2013 CANINE VACCINATION GUIDELINES
Implementing the Protocol

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Veterinarians continue to be challenged with new, sometimes complex, even conflicting, information regarding the selection and use of companion animal vaccines. Each year new products, new issues, and of course, new controversies seem to emerge regarding the selection and use of companion animal vaccines. The proceedings that follow reflect key issues on canine vaccination outlined in the 2011 AAHA Canine Vaccination Guidelines and common questions being asked by practicing veterinarians. The objectives of this paper are to: 1) encourage veterinarians to review canine vaccination recommendations currently in place, and 2) facilitate efforts in implementing a safe and effective protocol. The 2011 Canine Vaccination Guidelines can be accessed in their entirety online.[1]

For veterinarians practicing in countries outside of North America, the World Small Animal Veterinary Association (WSAVA) recently updated vaccination guidelines for the dog and cat (2010).[2] It should be noted that there is considerable consistency among the recommendations outlined by each set of Guidelines. This highlights the fact that vaccination guidelines for the dog reflect a global perspective. While veterinarians are not obligated to follow the recommendations outlined, published guidelines do reflect a global standard of care for recommending and administering vaccines to dogs.

For veterinarians practicing in the United States or Canada, it should be emphasized that the 2011 AAHA Canine Vaccination Guidelines are not intended to represent a universal or standardized protocol applicable to all dogs. Instead, they are intended to guide decisions leading to the development of a *rational* vaccination protocol. The notes that follow include a representative protocol (Part I) derived from practices that follow current guidelines. In addition, a series of Frequently Asked Questions (FAQs) are included that offer advice on practical issues related to the selection and use of vaccines in dogs.

PART I: Representative Canine Vaccination Protocol

This section outlines key vaccination recommendations and provides examples of protocols currently used by practices in North America that follow current (AAHA) Canine Vaccination Guidelines.

PART II: Frequently Asked Questions (FAQs)

The FAQ section of this paper addresses key vaccination concerns raised by practicing veterinarians.

NOTE: *Significant effort has been made to validate canine vaccination recommendations on the basis of recently published studies. The reader is reminded, however, that for some of the recommendations and FAQs included below, published studies are simply not available. To that end, some recommendations represent the opinion of the author, experts in the field, and the collective insight of experienced practitioners.*

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[1] 2011 AAHA Canine Vaccination Guidelines; the full text is currently available at www.aahanet.org (Search: LIBRARY; Guidelines).

[2] World Small Animal Veterinary Association's Vaccine Guidelines-2010: available at www.wsava.org.

PART I
-REPRESENTATIVE CANINE VACCINATION PROTOCOL-

A. Recommendations for INITIAL VACCINATION of DOGS

CORE Vaccines	Administration	FIRST Booster
MLV or Recombinant Distemper + MLV Parvovirus + MLV Adenovirus-2 (as a combination product)	8 wks; and 12 wks; and 16 wks of age.	Administer a single dose (of a combination product) not later than 1 year following the last dose in the initial series.
Option: MLV Parainfluenza Virus (products are available for SQ or IN administration)	Option: In the US and Canada, parainfluenza virus (CPiV) vaccine is commonly administered in combination with the above vaccines as DA2PPi. . (*see below*)	
Rabies (killed) 1-Year & 3-Year products are available. Rabies should not be administered to any dog less than 12 weeks of age.	Administer a single dose of rabies vaccine, then… (local or state statutes apply)	…schedule a second dose of rabies vaccine to be administered not later than 1 year following administration of the 1st dose, *regardless of the dog's age at the time the initial dose is administered*. (local or state statutes apply)
NON-CORE Vaccines	**Administration**	**Booster Recommendations**
B. bronchiseptica + parainfluenza virus (intranasal only) (some IN products may also contain CAV-2 antigen)	Single dose (intranasal) at 12 or 16 weeks of age. (optional-some authors recommended 2 doses at 12 and 16 weeks of age). IN vaccine may be administered as early as 3 to 4 weeks of age.	When risk of exposure persists…administer a single dose 1 year following the last dose administered.
B. bronchiseptica only (monovalent) Available for parenteral (killed-bacterin) and intraoral (avirulent live) administration.	Parenteral (SQ): Two doses are required, 2 to 4 weeks apart. Intraoral: The manufacturer recommends a single initial dose.	Annual booster is recommended by the manufacturer. (Duration of immunity for these products has not been established).
Leptospirosis (killed) 4-serovar [2-way Leptospirosis vaccines are *not* recommended by either AAHA or the ACVIM]	2 initial doses, 2 to 4 weeks apart. NOTE: not recommended to administer the 1st dose prior to 12 weeks of age. ALSO: *Small Breed Dogs: consider delaying initial administration until after completion of the CORE series.*	Where risk of exposure exists…administer a single dose 1 year following completion of the *initial* 2-dose series.
Lyme disease (recombinant or killed)	2 initial doses, 2 to 4 weeks apart. . ALSO: *Small Breed Dogs: consider delaying initial administration until after completion of the CORE series.*	Where risk of exposure exists…administer a single dose 1 year following completion of the *initial* 2-dose series.
Canine Influenza Virus (killed)	2 initial doses, 2 to 4 weeks apart are required. ALSO: *Small Breed Dogs: consider delaying initial administration until after completion of the CORE series.*	- Manufacture recommends annual re-vaccination where risk of exposure exists. - Duration of immunity has not been established at this time.

