

## Recommended Vaccination Schedule for Animal Shelters

### Canine Vaccines

#### Core (Required) Vaccines for Dogs

Vaccine	Puppies	Adults with No Vaccination History	Adults with Vaccination History	Comments
<b>DHPP (MLV)</b> <b>D</b> = canine distemper virus (CDV) <b>H</b> = infectious canine hepatitis = canine adenovirus 2 (CAV2) <b>P</b> = canine parainfluenza virus <b>P</b> = canine parvovirus (CPV) <b>High titer low passage CPV:</b> PFIZER (Vanguard Puppy) INTERVET (Progard, Continuum) Merial (Recombitek) FORT DODGE (the Puppy Shot) SCHERING-PLOUGH (Galaxy)	<ul style="list-style-type: none"> <li>● on admission or when 6 weeks</li> <li>● every 3 weeks</li> <li>● last dose after 12 weeks</li> </ul>	<ul style="list-style-type: none"> <li>● on admission</li> <li>● booster in 3 weeks</li> </ul>	<ul style="list-style-type: none"> <li>● on admission if no booster in the past year</li> <li>● some advocate on admission vaccination for all</li> </ul>	<ul style="list-style-type: none"> <li>● CPV - can cause heart failure (myocarditis) if given to pups &lt;4 weeks old</li> <li>● CPV - At 6 weeks of age, only 30% of healthy puppies are protected by maternal immunity but 100% are exposed to the virus at the shelter.</li> <li>● CPV – high titer low passage vaccines are more effective at breaking through maternal immunity than other MLV CPV vaccines</li> <li>● CDV – subunit vaccine (Recombitek – Merial) is more effective at breaking through maternal immunity than MLV</li> </ul>
<b>Bordetella (bacterin, IN or SC)</b> Bordetella bronchiseptica Canine parainfluenza virus	<ul style="list-style-type: none"> <li>● on admission or when 6 weeks</li> <li>● every 3 weeks</li> <li>● last dose after 12 weeks</li> </ul>	<ul style="list-style-type: none"> <li>● on admission</li> <li>● booster every 6 months</li> </ul>		<ul style="list-style-type: none"> <li>● protects against 2 of the many causes of kennel cough</li> <li>● Intranasal (IN) produces immunity in 2 days</li> <li>● injectable (SC) produces immunity in 2 weeks</li> <li>● Giving IN vaccine SC by mistake can cause abscess, fever or rarely liver failure</li> <li>● Giving SC vaccine IN by mistake can cause nasal ulceration, URI or sinus infection</li> </ul>
<b>Rabies (killed)</b>	<ul style="list-style-type: none"> <li>● 12-16 weeks</li> </ul>	<ul style="list-style-type: none"> <li>● on admission</li> </ul>	<ul style="list-style-type: none"> <li>● Booster as required by law (1-3 years since last vaccine)</li> </ul>	<ul style="list-style-type: none"> <li>● rabid wildlife may infect dogs.</li> </ul>
Non-Core (Optional) Vaccines for Dogs				
Vaccine	Puppies	Adults with No Vaccination History	Adults with Vaccination History	Comments
<b>Canine Influenza Virus (killed)</b>	<ul style="list-style-type: none"> <li>● &gt;12 weeks treat as adults</li> </ul>	<ul style="list-style-type: none"> <li>● 3 doses, 3 weeks apart</li> <li>● booster yearly</li> </ul>		<ul style="list-style-type: none"> <li>● If canine flu is endemic to your area or a problem at your shelter</li> </ul>
<b>Coronavirus (MLV or killed)</b> Canine coronavirus (CCV)	<ul style="list-style-type: none"> <li>● on admission or when 6 weeks</li> <li>● every 3 weeks</li> <li>● last dose after 12 weeks</li> </ul>	<ul style="list-style-type: none"> <li>● on admission</li> <li>● booster in 3 weeks</li> </ul>	<ul style="list-style-type: none"> <li>● on admission if no booster in the past year</li> </ul>	<ul style="list-style-type: none"> <li>● Rare disease.</li> <li>● Mild self-limiting disease in most cases.</li> <li>● Efficacy of the vaccine is questionable.</li> <li>● not recommended after adoption.</li> </ul>

<b>DHP (killed, subunit CDV)</b> No canine parainfluenza	● <6 weeks	Not applicable		● can be used in sick/pregnant adults or pups who did not nurse colostrum from healthy mother
<b>Leptospirosis (bacterin)</b> Leptospira interrogans canicola, grippityphosa, pomona and icterohemorrhagica	● on admission or when 9 weeks ● last dose after 12 weeks	● on admission ● booster every 6 months		● uncommon disease. ● most likely vaccine to cause side effects in dogs and puppies. ● protects against only 2-4 of dozens of serovars (no cross-protection).
<b>Lyme Disease (bacterin or vectored)</b> Borellia burgdorferi	● on admission or when 9 weeks ● last dose after 12 weeks	● on admission ● booster every 6 months		● Low risk in much of the United States. ● 85% of cases are in 9 New England states and Wisconsin. ● Possible side effect of polyarthritis from whole cell bacterin.
<b>Parvovirus (MLV)</b>	● 12-16 weeks	Not applicable	Not applicable	● some give an extra dose to rottweilers, Dobermans and pit bulls at 16-20 weeks

