

2006 AAHA Canine Vaccine Guidelines

In 2005, AAHA's Canine Vaccine Task Force met to re-examine and revise guidelines on the use of vaccines in dogs. The results of the Task Force's work are summarized and tabulated in this article and are published in their entirety on the AAHA website (www.aahanet.org). The 2006 AAHA Canine Vaccine Guidelines contain information on new technological developments in vaccines, an introduction to conditionally licensed vaccines, and detailed recommendations on the use of available vaccines. Perhaps the most noteworthy addition to the guidelines is a separate set of recommendations created for shelter facilities. Vaccines are classified as core (universally recommended), noncore (optional), or not recommended. The Task Force recognizes that vaccination decisions must always be made on an individual basis, based on risk and lifestyle factors.

Report of the American Animal Hospital Association (AAHA) Canine Vaccine Task Force:

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Executive Summary

Since the publication of the AAHA Canine Vaccine Guidelines in 2003, the profession and the biologics industry have moved in the direction advocated in that document by the Canine Vaccine Task Force. The profession has witnessed no negative medical ramifications to the recommendations issued by the Task Force, several well-documented studies have demonstrated the extended duration of immunity (DOI) and supported the extended vaccine intervals advocated by the guidelines, and the industry has responded in the main by supporting the use of products with extended DOI protocols. While a number of rabies vaccines have long been available as licensed for 3 years by the US Department of Agriculture (USDA), vaccines against other infectious diseases of dogs have generally been licensed as 1-year vaccines. At least one manufacturer has been successful in obtaining a 3-year license from the USDA Center for Veterinary Biologics (USDA/CVB).

This document was developed by the American Animal Hospital Association through a collaborative effort among Task Force members to aid practitioners in making decisions about appropriate care of their canine patients with respect to currently available vaccines. The Task Force included experts in immunology, infectious diseases, internal medicine, and medicine and clinical practice.

The guidelines are supported by professional, scientific and clinical evidence, as well as published and unpublished documentation.

These guidelines and recommendations should not be construed as dictating an exclusive protocol, course of treatment, or procedure. Variations in practice may be warranted based on the needs of the individual patient, resources, and limitations unique to each individual practice setting. The guidelines are not intended to be an AAHA standard of care.

Please visit www.aahanet.org for a complete copy of this report.

In early 2005, the Canine Vaccine Guidelines Task Force was reconvened with the charge of updating the guidelines and developing a plan to simplify the revision process and make it more responsive to the emergence of new vaccines and developments. To that end, the guidelines will be published in their entirety electronically on the AAHA web site (www.aahanet.org), where they can be readily accessed by the profession.

The Task Force recognizes that individual readers will find some sections of immediate interest and others of background interest. However, practitioners are urged to read the entire document for reference, with special attention to certain key sections that have been revised and new sections that have been added.

Revised sections include those addressing the vaccine licensing process and the medical and legal implications of vaccine medicine. Because serologic interpretation in conjunction with or in lieu of vaccination is of major interest to the profession, the section addressing serologic testing has been expanded. The question is not the validity of serology but the application and indication for serologic testing.

A key section of the 2003 guidelines focused on vaccine adverse events and emphasized the importance of reporting adverse events to the appropriate agency. A vaccine adverse event is any undesirable or unintended outcome (including failure to achieve the desired result) that occurs in conjunction with vaccine administration. The section on vaccine adverse events has been updated to reflect recent developments in reporting procedures. The Task Force reiterates its recommendation that practitioners take the time to document and report all adverse events. As changes in protocols are adopted and innovative vaccines and vaccine technologies gain ground, such vigilance is even more essential.

Included in the 2006 guidelines is a section highlighting the science of vaccine development, specifically such technologies as live vectored, subunit, gene-deleted, and deoxyribonucleic acid vaccines. In adding this material, the Task Force's intent is to introduce its audience to new concepts and future technologies and to stimulate awareness of where the science of vaccine development is headed.