NOTE: 1 additional canine vaccine is conditionally licensed as an aid in the prevention of signs following envenomation by the Western Diamondback Rattlesnake (*Crotalus atrox).* Canine Coronavirus vaccine is not recommended.

Recommendations for RE-VACCINATION (Booster)-Canine:

- After completing the initial series CORE vaccines (distemper+parvovirus+adenovirus-2) it is recommended to administer a single dose (combination vaccine) every 3 years *or longer. NOTE: substantial data exists to demonstrate that dogs derive protective immunity for several years following administration of MLV Core vaccines.*

- *RABIES boosters…In the US, all States currently recognize and accept the use of "3-year" rabies vaccine in dogs. NOTE: some local municipalities may mandate stricter requirements (annual booster) for rabies vaccination.*

- Non-CORE vaccines: administer annually where risk of exposure is sustained.

PART II
FREQUENTLY ASKED QUESTIONS

1. Selection and use of vaccines.

FICTION: Vaccines licensed to protect against a particular infection have comparable safety and efficacy.

FACT: From the standpoint of both safety and efficacy, the differences among the various vaccine types can be significant.

Today, vaccines can be divided into 3 types based on manufacturing technology: **Inactivated** (killed), **Attenuated** (modified live); and **Recombinant**. Knowledge of vaccine type is becoming increasingly important to veterinarians as more products enter the companion animal vaccine market, creating more options for vaccinating against a given disease.

Inactivated Vaccines contain *killed* antigens (bacteria or virus). As such they are "non-infectious" and cannot replicate or revert to virulence post-injection. Because of that, they are often classified as "very safe" vaccines. However, inactivated vaccines tend to contain extraneous (excipient) proteins, many also contain adjuvant, which may increase risk for development of acute vaccine reactions (facial edema, shock) and have been implicated in causing delayed onset adverse reactions, eg, "injection-site sarcoma" in cats.

In addition, inactivated vaccines tend to have the shortest durations of immunity (typically about 1 year). Veterinarians should be alert to the package label, which must classify the immunizing antigen as "killed".

When an alternative choice is available, it is generally preferable to use either an attenuated or recombinant product…the potential advantages being longer duration of immunity and reduced reaction risk.

NOTE: Examples of inactivated (killed) vaccines include: all leptospirosis vaccines, canine influenza, FIV, all canine rabies vaccines, parenteral *B. bronchiseptica*.

Modified-Live (attenuated, or MLV) Vaccines contain either bacteria or virus capable of replicating in the patient following inoculation, hence they are also called "infectious" vaccines. Because vaccine virus/bacteria have been attenuated, the risk of causing clinical signs/illness post-inoculation is significantly low today.

Attenuated vaccines induce a sustained protective immune response lasting, typically, for several years following initial immunization. Unless combined with a killed antigen, attenuated vaccines do not contain adjuvant. The safety of MLV vaccines used today is excellent. For this reason, MLV vaccines are recommended over killed vaccines when the choice is available. Technically speaking, there is a slight risk that, in some patients, replicating virus/bacteria in the vaccine will cause clinical signs consistent with the disease the vaccine intends to prevent following inoculation. Occasional reports of illness have been linked to IN *Bordetella bronchiseptica* vaccines, MLV Distemper and Parvovirus (dog and cat) vaccines. True reversion of attenuated vaccine virus to a virulent virus is extremely unlikely today.

Recombinant Vaccines, and there are different kinds of recombinant vaccines, represent the latest technology available today for the immunization of animals. Recombinant vaccines are in widespread use in dogs, cats, and horses (and ferrets) throughout the world. A variety of technologies are used today to produce recombinant vaccines. However, one property they share is the ability to induce a protective immune response without the need for administering whole live, or killed, virus/bacteria. This technology takes advantage of the ability to isolate selective genetic sequences from pathogens and 'deliver', in the form of a vaccine, sequences that subsequently express immunogenic protein…but only the protein needed to induce immunity. The greatest advantage to recombinant vaccine use is safety. Today, none of the canine or feline recombinant vaccines sold in North America contain adjuvants.

