



## **Internal Medicine - Fact Sheets/Brochures/Newsletters**

### **UC Davis VMTH Feline Vaccination Guidelines (Revised 11/09)**

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/boarded 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 cats. As further research is performed, and as new vaccines become available on the market, this document will be continuously updated and modified.

## **Feline Vaccination Guidelines**

In general, guidelines for vaccination of cats have been strongly influenced by the appearance of vaccine-associated sarcomas in cats, and in particular their epidemiologic association with feline leukemia virus vaccines and killed rabies virus vaccines. Thus, there is clear evidence for minimizing frequency of vaccination in cats. The recommendations below have been made in light of the AVMA/AAHA/AAFP/VCS task force recommendations on vaccine-associated sarcomas in cats. Risk factors for sarcomas should be discussed with cat owners at the time of examination. If a cat develops a palpable granuloma at the site of previous vaccination, the benefits vs risks of future vaccinations should be carefully considered. All vaccine-associated sarcomas should be reported to the vaccine manufacturer, the USDA Center for Veterinary Biologics, and the AVMA.

## **Feline Core Vaccines**

The definitions of core and non-core vaccines described in the canine vaccination guidelines above also apply to the feline vaccines. The core feline vaccines are those for feline herpesvirus 1 (FHV1), feline calicivirus (FCV), feline panleukopenia virus (FPV) and rabies.

## **Feline Herpesvirus 1, Feline Calicivirus and Feline Panleukopenia Virus Vaccines**

For initial kitten vaccination (<16 weeks), one dose of parenteral vaccine containing modified live virus (MLV) FHV1, FCV, and FPV 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 cats older than 16 weeks of age, two doses of vaccine containing modified live virus (MLV) FHV1, FCV, and FPV given 3-4 weeks apart are recommended. After a booster at one year, revaccination is suggested every 3 years thereafter for cats at low risk of exposure. According to recommendations of the vaccine-associated sarcoma task force, these vaccines are administered over the right shoulder. Note that recommendations for killed and intranasal FHV1 and FCV vaccines are different from the above. Killed and intranasal varieties of these vaccines are not routinely used at the VMTH. The use of FPV MLV vaccines should be avoided in pregnant queens and kittens less than one month of age.

## **Feline Rabies Virus Vaccines**

Cats are important in the epidemiology of rabies in the US. In general we recommend that kittens receive a single dose of killed or recombinant rabies vaccine at 12-16 weeks of age. Adult cats with unknown vaccination history should also receive a single dose of killed or recombinant rabies vaccine. For the recombinant vaccines, boosters are recommended at yearly intervals. We currently stock and suggest the use of the recombinant rabies vaccine, although there is no evidence as yet that it is associated with a decreased risk of sarcoma formation. For the killed rabies vaccines, a booster is required at one year, and thereafter, rabies vaccination should be performed every 3 years using a vaccine approved for 3-year administration. According to recommendations of the vaccine-associated sarcoma task force, rabies vaccines are administered subcutaneously as distally as possible in the right rear limb.

## **Feline Non-Core Vaccines**

Optional or non-core vaccines for cats consist of the vaccines for feline leukemia virus (FeLV), feline immunodeficiency virus, virulent FCV, *Chlamydomyces felis*, and *Bordetella bronchiseptica*.

## **Feline Leukemia Virus Vaccine**

A number of FeLV vaccines are available on the market. The whole inactivated viral vaccines have recently been shown to be highly efficacious based on the results of molecular detection methods for FeLV, even producing sterilizing immunity, although this was not found to be the case for a inactivated mixed subunit vaccine (Torres et al, 2009). We recommend vaccination of FeLV-negative cats allowed to go outdoors or cats having direct contact with other cats of unknown FeLV status. Vaccination is most likely to be useful in kittens and young adult cats, because acquired resistance to infection develops beyond 16 weeks of age. As of 2006, the AAFP recommends primary vaccination of all kittens for FeLV, but the decision to administer booster vaccines is based on risk assessment. Vaccination is not recommended for FeLV-positive cats and indoor cats with no likelihood of exposure to FeLV.

Because of concerns relating to sarcoma formation following administration of killed, adjuvanted vaccines, we currently stock and suggest the use of the recombinant transdermal FeLV vaccine. This vaccine does not produce chronic inflammatory reactions, which are a prerequisite for sarcoma induction. Its efficacy has been demonstrated only using commonly used antigen detection methods, and not highly sensitive nucleic acid detection methods. Therefore, it is uncertain whether immunity is of priming or sterilizing nature.

Initially, two doses of FeLV vaccine are given at 2-4 week intervals, after which annual boosters are recommended depending on risk. According to recommendations of the vaccine-associated sarcoma task force, parenteral FeLV vaccines are administered subcutaneously as distally as possible in the left rear limb.