The Task Force has also introduced the subject of conditionally licensed vaccines in one of the several tables included in this update. These vaccines have demonstrated safety and purity and in preliminary studies have demonstrated a reasonable expectation of efficacy. Though only granted conditional licenses by the USDA/CVB, these products may have definite indications in individual animals and bear consideration in selected animals.

Another notable addition to these updated guidelines is a section devoted to shelter medicine. The impetus for separate shelter vaccination guidelines was the Task Force's recognition that this rapidly developing area of veterinary practice faces unique challenges. What best serves a clinical companion animal practice may not be ideal in an environment housing an ever-changing population. This section discusses some of the special considerations and issues confronting shelter medicine and provides tables listing vaccines that

are recommended, optional, and not recommended for the shelter environment.

For many readers, a highlight of the 2006 guidelines will be the recommendations for selecting appropriate vaccines to be administered to the individual patient. The vaccine type, optimal time of administration for puppies and adult dogs, and general comments are compiled in an easy-to-use table within the main guidelines. Vaccines are now categorized as *core*, *noncore* (or optional), and *not recommended*. Core vaccines are those that all dogs should receive in one form or other. Optional vaccines should be administered selectively, based on the animal's geographic and lifestyle exposure and an assessment of risk/benefit ratios. The table does not mention specific products or manufacturers; it is the position of the Task Force that all major manufacturers produce quality canine vaccines and that these decisions are best left to the clinician.

Even in their revised and updated form, the 2006 guidelines reflect the same underlying principles that imbued the 2003 edition:

- Vaccination is a medical decision and a medical procedure that should be individualized based on the risk and lifestyle of the individual animal.
- An extended vaccine interval is reasonable, safe, and effective in preventing most infectious diseases.
- Veterinary medicine must remain vigilant of emerging diseases, changes in incidence of known diseases, and adverse events associated with vaccine administration. It is incumbent on veterinarians to proactively report adverse events.
- Decisions surrounding vaccination of client-owned pets should include a discussion with clients and always be fully documented in the medical record.

Table 1
2006 AAHA Canine Vaccination Guidelines* for the General Veterinary Practice

Vaccine†	Initial Puppy Vaccination* (≤16 weeks)	Initial Adult Vaccination (>16 weeks)	Revaccination (Booster) Recommendation	Comments and Recommendations See the second page of the guidelines for definitions of core, noncore, and nonrecommended vaccines
Canine Parvovirus (CPV-2) (MLV)	Administer at 6-8 weeks of age, then every 3-4 weeks until 12-14 weeks of age.	Two doses, 3-4 weeks apart. One dose is considered protective and acceptable.	After a booster at 1 year (unless manufacturer label recommends otherwise), revaccination once every 3 years or more is considered protective.	<i>Core:</i> Although annual boosters are recommended by some vaccine manufacturers, studies have shown protection against challenge (DOI) up to 7 years postvaccination with MLV vaccine. ^{§,} Products with CPV-2, regardless of genotype (i.e., CPV-2, 2a, or 2b), all provide excellent protection against field isolates. <i>Not Recommended:</i> Killed parvovirus products have been shown to be susceptible to maternal antibody interference in puppies as old as 16-18 weeks. Multiple doses (2-5) may be required even in puppies older than 12 weeks.
Canine Parvovirus (CPV-2) (killed)				
Canine Distemper Virus (CDV) (MLV)	Administer at 6-8 weeks of age, then every 3-4 weeks until 12-14 weeks of age.	Two doses, 3-4 weeks apart. One dose is considered protective and acceptable.	After a booster at 1 year (unless manufacturer label recommends otherwise), revaccination once every 3 years or more is considered protective.	<i>Core:</i> Although annual boosters are recommended by some vaccine manufacturers, adult dogs challenged 7 years (Rockborn Strain) and 5 years (Onderstepoort Strain) following MLV vaccination were protected (DOI). [*]
rCanine Distemper Virus (rCDV)	Administer at 6-8 weeks of age, then every 3-4 weeks until 12-14 weeks of age.	Two doses, 3-4 weeks apart.	After a booster at 1 year (unless manufacturer label recommends otherwise), revaccination once every 3 years or more is considered protective.	<i>Core:</i> A suitable alternative to the MLV-CDV and may be used interchangeably with MLV-CDV vaccine. Recent unpublished studies have shown that compared with the MLV-CDV vaccines, the recombinant CDV vaccine is more likely to immunize puppies in the face of passively acquired maternal antibody (PAMA).
Distemper-Measles Virus (D-MV) (MLV)	One dose only between 4 and 12 weeks of age.	Never indicated in animals older than 12 weeks.	Never indicated in animals older than 12 weeks.	<i>Noncore:</i> Intended to provide temporary protection in young puppies because the measles vaccine is effective at providing immunity against CDV even in the presence of passively acquired maternal antibody (PAMA) to CDV. NOTE: Recent unpublished studies have shown that the recombinant CDV vaccine immunizes puppies in the face of PAMA. Therefore, D-MV is no longer the preferred option.

