

Ohio State University VTH Canine and Feline Vaccination Guidelines

These guidelines were developed as a **REFERENCE** for veterinary students and veterinarians. They have been developed based on recently published studies and recommendations made by various task forces (including the American Association of Feline Practitioners/Academy of Feline Medicine Advisory Panel on Feline Vaccines, American Animal Hospital Association Canine Vaccine Task Force and the American Veterinary Medical Association Council on Biologic and Therapeutic Agents, American College of Veterinary Internal Medicine, and the veterinary teaching hospitals of North American veterinary colleges). These groups have evaluated the risk benefit ratio of vaccine preparations that are currently on the market and have published “standard of care” recommendations based on expert opinion. The complete reference list utilized to develop the OSU vaccination guidelines are listed at the end of this document. We encourage you to consult these references if you have further questions. It should also be noted that most of the large pharmaceuticals companies have now provided a 3-year guarantee for their core vaccine products, even if they have not completed challenge or serological studies to prove efficacy.

Research and development is continuing in the field of companion animal vaccinology and as of yet there is not an optimal protocol for all pets. Therefore, as new products and further research is performed there will be changes to what the profession considers the “standard of care” and ongoing modifications will be required in our recommendations and those of others. Please visit the following website frequently if you want access to our most recent revisions: <http://www.vet.ohio-state.edu/541.htm>.

Each individual veterinarian must take into account an array of individual factors (age, health status, lifestyle, geographical location, travel plans, underlying diseases, etc) in order to determine the optimal vaccination protocol for each individual pet. These factors may change over the lifetime of the pet and modifications to vaccination protocol of individuals may be required. Depending on the individual factors taken into consideration, some animals may require only a triannual vaccination visit. An annual physical examination is still recommended for general health and wellness care.

One area of continued controversy regarding vaccination is when to begin vaccinating and how often to vaccinate puppies/kittens to ensure protective immunity. Factors that may influence the effectiveness include: presence of maternal antibodies, maturity of the animal’s immune system and the type of vaccine used. At this time, it appears that in most animals one modified live vaccination given at 12 weeks of age or older is protective in the vast majority of patients. A second vaccination 3-4 weeks later will improve protection and the anamnestic response but may not be necessary for most patients. Any vaccinations administered prior to 12 weeks of age will have a variable effect depending on the quantity of maternal antibodies present. Isolation of the animal from exposure to infectious disease until greater than 12 weeks of age is very important in protecting them from disease during this vulnerable period.

The use of serology in making vaccination decisions for dogs and cats has emerged as a recent tool. The utility and reliability of serological testing in dogs, as it pertains to immunization decisions, has not been established at this time. There is excellent evidence in cats that the protective effect of a vaccination can be predicted by serology. Therefore, serology can play a role in immunization decisions in the cat. Currently the reasons serology has not played a widespread role in vaccination decisions in cats is due to the inaccessibility of the laboratory-based assay and that the assays run by different labs have not been standardized.

For all vaccinations the product name, expiration date, lot number route and injection site should be recorded in the medical record.

Please view the charts provided at the end of this document for an overview of the guidelines.

These are only general guidelines and suggested protocols.

CANINE VACCINATION GUIDELINES

CANINE CORE VACCINES

Core vaccines are recommended in all healthy puppies and dogs. Core vaccines protect against diseases with significant morbidity and mortality and that have a wide geographic distribution. Vaccination for these diseases tends to result in effective immunization and historically has resulted in a decrease in the prevalence of the clinical disease.

Core vaccines include: **Canine Distemper (CDV)**, **Canine Parvovirus (CPV)**, **Canine Infectious Hepatitis (CAV-1**, however vaccination against **CAV-2** results in cross immunization and is a safer vaccine) and **Rabies**.

Suggested Guidelines for the Core vaccines:

- If a puppy is >7-8 weeks of age and <12 weeks of age at the time of first vaccination, it should be vaccinated with a multivalent core vaccine every 3-4 weeks until it is at least 12 weeks of age (this typically results in 2-3 vaccinations in this time period). The final vaccination in the series **MUST** occur at 12 weeks of age or greater. The puppy should then be revaccinated 12 months from the last booster, then every 3 years thereafter.
- If a puppy is \geq 12 weeks of age at the time of the first vaccination, 2 multivalent core vaccines should administered 3-4 weeks apart, and then the puppy should be revaccinated 12 months from the last booster and then every 3 years thereafter.
- Dogs older than 12 weeks of age with an unknown vaccination history should receive 2 multivalent core vaccinations 3-4 weeks apart. They should receive a booster vaccination in one year, and then every three years thereafter.