### Vaccines Not Recommended For Dogs

<b>CAV1 (MLV)</b> Canine adenovirus 1	1) causes "blue eye" – corneal edema that can result in blindness.			
<b>Crotalid Toxoid (rattlesnake vaccine)</b>	Only if your shelter is overrun with rattlesnakes ;-).			
<b>Giardia</b>	Efficacy of vaccine unsubstantiated by independent studies.			
<b>Porphyromonas (Dental vaccine – bacterin)</b>	Provisionally licensed – unknown efficacy.			

## Feline Vaccinations

### Core (Required) Vaccines for Cats

Vaccine	Kittens	Adults with No Vaccination History	Adults with Vaccination History	Comments
<b>FVRCP (MLV)</b> FVR = feline viral rhinotracheitis = feline herpesvirus 1 (FHV1) C = feline calicivirus (FCV) P = feline parvovirus (FPV) = feline panleukopenia	● on admission or when 6 weeks ● every 3 weeks ● last dose after 12 weeks	● on admission ● booster in 3 weeks	● on admission if no booster in the past year ● some advocate on admission vaccination for all	● FPV – can cause brain defect (cerebellar hypoplasia) if given to kittens <4-6 weeks old or to queen (kittens in utero) ● FPV – IN vaccines are not effective in the shelter setting ● Feline URI vaccines are about 50% effective ● FPV vaccine is much more effective than URI
<b>Rabies (killed)</b>	● 12-16 weeks	● on admission	● Booster as required by law (1-3 years since last vaccine)	● rabid wildlife may infect cats

<b>Non-Core (Optional) Vaccines for Cats</b>				
<b>Vaccine</b>	<b>Kittens</b>	<b>Adults with No Vaccination History</b>	<b>Adults with Vaccination History</b>	<b>Comments</b>
<b>Chlamydia felis (bacterin)</b>	<ul style="list-style-type: none"> <li>● on admission or when 6 weeks</li> <li>● every 3 weeks</li> <li>● last dose after 12 weeks</li> </ul>	<ul style="list-style-type: none"> <li>● on admission</li> <li>● booster every 6 months</li> </ul>	<ul style="list-style-type: none"> <li>● on admission</li> <li>● booster every 6 months</li> </ul>	<ul style="list-style-type: none"> <li>● uncommon disease.</li> <li>● most likely vaccine to cause side effects including sneezing.</li> </ul>
<b>Feline Leukemia (vectored or killed)</b> Feline leukemia virus (FeLV)	<ul style="list-style-type: none"> <li>● negative FeLV test</li> <li>● 9 weeks</li> <li>● booster 3 weeks later</li> </ul>	<ul style="list-style-type: none"> <li>● negative FeLV test</li> <li>● on admission</li> <li>● booster 3 weeks later</li> </ul>	<ul style="list-style-type: none"> <li>● negative FeLV test</li> <li>● on admission ?</li> <li>● booster every 3 years</li> </ul>	<ul style="list-style-type: none"> <li>● recommended for cats in colony housing</li> <li>● vaccinating FeLV+ cats is not harmful, but wastes resources</li> <li>● vaccinating FIV+ cats can prolong survival</li> <li>● vectored vaccine requires use of VetJet injector</li> </ul>
<b>FVRCP (killed)</b>	<ul style="list-style-type: none"> <li>● &lt;6 weeks</li> </ul>	Not applicable		<ul style="list-style-type: none"> <li>● can be used in sick/pregnant adults or kittens who did not nurse colostrum from healthy queen</li> </ul>
<b>FVR (MLV IN)</b> Feline herpesvirus 1 (FHV1)	<b>See FVRCP MLV</b>			<ul style="list-style-type: none"> <li>● can mitigate symptoms of FHV1 infection</li> <li>● can be used in sick/pregnant adults or kittens who did not nurse colostrum from healthy queen</li> </ul>
<b>Vaccines Not Recommended for Cats</b>				
<b>FIP ()</b> Feline infectious peritonitis	<ol style="list-style-type: none"> <li>1) can cause enhanced infection under experimental conditions.</li> <li>2) direct contagion of FIP is under debate.</li> <li>3) efficacy is questionable.</li> </ol>			
<b>FIV (killed)</b> Feline Immunodeficiency Virus	<ol style="list-style-type: none"> <li>1) causes vaccinates to test positive for FIV for the rest of their life.</li> <li>2) efficacy is questionable.</li> </ol>			
<b>Giardia</b>	Efficacy of vaccine unsubstantiated by independent studies.			