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Canine Adenovirus-1 (CAV-1) (MLV and killed)				<i>Not Recommended:</i> Significant risk of "hepatitis blue-eye" reactions is associated with CAV-1 vaccines. CAV-2 vaccines very effectively cross-protect against CAV-1 and are much safer.
Canine Adenovirus-2 (CAV-2) (MLV parenteral)	Administer at 6-8 weeks of age, then every 3-4 weeks until 12-14 weeks of age.	Two doses, 3-4 weeks apart. One dose is considered protective and acceptable.	After a booster at 1 year (unless manufacturer label recommends otherwise), revaccination once every 3 years or more is considered protective.	<i>Core:</i> Demonstrated cross-protection against canine hepatitis caused by CAV-1 as well as CAV-2, one of the agents known to be associated with infectious tracheobronchitis. Adult dogs challenged 7 years following CAV-2 MLV vaccination were found to be protected (DOI) against the more virulent CAV-1. ¹
Canine Adenovirus-2 (CAV-2) (killed or MLV-topical)				<i>Not Recommended:</i> CAV-2 (MLV parenteral) vaccines produce a more effective immune response than CAV-2 (killed parenteral) vaccines do. CAV-2 (MLV-parenteral) vaccine is commonly combined with CDV and CPV-2 parenteral vaccines, and in general, there is no advantage to administering both CAV-2 (MLV-parenteral) and CAV-2 (MLV-topical) vaccines.
Rabies 1-year (killed)	Administer one dose as early as 3 months of age.	Administer a single dose.	Annually. State, provincial, and/or local laws apply. The 1-year rabies vaccine may be used as a booster vaccine when dogs are required by statute to be vaccinated annually against rabies.	<i>Core:</i> State, provincial, and local statutes govern the frequency of administration for products labeled as "1-year rabies vaccines." The 1-year rabies vaccine is sometimes administered as the initial dose followed 1 year later by administration of the 3-year rabies vaccine. State, provincial, and local statutes may dictate otherwise. When given annually, 1-year rabies products should not be considered to cause fewer adverse reactions than 3-year rabies products. Route of administration may not be optional; see product literature for details.

