components of other rattlesnake venoms, but research in this area is ongoing. Owners of vaccinated dogs must still seek veterinary care immediately in the event of a bite, because 1) the type of snake is often unknown; 2) antibody titers may be overwhelmed in the face of severe envenomation, and 3) an individual dog may lack sufficient protection depending on its response to the vaccine and the time elapsed since vaccination. According to the manufacturer, to date, rare vaccinated dogs have died following a bite when there were substantial delays (12-24 hours) in seeking treatment. Recommendations for booster vaccination are still under development, but it appears that adequate titers do not persist beyond one year after vaccination. Adverse reactions appear to be low and consistent with those resulting from vaccination with other products available on the market. The product license is currently conditional as efficacy and potency have not been fully demonstrated. Based on existing evidence, the UC Davis VMTH does not currently recommend routine vaccination of dogs for rattlesnake envenomation, and the vaccine is not stocked by our pharmacy.