### **Immunization Schedules**

There is a great deal of controversy and confusion surrounding the appropriate immunization schedule. Over the past 20 years, we have learned more about the side effects of over-vaccination, and the true duration of immunity of the vaccine strains on the market. It is important to remember that recommendations for vaccination of shelter animals are by definition different from recommendations for pets that live in the general public. Shelter animals are more susceptible to disease due to suboptimal nutrition and health care at the time of surrender, stress of shelter living, and increased exposure to disease. Shelter puppies and kittens may or may not have nursed sufficiently from healthy mothers with immunity to disease to impart sufficient maternal immunity to protect them from disease until 6-12 week of age, as is usual for puppies and kittens in the general population.

## Vaccine Types

There are five types of vaccines currently available to veterinarians: modified-live vaccines, inactivated ("killed") vaccines, recombinant vaccines, bacterins and toxoids

**Modified Live Vaccines (MLV).** Modified-live vaccines contain a weakened strain of the disease causing agent, which stimulate immunity but do not cause disease in most animals. Weakening of the agent is typically accomplished by chemical means or by genetic engineering. These vaccine viruses replicate within the host, thus increasing the amount of material available for provoking an immune response. This provocation primes the immune system to mount a vigorous response if the disease causing agent is ever introduced to the animal. Further, the immunity provided by a modified-live vaccine develops rather swiftly and since they mimic infection with the actual disease agent, it provides the best immune response. In some cases, a single dose of MLV vaccine can produce lifetime immunity. Vaccine strains can in some cases be passed from one animal to another, strengthening immunity of the group even when all are not vaccinated. MLV vaccines can cause mild signs of disease in some cases (especially feline URI vaccines), as well as false positive tests for 7-10 days or so after vaccination (parvovirus, canine distemper virus). MLV vaccines can cause abortions or birth defects if given to pregnant animals. If not properly handled, MLV vaccines are rather easily inactivated. Once mixed, MLV vaccines must be used within 2 hours.

**Inactivated Vaccines (Killed).** Inactivated vaccines contain killed whole disease causing agents. Since the agent is killed, it is much more stable and has a longer shelf life, there is no possibility that they will revert to a virulent form, and they never spread from the vaccinated host to other animals. They are also safe for use in pregnant and nursing animals, as well as puppies and kittens younger than 6 weeks old and animals with weak immune systems that might be susceptible to vaccine induced disease. Immunity produced is a little slower compared to MLV and recombinant, and more than a single dose of vaccine is required to establish maximum immunity. Duration of immunity is generally shorter. Because killed vaccines create weaker immunity, most must contain adjuvants in order to be effective. Adjuvants are chemicals that irritate the immune system, and can result in increased risk of vaccine reaction, including vaccine associated sarcoma (cancer).

**Recombinant Vaccines.** USDA classifies recombinant vaccines into 4 groups: subunit, gene deleted, vectored and other. Subunit vaccines use a small part of the pathogen (antigen) to stimulate immunity without risk of causing disease. In gene deleted vaccines, the genes in the pathogen responsible for causing disease are removed. In vectored vaccines, antigen creating immunity is attached to a non-pathogenic virus that multiplies in the host. Purevax vaccines for cats use canarypox. Oral rabies vaccines used for wildlife are vectored. Recombinant vaccines are associated with fewer vaccine reactions and can break through maternal immunity better in some cases. Vectored vaccines allow manufacturing of vaccines without adjuvants that can rarely cause cancer for pathogens previously only made as killed vaccines. Recombinant vaccines tend to be more expensive than other types.

**Bacterins.** Bacterins are suspensions of either killed or attenuated (avirulent live – AL) bacteria. AL bacterins establish local immunity in the nasal passages when given intranasally. Immunity is short lived in most cases (6-12 months), and these vaccines carry the greatest risk of vaccine reaction, and vaccine efficacy can be reduced by concurrent administration of antibiotics. AL kennel cough vaccines can cause signs of kennel cough in some cases.

**Toxoid.** Toxoid vaccines are created by harvested toxins produced by the pathogen that stimulated production of antibodies to the disease. Examples are tetanus and rattlesnake vaccines.

## Vaccine Administration

In order to keep track of which vaccines are causing a particular reaction, it is recommended that vaccines be given at standardized locations:

Dogs: DHPP right front; rabies right rear; others left front.

Cats: FVRCP right front; rabies right rear; FeLV and FIV left rear; all others left front.

## References:

1. American Association of Feline Practitioners (AAFP) **2006 AAFP Feline Vaccine Advisory Panel Report** - revised 2007.
2. American Animal Hospital Association (AAHA) **2006 AAHA Vaccine Guidelines** – revised.
3. Dodds, Jean. Recommended vaccination schedule for dogs.
4. Journal of the American Veterinary Medical Association (JAVMA) Nov 15 2002, pp. 1401-1407, AVMA Council on Biologic and Therapeutic Agents' report on cat and dog vaccines (COBTA).
5. Miller, Lila, Zawistowski. Shelter Medicine for Veterinarians and Staff. Chapter 17, pp. 285-306, Vaccination Strategies in the Animal Shelter Environment.