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Vaccination Guidelines for Dogs and Cats

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Recently there has been much discussion about vaccination schedules for cats and dogs. Vaccinations are important as they protect the animals from infectious diseases. Owners and breeders should discuss vaccination strategies for their animals with their veterinarians, they can recommend the most effective regimen for their animal patients.

The purpose of vaccinations is to stimulate humoral and/or cellular immune responses and to generate an appropriate immune memory so that subsequent exposure of the animal to the infectious agent will not result in a disease state. In young animals, the presence of maternally derived, passive immunity may interfere with this process, as may other factors such as poor nutritional status, concurrent disease, and anesthesia. Because maternally derived antibodies may block an immune response to vaccines in very young puppies and kittens, a series of vaccines are given at appropriate intervals which should then result in active immunity against the vaccine antigens and the corresponding naturally found antigens.

Following are recommendations and vaccination schedules for cats and dogs developed by dinicians at VHUP.

At what age should one begin vaccinating puppies and kittens? As there is no transfer of maternal antibodies through the placenta to the fetus, puppies and kittens are born with almost no antibodies; only a few (IgM) that they have generated themselves, which are not sufficient for protection against most infectious agents. Thus, protection is provided by ingestion of colostral antibodies during the first day of life. As maternally derived antibody titers decline in the kittens and puppies, the neonatal immune system develops further. In theory, colostrum-deprived animals could receive their first vaccinations at 2-3 weeks of age and colostrum recipients at 6-9 weeks of age.

The interval between the first series of booster vaccinations should be between 3 and 4 weeks because vaccines can interfere with each other; upon infection with the vaccine virus, cells increase interferon production. Therefore, if the second vaccine is given within a week to ten days, it will fail. Delays longer

Canine Vaccination Protocol at VHUP

*:Puppies: If a dog needs to be vaccinated before 6 weeks of age and has no known history of ingestion of colostrum or known lack of colostrum or in case of high infectious disease risk (*), it may be given measles virus vaccine to overcome maternal protection against distemper and killed canine Parvovirus vaccine (killed CPV). Do not use live CPV at less than 5 weeks of age because of the potential damage to still dividing and developing myocytes.

Coronavirus Vaccines: Coronavirus only causes serious, fatal disease in puppies less than 5 weeks of age. However, puppies are generally protected through colostral antibodies until 8-12 weeks of age. Thus, it is probably of little value vaccinating puppies against coronaviral infections.

Leptospira vaccines: This vaccine presents a dilemma for several reasons: In more recent times, several dogs seemed to have had allergic type reactions to the Leptospira component in the multivalent vaccines. It has also been suggested that the duration of immunity after vaccination only lasts for about 8 months. Recently, a new Leptospira vaccine has become available that contains four different serovars: *grippotyphosa, canicola, icterohemorrhagica,* and *pomona*. The vaccine is now purified, which may reduce allergic reactions and although titers drop significantly after 6 months, challenge with pathogenic forms of *L. icterohemorrhagica* and *canicola* one year after vaccination did not cause disease. Because of these recent developments we recommend this vaccine.

Lyme Disease (Borreliosis) vaccines: As the pathogenesis of infections with *Borrelia burgdorferi* is still not clearly defined, this should not be a routine vaccination. Post-vaccinal Lyme-like syndrome has been described and it is possible that the same dog breeds that have had these types of reactions may also be the ones that have more serious disease after infection with the pathogenic strain. The vaccine also interferes with interpretation of titers possibly for years after vaccination.

***Bordetella bronchiseptica* vaccines:** This is probably not a very effective vaccine, and there are not enough studies to document either short- or long-term efficacy. However, there are some kennels that require Bordetella vaccinations before the dog can be boarded. The intranasal vaccine seems to provide marginally better protection than the injectable form. The dog should receive a booster 2-4 weeks after the initial vaccination, if given the killed injectable vaccine. A single dose of the intranasal vaccine is likely to be sufficient in a puppy older than 14 weeks of age, when the maternal antibodies have dropped to undetectable levels.

Canine Vaccination Protocol at VHUP

	Neonates*	Puppy Series			Last Puppy Booster	First Adult Booster	Adult Boosters	
Vaccines	2-6 weeks	6-8 weeks	10-12 weeks	13-16 weeks	16 weeks	15 mts.	Annually	Every 3 years
Distemper/ Measles	❑							
Killed Parvovirus	❑							
Distemper		❑	❑	❑	❑#	❑		❑
Canine Adeno-virus Type 2		❑	❑	❑	❑#	❑		❑
Canine Para-influenza		❑	❑	❑	❑#	❑		❑
Canine Parvo-virus		❑	❑	❑	❑	❑		❑
Leptospira-four serovars		❑	❑	❑	❑#	❑	❑	
Rabies Virus				❑		❑		❑
Bordetella (optional)		❑	❑	❑		❑	❑	
Lyme (optional)		❑	❑	❑		❑	❑	

#: Optional; usually present in combination vaccines together with canine Parvovirus.

than 8 weeks should be avoided. The exception is the rabies vaccine (adjuvanted killed virus), in which long-term immunity studies indicate efficacy of boosters after 1 year followed by triennially given boosters.