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Rabies 3-year (killed)	Administer one dose as early as 3 months of age. Where authorized by local/state statutes, a 3-year rabies vaccine may be substituted as an alternative to a 1-year rabies vaccine for initial and subsequent doses.	Administer a single dose. Where authorized by local/state statutes, a 3-year rabies vaccine may be substituted as an alternative to a 1-year rabies vaccine for initial and subsequent doses.	The second rabies vaccination is recommended 1 year following administration of the initial dose, regardless of the animal's age at the time the first dose was administered. Booster vaccines should be administered every 3 years. State, provincial, and/or local laws apply.	Core: State, provincial, and local statutes govern the frequency of administration for products labeled as "3-year rabies vaccines." The 1-year rabies vaccine is sometimes administered as the initial dose followed 1 year later by administration of the 3-year rabies vaccine. State, provincial, and local statutes may dictate otherwise. Route of administration may not be optional; see product literature for details.
Parainfluenza Virus (CPIV) (MLV-parenteral)	Administer at 6-8 weeks of age, then every 3-4 weeks until 12-14 weeks of age.	One dose is adequate.	After a booster at 1 year (unless manufacturer label recommends otherwise), revaccination once every 3 years is considered protective.	Noncore: DOI by challenge has been shown to be at least 1 year (unpublished) for topical (intranasal) vaccine. Note: There is no evidence that parainfluenza vaccine produces any cross immunity to the recently reported canine influenza virus.
<i>Bordetella bronchiseptica</i> (killed bacterin)—parenteral	Administer one dose at 6-8 weeks and one dose at 10-12 weeks of age.	Two doses, 2-4 weeks apart.	Annually. Annually or more often in very high-risk animals not protected by annual booster.	Noncore: There is no known advantage to administering parenteral and intranasal <i>B. bronchiseptica</i> vaccines simultaneously. Vaccine should be administered at least 1 week prior to anticipated exposure.
<i>Bordetella bronchiseptica</i> (live avirulent bacteria) + Parainfluenza Virus (MLV)—topical (intranasal) application	Administer a single dose as early as 3 weeks of age (see product literature for specific age recommendations). For best results, a second dose should be given 2-4 weeks after the first.	A single dose is recommended by the manufacturer.	Annually. Annually or more often in very high-risk animals not protected by annual booster.	Noncore: Note: Transient (3-10 days) coughing, sneezing, or nasal discharge may occur in a small percentage of vaccinates. If animal has not been vaccinated within the previous 6 months, a booster is recommended 1 week prior to known exposure (e.g., boarding, showing).

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<i>Bordetella bronchiseptica</i> (cell wall antigen extract)—parenteral	Administer one dose at 8 weeks of age and one dose at 12 weeks of age.	Two doses, 4 weeks apart.	Annually (manufacturer). Annually or up to every 6 months in high-risk environments.	<i>Noncore</i> : DOI is approximately 9-12 months. There is no known advantage to administering parenteral and intranasal <i>B. bronchiseptica</i> vaccines simultaneously. Vaccine should be administered at least 1 week prior to anticipated exposure.
<i>Borrelia burgdorferi</i> (Lyme borreliosis) (killed whole bacterin) or <i>Borrelia burgdorferi</i> (rLyme borreliosis) (recombinant-Outer surface protein A [OspA])	Initial dose may be given at 9 or 12 weeks of age (depending on manufacturer recommendations) with a second dose 2-4 weeks later.	Two doses, 2-4 weeks apart.	Annually (manufacturer). Revaccinate just prior to start of tick season as determined regionally.	<i>Noncore</i> : Generally recommended only for use in dogs with a known high risk of exposure, living in or visiting regions where the risk of vector tick exposure is considered to be high, or where disease is known to be endemic. Minimum DOI based on challenge studies is 1 year.
Canine Coronavirus (CCV) (killed and MLV)				<i>Not Recommended</i> : Prevalence of clinical cases of confirmed CCV disease does not justify vaccination. Clinical disease rarely occurs and when seen is typically mild and self-limiting. Experience has shown no additional increase in infectious enteritis among adults or puppies subsequent to discontinuing CCV vaccine. Neither the MLV vaccine nor the killed CCV vaccines have been shown to significantly reduce disease caused by a combination of CCV and CPV-2. Only CPV-2 vaccines have been shown to protect dogs against challenge when these two viruses are used. DOI cannot be determined because in studies performed to date, neither vaccinates nor control dogs developed clinical evidence of disease following experimental virus challenge.