Breed Variations

- For optimal protection, puppies of certain breeds that are predisposed to parvovirus, such as Dobermans, Rottweilers and American Staffordshire Terriers should be vaccinated every 3-4 weeks until 16 weeks of age with a multivalent core vaccination product. Alternatively following 2 multivalent core vaccinations (ending at \geq 12 weeks of age), they can be vaccinated in 3-4 weeks with a monovalent parvovirus vaccine. In either scenario puppies of these breeds should be revaccinated 12 months from the last multivalent core booster and then every 3 years thereafter.
 - If a high titer parvovirus vaccine product is routinely utilized in the vaccination protocol then the series maybe ended at 12 weeks of age even in the higher risk breeds.
- An immunodeficiency syndrome has been reported in young Weimaraners (<1 yr of age). In this breed, a modified puppy vaccination protocol has been recommended. A multivalent core vaccine without CPV is administered according the above protocol. A modified life parvovirus vaccine is then administered alone 7 to 10 days later. This is repeated every 3-4 weeks until the puppy reaches 16 weeks of age.

Rabies

Follow county/state laws.

CANINE NON-CORE VACCINES

These are optional vaccines that are chosen, based on the risk of exposure, geographic location and lifestyle of the animal. These diseases tend to be self-limiting, or respond readily to therapy or the vaccines have only moderate efficacy.

Non-core vaccines include: **Canine Parainfluenza (CpiV)**, **Distemper-Measles combination vaccine** (utilized in puppies between 4 to 10 weeks of age as the only viable method to overcome

maternal antibody interference with immunization to CDV), **Bordetella bronchiseptica**, **Leptospira spp.** and **Borrelia burgdorferi**.

Leptospirosis

This bacterial spirochete is the most important non-core vaccine due to its zoonotic potential. It has a worldwide distribution and there are geographical variations in the prevalence of different serovars. The severity of clinical disease can vary according to the infective serovar in addition to other factors. Exposure to contaminated sites is related to the dog's roaming tendencies and the wildlife population density. Dogs at high risk are hunting dogs, working dogs, dogs with exposure to wildlife, rodent pests or livestock, show animals and dogs with access to ponds or slow-moving streams. Middle-aged dogs (4 to 7 years of age) and sexually intact male dogs have the greatest risk of infection. However, ANY dog may contract this disease, even small breed apartment dwellers.

Why is Leptospirosis not a core vaccine?

The issue is with the vaccine efficacy. A high percentage of dogs vaccinated do not develop protective levels of antibodies to ensure immunity or if they do it tends to be short lived. Serological titers have been performed and demonstrate that a decline in the serum antibody titers occurs 16 weeks post-vaccination. This does not indicate that the animal would not be able to mount an effective immune response if exposed as the serum titer does not take into account the cell mediated response or the anamnestic response.

The vaccines are also serovar specific. Therefore, if the animal does mount an antibody response to the vaccination it would only be protected against the serovars contained in the vaccine. If the dog encounters a serovar that was not in the vaccine, the dog is not protected. The vaccines maybe effective at preventing the systemic invasion of the *Leptospira*, however, they do not prevent the infection of the proximal renal tubules with the organism, nor do they prevent shedding of this organism into the urine. Therefore, asymptomatic dogs can shed and contaminate the environment. Thus the public health threat from the organism being shed into the environment still persists.

The final consideration in the efficacy of this vaccine is the number and severity of adverse reactions that occur upon administration. It is apparent, both experimentally and anecdotally, that the *Leptospira* component of the vaccine has been associated with multiple types of immune-mediated hypersensitivities and moderate to severe vaccine reactions.

Therefore, the risk to benefit ratio of administering this vaccine must be considered for each individual dog. If the vaccine is to be administered it makes sense to vaccinate against the serovars that the dog is likely to encounter.

Suggested Guidelines for Leptospirosis:

- Dogs being vaccinated against Leptospirosis should be at least 12 weeks of age or older. A booster vaccination should be administered 3-4 weeks later, and annually thereafter.

Kennel Cough (Infectious Tracheobronchitis) *Bordetella bronchiseptica* and Parainfluenza

Infectious tracheobronchitis is a self-limiting syndrome that only rarely causes significant morbidity or mortality. Numerous vaccine products are available that contain one or more components of the infectious complex and may be given intranasally or parenterally. The Parainfluenza component is often combined with the other core vaccines in a multivalent vaccine, but can also be combined with the other infectious components responsible for the syndrome. The *Bordetella bronchiseptica* vaccine is an avirulent bacterin and tends to have a short duration of immunity. Therefore, vaccination for *Bordetella bronchiseptica* should occur when there is an

increased risk of exposure in the near future or for dogs with **continued** high risk (dog shows, or frequent boarding) vaccination should occur at least every 6 months.