### **Feline Immunodeficiency Virus Vaccine**

The FIV vaccine is an inactivated, adjuvanted dual subtype vaccine that was released in July 2002. Unfortunately, vaccination of FIV-negative cats renders currently available serologic tests (ELISA and Western blot) positive for at least a year following vaccination, and polymerase chain reaction (PCR)-based tests do not reliably identify cats with natural infection. Previous vaccination does not prevent infection, and the significance of a positive test result in a vaccinated cat cannot be assessed. Questions remain regarding the vaccine's ability to protect against all of the FIV subtypes and strains to which cats might be exposed. Therefore, the decision regarding whether to use this vaccine is not straightforward, and the risks and benefits of the use of this vaccine should be carefully discussed with owners prior to using the vaccine in cats at risk of exposure. The UC Davis VMTH pharmacy does not stock this vaccine, and its routine use in indoor cats is not recommended.

### **Virulent Calicivirus Vaccine**

The virulent FCV vaccine (Calicivax) is a killed, adjuvanted vaccine containing just one of many different strains of hypervirulent FCV known to cause severe systemic disease, including facial or limb edema, cutaneous ulceration, hepatocellular dysfunction, and high mortality. The disease is relatively rare, but has often involved otherwise healthy, adult cats that have been vaccinated with core vaccines containing FCV. In general, outbreaks have been self-limiting with no spread to the wider cat community. Although the virulent FCV vaccine has protected against challenge with the same FCV strain present in the vaccine, no field studies have yet been performed to determine whether it protects against other virulent strains. Given that the degree of serologic cross-reactivity between these strains is low, cross-protection does not seem very likely. Currently we do not recommend or stock this vaccine because 1) it is an adjuvanted vaccine that may increase risk of sarcoma formation; 2) the disease is rare and spread tends to be self-limiting; and 3) the degree of cross-protection between the strain included in the vaccine and other virulent FCV strains is unknown. For more information on this disease, the reader is referred to the [Center for Companion Animal Health's Shelter Medicine document](#).

### **Feline Chlamydomphila felis Vaccine**

Chlamydomphila felis causes conjunctivitis in cats that generally responds readily to antimicrobial treatment. Immunity induced by vaccination is probably of short duration and the vaccine provides only incomplete protection. The use of this vaccine could be considered for cats entering a population of cats where infection is known to be endemic. However, the vaccine has been associated with adverse reactions in 3% of vaccinated cats, and we do not recommend routine vaccination of low-risk cats with this vaccine. The C. felis vaccine is therefore not stocked by the VMTH pharmacy.

### **Feline Bordetella bronchiseptica Vaccine**

This is a modified live intranasal vaccine. Bordetella bronchiseptica is primarily a problem of very young kittens, where it can cause severe lower respiratory tract disease. It appears to be uncommon in adult cats and pet cats in general. For these reasons, the UC Davis VMTH does not recommend routine vaccination of pet cats for Bordetella bronchiseptica. The vaccine could be considered for young cats at high risk of exposure in large, multiple cat environments. The UC Davis VMTH pharmacy does not stock this vaccine.

### **Other Feline Vaccines**

Feline vaccines that have been listed as 'Not Generally Recommended' by the AAFP, include the feline infectious peritonitis (FIP) vaccine and the feline Giardia lamblia vaccine, which at the time of writing is of questionable availability.

### **Feline Infectious Peritonitis Vaccine**

The FIP vaccine is an intranasal modified live virus product. The efficacy of this vaccine is controversial, and duration of immunity may be short, although the vaccine appears to be safe. Although exposure to feline coronaviruses in cat populations is high, the incidence of FIP is very low, especially in single-cat households (where it is 1 in 5000). Most cats in cattery situations where FIP is a problem become infected with

coronaviruses prior to 16 weeks of age, which is the age at which vaccination is first recommended. Vaccination could be considered for seronegative cats entering a cattery where FIP is common. We do not routinely recommend vaccinating household cats with the FIP vaccine, and the vaccine is not stocked by our pharmacy.

### **Feline Giardia Vaccine**

A killed *Giardia* vaccine has been marketed for use in cats. This vaccine has the same limitations as those listed above for canine giardiasis, and has the additional potential to induce vaccine-associated sarcomas. We currently do not recommend routine use of this vaccine in pet cats. The UC Davis VMTH pharmacy does not stock this vaccine.

## **REFERENCES/SUGGESTED FURTHER READING**

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Paul MA, Appel M, Barrett R et al. 2003. Report of the American Animal Hospital Association (AAHA) Canine Vaccine Task Force: Executive Summary and 2003 Canine Vaccine Guidelines and Recommendations. *J Am Anim Hosp Assoc.* 39(2):119-131 (also <http://www.aahanet.org> via the AVMA Login (green))

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American Association of Feline Practitioners: 2000 Feline Vaccination Guidelines.  
[http://www.aafponline.org/about/guidelines\\_vaccine.pdf](http://www.aafponline.org/about/guidelines_vaccine.pdf)

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