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<i>Leptospira interrogans</i> (combined with serovars canicola and icterohaemorrhagiae) (killed bacterin) (Also available with serovars grippityphosa and pomona)	Administer one dose at 12 weeks and one dose at 14-16 weeks. For optimal response, do not administer to dogs younger than 12 weeks.	Two doses, 2-4 weeks apart.	Annually (manufacturer). Annual boosters are not routinely recommended for all dogs. Vaccination should be restricted to use in areas where a reasonable risk of exposure has been established. Veterinarians are advised of anecdotal reports of acute anaphylaxis in toy breeds following administration of leptospiriosis vaccines. Routine vaccination of toy breeds should only be considered in dogs known to have a high exposure risk. Dogs determined to be at exceptionally high risk should be vaccinated at 12 and 16 weeks of age, and then at intervals of 6-9 months until the risk has been reduced.**	Noncore: Disease prevalence is likely to vary for each serovar. Vaccine recommendations are therefore difficult to make due to lack of information on prevalence of specific serovar infections in dogs in various geographic regions. Anecdotal reports from veterinarians and breeders suggest that incidence of postvaccination reactions (acute anaphylaxis) in puppies (<12 weeks of age) and small-breed dogs is high. Reactions are most severe in young puppies. Therefore, routine use of the vaccine should be delayed until dogs are 12 weeks of age. Minimum DOI based on challenge studies has been shown to be approximately 1 year for serovars <i>L. canicola</i> and <i>L. icterohaemorrhagiae</i> ; however, efficacy of the products can be low (<75%). DOI for serovars grippityphosa and pomona are assumed to be up to 1 year.
<i>Giardia lamblia</i> (killed)				Not Recommended: The vaccine may prevent oocyst shedding but does not prevent infection. There is insufficient data to warrant routine use of this vaccine. Infection in puppies and kittens is often subclinical. Most animal strains of <i>Giardia duodenalis</i> are not infective to an immunocompetent human host. Dogs can carry <i>Giardia</i> strains that are potentially infective for humans.†† Transmission to humans is most likely through fecal-oral contact with ingestion of cysts, or from contaminated water. Because the vaccine does not prevent infection, a minimum DOI based on challenge is not reported.

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<i>Crotalus atrox</i> Toxoid (rattlesnake vaccine)	Refer to manufacturer's label. Current administration is two doses 1 month apart to puppies as young as 4 months.	Refer to manufacturer's label. Current administration is two doses 1 month apart.	Refer to manufacturer's label. Annual boosters are currently recommended, especially at the beginning of rattlesnake "season" or when the animal is traveling into rattlesnake habitats.	Intended to protect dogs against the venom associated with the bite of the Western Diamondback Rattlesnake. Some cross-protection may exist against the venom of the Eastern Diamondback Rattlesnake. There is currently no evidence of cross-protection against the venom of the Mojave Rattlesnake. Because of a lack of experience and paucity of field validation of efficacy, the Task Force takes no position on the use of this vaccine. A reasonable expectation of efficacy does exist.
<i>Porphyromonas</i> sp. (periodontal disease vaccine)	See manufacturer's labeled directions.	See manufacturer's labeled directions.	See manufacturer's labeled directions.	Intended as an aid in prevention and control of periodontal disease in dogs. Because of a lack of experience and paucity of field validation of efficacy, the Task Force takes no position on the use of this vaccine. A reasonable expectation of efficacy does exist.

* The AAHA 2006 Canine Vaccine Guidelines are provided to assist veterinarians in developing a vaccination protocol for use in clinical practice. They are not intended to represent vaccination standards for all dogs.

† MLV—modified live virus; r—recombinant.

‡ Route of administration is SQ (subcutaneous) or IM (intramuscular) unless otherwise noted by the manufacturer.

§ DOI—duration of immunity.

∖ American Animal Hospital Association Canine Vaccine Task Force. Report of the AAHA Canine Vaccine Task Force: executive summary and 2003 canine vaccine guidelines and recommendations. *J Am Anim Hosp Assoc* 2003;39:119–131.

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