- Generally, intranasal vaccines require a single dose for protection. Follow manufacturer's recommendations.
- Parenteral vaccines should be re-administered in 2 to 4 weeks after initial vaccination. Follow manufacturer's recommendations.
- Consider 2 doses of intranasal vaccine if puppy is <12 weeks of age at first administration.
- Little information is available regarding the anamnestic response to vaccination, thus revaccination should follow the guidelines from individual manufacturers.
- Clinical signs of sneezing and nasal discharge have been noted with the MLV intranasal products and may begin immediately and last for several days. If the symptoms persist past 3-4 days then naturally occurring disease may be present.
- The vaccines should be administered 1-2 weeks prior to exposure in order to ensure adequate time for antibody production.
- For animals at high risk, giving one intranasal and one parenteral vaccination 2 weeks apart seems to provide the highest level of protection.

Borrelia burgdorferi

There is geographical variation associated with this disease. The incidence of Lyme disease in Ohio is low and even in endemic areas there is some concern over the use of the vaccine. The efficacy of the vaccine has been questioned and vaccination has been associated with a moderate number of mild to severe adverse reactions.

- Infected dogs tend to show very few clinical signs
- Tick prevention may be more effective than vaccination
- Follow manufacturer's guidelines for administration frequency

OTHER CANINE VACCINES

The following vaccines are generally not recommended as the diseases they protect against have minimal clinical significance and respond readily to therapy, or may not have demonstrated clinical efficacy in the prevention of these diseases, or may produce adverse events with limited benefit.

Generally not recommended vaccines include: **Canine Coronavirus and Giardia spp.**

FELINE VACCINATION GUIDELINES.

Vaccination recommendations for cats have been strongly influenced by vaccine-associated sarcomas in cats (VAS), serology studies, and duration of immunity studies.

An increased incidence in VAS was observed when adjuvanted feline leukemia vaccines and mandatory killed rabies vaccinations were introduced. Injection of other pharmaceuticals (corticosteroids and antibiotics) has also rarely been reported as a cause of sarcoma development. The risk to benefit ratio of vaccinating the individual cat (incidence of VAS 0.5-4 cases/10,000 cats) should be discussed with the owner at the time of immunization. There seems to be an increased risk with adjuvanted vaccines, however, there is a considerable controversy regarding the role adjuvants play in the development of VAS. The number of organisms contained in the product, as well as multiple injections at the same site have been implicated as other potential contributing factors. There are also likely many immunoregulatory factors that may predispose

the cat to the transformation from inflammation to malignancy such as, the expression of oncogenes, growth factors and tumor suppressor genes.

The overall incidence of this problem has been difficult to accurately determine and as a profession we must become more diligent in the reporting of adverse events associated with immunization. All suspected and especially histologically confirmed VAS should be reported to the manufacturers and the US Pharmacopoeia Veterinary Practitioner's Reporting Program (1-800-487-7776 or the web site www.usp.org).

The injection sites of all vaccines and other injections must be recorded and should be administered as far down a limb as possible.

Rabies- right hind limb (alone or with any other antigen)

FVRCP- right front limb (lateral to the scapula- off center)

FELV- left hind limb (with or without other antigens except rabies)

FELINE CORE VACCINES

The core feline vaccines include: **Feline Panleukopenia (FPV), Feline Herpesvirus-1 (FHV-1), Feline Calicivirus (FCV) and Rabies.**

Suggested Guidelines for Feline Core Vaccines:

- If a kitten is >7-8 weeks of age and <12 weeks of age at the time of first vaccination, it should be vaccinated with a multivalent core vaccine every 3-4 weeks until it is at least 12 weeks of age (this typically results in 2-3 vaccinations in this time period). The final vaccination in the series MUST occur at 12 weeks of age or greater. The kitten should then be revaccinated 12 months from the last booster, then every 3 years thereafter.
- If a kitten is \geq 12 weeks of age at the time of the first vaccination, 2 multivalent core vaccines should administered 3-4 weeks apart, and then the kitten should be revaccinated 12 months from the last booster and then every 3 years thereafter.
- Cats older than 12 weeks of age with an unknown vaccination history should receive 2 multivalent core vaccinations 3-4 weeks apart. They should receive a booster vaccination in one year, and then every three years thereafter.

Intranasal Vaccines

- Multivalent MLV intranasal core vaccines are available. The original 1 mL intranasal vaccines tended to result in clinical signs of sneezing and ocular discharge. A new 0.2 mL product has recently been approved by the FDA that has a similar immunogenicity to subcutaneous vaccines but with fewer side effects and due to the lower volume is easier to administer. There is only short-term serological data for the 0.2 mL intranasal product and thus the duration of immunity for longer than one year is uncertain. Serological evidence suggests that equivalent protective immunity is achieved by the 1 mL products as compared to parenteral vaccines, but no challenge studies have been performed to verify adequate protection. Thus, it is uncertain whether revaccination with intranasal products should occur annually or triannually.