Only healthy animals should be vaccinated. For example, if an animal has an elevated body temperature that remains over 103°F on repeated measurements, its cellular immune system shuts down. Thus, the vaccine may not be efficacious, or worse, may cause disease. Animals with immunodeficiencies or receiving chemotherapy will also not respond appropriately to vaccination.

Vaccination sites: It should always be recorded where the vaccines were given, in case reactions are seen later. In cats and dogs, rabies should always be given in the right upper hind limb. In cats, FeLV vaccines are given in the left upper hind limb. The other vaccines may be given on the right or left side of the abdomen. We do not recommend giving vaccines between the shoulder blades because of the poor drainage of this site.

Pregnancy: It is best to vaccinate before pregnancy. If this is not possible or the opportunity was missed, it has been recommended that killed vaccines should be and could be safely used two weeks before the expected due date. Two weeks allow sufficient time for the production of antibodies, which can then be passed on to the offspring via colostral intake. However, because of the nature of killed vaccines, adverse, allergic type reactions are more likely.

Vaccine reactions: The owner should carefully observe any animal that has been vaccinated for the first half-hour after vaccination for signs of acute allergic reactions. In case of allergic reactions, contact the veterinarian or an emergency service immediately. If an animal has had a reaction before, the veterinarian should be informed. In cases where the veterinarian and the owner have opted not to vaccinate the animal, titers to the corresponding diseases may be measured, but it must be kept in mind that serum titers do not reflect the actual state of local immunity.

Feline Vaccination Protocol at VHUP

Kittens: Protection through maternally derived antibodies lasts usually until 6-8 weeks of age, but against feline infectious peritonitis (FIP) only until 4-6 weeks of age. If colostrum-deprived, neonatal kittens under 4 weeks need to be vaccinated (*), use either killed vaccines or one half dose of the intranasal vaccine. In catteries with chronic upper respiratory tract infections, parenteral or intranasal FVR/FCV vaccinations can be started at 4-6 weeks in endemic catteries. Protection seems to be incomplete regardless of vaccine type.

Intranasal versus Parenteral vaccines: As the intranasal vaccines are modified live, they have the advantage that they elicit a much better, longer lasting immune response. Intranasal vaccines are also quicker in breaking through the maternally derived immunity and are not associated with fibrosarcomas. The disadvantage is that some cats will show mild signs of disease, which may upset the owner, but rarely require veterinary intervention.

Feline Calicivirus: Chronic ulcerative gingivostomatitis is a hypersensitivity reaction to persistent caliciviral carriage. Thus, we do not recommend boostering repeatedly, as it may lower the protective titer leading to prevention of clinical signs but not eliminating the virus.

Rabies (#): Currently, there are two different types of rabies vaccines available for use in cats. One is the previously marketed killed virus vaccine, which needs to be boostered one year after the initial vaccine and then only triennially. Recently, a recombinant virus vaccine has become available which provides protection by stimulating antibody response to some of the surface antigens of the rabies virus. In Pennsylvania, the law states that any cat that spends any time indoors must be vaccinated against rabies; i.e. farm cats that are always outdoors do not need to be vaccinated, although it is highly advisable to vaccinate them.

Feline Leukemia Virus: The decision to vaccinate against FeLV must be based on the cat's environment; if the cat is indoors, alone or with only one other cat, it is not worth to expose the cat to the potential side effects of a vaccine that does not offer 100% protection. However, if a cat is outdoors, unsupervised, most of the time and has contact to other outdoor cats, attends cat shows or is in a multi-cat household, the risk of getting infected with FeLV is much greater than that of adverse reactions. Even in a multi-cat household, it might be better in the long run, to carefully test every new addition to the cattery for FeLV infection, instead of vaccinating every cat. Because maternal antibodies against FeLV may be present until at least 8 weeks, it is recommended that the first FeLV vaccine not be given until 10 weeks of age. The immunity after vaccination only lasts one year. Thus, a yearly booster is required.

Chlamydia Vaccines: Due to the low prevalence of chlamydial respiratory disease, it should not be given as a routine vaccination.

Feline infectious peritonitis: As the pathogenesis of FIP is incompletely understood at this time, the efficacy of this vaccine cannot be clearly assessed. While it seems to be a safe vaccine, because of its questionable efficacy, we do not recommend this vaccine.

Feline Vaccination Protocol at VHUP

	Neonates*	Kitten Series		Last Kitten Booster	First Adult Booster	Adult Boosters	
Vaccines	2-4 weeks	6-8 weeks	10-12 weeks	12-13 weeks	15 months	Annually	Every 3 years
Feline Viral Rhinotracheitis (FVR)	❑	❑	❑	❑	❑		❑
Panleukopenia (FPV)	❑	❑	❑	❑	❑		❑
Feline Calicivirus	❑	❑	❑	❑	❑		
Rabies Virus				❑	❑	❑#	❑#
Feline Leukemia (FeLV) (optional) (optional)			❑	❑	❑	❑	