Rabies

An annual recombinant canary-pox rabies virus vaccine is available for cats only and may reduce the risk of VAS because it does not contain an adjuvant. Alternatively, the triannual vaccines (adjuvanted) can also be used in the cat. As the canary-pox recombinant vaccine provides effective protection and **may** reduce the risk of VAS it makes sense for most cats to be receiving this vaccine annually. If the client elects the triannual adjuvanted vaccine product and the cat is less than 6 months of age at the time of first rabies vaccination, the manufacturer recommends a second vaccination be given during the next 12 months before the vaccine can be administered triannually (annual booster). If the cat is over 6 months of age at the time of the first vaccination

(with adjuvanted triannual product) when its immune system is considered mature, the manufacturer recommends that the next vaccination can be administered in 3 years. Always follow county/state laws.

FELINE NON-CORE VACCINES

FeLV is a disease of young and sociable cats. Prolonged intimate interactions are required for transmission of the virus. Kittens ≤ 16 weeks old are most susceptible. Cats develop natural resistance to this virus as they age and as a result, it is very difficult to experimentally infect a cat over 1 year of age with the virus even when they have not been vaccinated.

There are several FeLV vaccines currently available. The reported efficacy of individual vaccines is variable and there are differences in the level of protection induced by each vaccine. A new recombinant vaccine (canary pox-based) appears to be as efficacious as the killed products. The canary pox vaccine has a unique method of administering a small vaccine volume (0.25 mL) via a needle-free delivery system into the transdermal area. One potential advantage of this product is a reduction of VAS due to the unique delivery system that results in less inflammation. Other potential advantages include an improved immunogenicity with a smaller foreign protein exposure. Clinical experience with this product is limited at the time of writing.

All cats should be tested for FeLV and Feline Immunodeficiency Virus (FIV) prior to immunization with FeLV vaccine, since there is no benefit to vaccinating a seropositive cat and adverse event (i.e. development of a VAS) may result. Guidelines for feline retroviral testing can be found at: http://www.aafponline.org/about_guidlines.htm. Control may be achieved by testing for the disease and elimination of the carriers (in humane shelter or cattery situation) or prevention of exposure (i.e. isolation of the infected cat from others in the household). These procedures may be just as effective as the vaccination of younger cats at risk of infection.

Suggested Guidelines for FeLV:

































































- Only cats/kittens at risk should be vaccinated.
- Cats at low to no risk are a part of a stable indoor-only cat population and have no exposure to cats other than indoor-only FeLV negative housemates.
- Healthy FeLV negative kittens/cats ≥ 9 weeks old can receive the vaccine. Cats/kittens require 2 vaccinations to be administered 3 to 4 weeks apart and can then be revaccinated annually to provide protection.
- Several experts believe that older cats have acquired a natural immunity and may not need to be revaccinated annually.

OTHER FELINE VACCINES

The following vaccines are generally not recommended as the diseases they protect against have minimal clinical significance or respond readily to therapy, or have not demonstrated clinical efficacy in the prevention of these diseases, or may produce adverse events with limited benefit.






































Generally not recommended vaccines include: **Chlamydia felis, Feline Infectious Peritonitis, Feline Bordetella bronchiseptica, Feline Giardia spp., Feline Immunodeficiency Virus and Microsporium canis.**

The Ohio State University Canine Vaccination Guidelines

	Puppy Visit 1 @ 7-12 w age	Puppy Visit 2 @ 3-4 w later	Puppy Visit 3 @ 3-4 w later	New Dog Visit @ > 12 w age	New Dog Visit 2 @ 3-4 w later	Visit @ 12 mo after last vaccine	Annual Revaccination	Triannual Revaccination
Distemper (MLV)								
Recombinant Canine Distemper*								
Parvovirus (MLV)								
Adenovirus-2 (MLV)								
Rabies (Killed)								
Leptospira (Bacterin) <i>canicola/ictero</i>								
Leptospira (Subunit) <i>grippopomona/canicola/ictero</i>								
Parainfluenza (MLV)								
Bordetella bronchiseptica (intranasal)								
Bordetella bronchiseptica (parenteral)								
Borrelia burgdorferi								

*Merial guarantees this vaccine for 3 years but the AAHA recommendations are for annual revaccination

The Ohio State University Feline Vaccination Guidelines:

	Kitten Visit 1 @ 8-12 w age*	Kitten Visit 2 @ 3-4 w later	New Cat Visit @ > 12 w age	New Cat Visit 2 @ 3-4 w later	Visit @ 12 mo after last vaccine	Annual Revaccination	Triannual Revaccination
Panleukopenia (Parenteral MLV)							
Herpesvirus (Parenteral MLV)							
Calicivirus (Parenteral MLV)							
Multivalent Core (Intranasal MLV)						?	?
Rabies 3 yr (Killed- adjuvanted)							
r-Rabies (Canary-pox) vaccine							
FeLV	 *						

* Kitten must be 9 weeks or older

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