REF: 2011 AAHA Canine Vaccination Guidelines, available at: www.aahanet.org
REF: Greene CE and Schultz RD. Immunoprohylaxis. Chpt 100, in CE Greene (ed): Infectious Diseases of the Dog and Cat. 3rd ed. pp. 1069-1119, 2006.
REF: Tizard IR. *Veterinary Immunology: An Introduction* (8th ed), Saunders-Elsevier, 2009.
REF: Moore GE and HogenEsch H. Adverse vaccinal events in dogs and cats. Vet Clin Small Anim. 40:393-407, 2010.

2. Vaccines not recommended.

FICTION: If a vaccine is licensed…it's "safe and effective" to use in my practice.

FACT: Over the years, both AAHA (canine) and AAFP (feline) vaccination guidelines have recommended that practitioners consider ***not*** administering a particular vaccine on the basis of lack of demonstrated efficacy or safety issues. Examples include: the ringworm vaccine, the canine adenovirus-1 ("blue-eye") vaccine, the Porphyromonas (periodontitis) vaccine…to mention a few. Today, the majority of these products have been removed from the market by the manufacturer.

At this time, the only *canine* vaccine listed in the Guidelines as "not recommended" is the canine coronavirus vaccine. Categorizing coronavirus vaccine in this way is based largely on the fact that coronavirus infections in dogs are mild to unapparent and tend to be limited to young (< 6 weeks of age) puppies. Because clinical illness following natural or experimental infection is so mild, coronavirus vaccines have not been shown, in independent studies, to significantly reduce clinical signs associated with challenge.

It should be noted that canine coronavirus vaccines are licensed by the USDA and are legal to use in vaccination programs for dogs,

REF: 2011 AAHA Canine Vaccination Guidelines; available at: www.aahanet.org

3. Use of 'combination' (ie, multivalent) products.

FICTION: Giving too many vaccines at the same time to the same patient could "overwhelm" the immune system resulting in little or no immune response.

FACT: Immunologists will point out that the immune system of a healthy dog or cat is quite capable of responding to all of the combination antigens in vaccines on the market today. 3-in-1 and 4-in1 products are commonly used...current licensing studies require the manufacturer to demonstrate efficacy associated with each antigen in a combination (multivalent) vaccine.

4. Acute Vaccine Adverse Reactions

FICTION: Size of the patient is *not* a consideration when there is a need to administer multiple vaccines at the same time.

FACT: Recent studies involving large numbers of dogs suggest that doing so may pose increased risk for an acute-onset reactions (hypersensitivity)…especially small breed dogs receiving multiple vaccines at the same appointment.

Giving multiple doses of vaccine at the same appointment (especially among small breed dogs) has been shown to be associated with increased risk of causing an acute vaccine adverse event. Today, it is recommended that, especially in small breed dogs, that veterinarians consider delaying administration of NON-core vaccine until 2 to 4 weeks after completion of the CORE vaccines. Then, administration of any NON-core vaccine should be limited to those patients having a reasonable risk of exposure to the pathogen.

REF: Moore GE, Guptill LF, Ward MP, et al. Adverse events diagnosed within three days of vaccine administration in dogs. *J Am Vet Med Assoc.* 227:1102–1108, 2005.
REF: Ford RB: Acute Post-vaccinal Angioedema. *Today's Veterinary Pract.* 3:Jan-Feb, 2013 (accepted for publication). Available at: www.tpvjournal.com

5. Splitting vaccine doses for "small" dogs.

FICTION**:** Vaccines are effective, and safer, when administered at weekly intervals.

FACT: Vaccines can be "safely" administered at weekly intervals…HOWEVER, doing so poses the risk that the innate immune response to the first dose (cytokines, etc) will interfere with the second dose given a week later…it is currently recommended that vaccines be administered at a MINIMUM interval of 2 weeks…*regardless of the antigen…and regardless of the age of the patient.*

REF: 2011 AAHA Canine Vaccination Guidelines; available at: www.aahanet.org
REF: Guidelines for the Vaccination of Dogs and Cats. WSAVA, published in JSm Anim Pract. 51:1-32, 2010. Available at: www.wsava.org.

6. Reducing the volume of a vaccine dose to reduce the risk of an adverse reaction.

FICTION: Vaccine can be effectively "dosed" to dogs on the basis of weight.

FACT: There are no data to support the practice of reducing the volume of vaccine in small breed dogs. It is inappropriate to do so. In fact, reducing the volume of any vaccine may result in a sub-immunizing response…ie, not enough antigen to effectively induce a protective immune response. Furthermore, there is no evidence that doing so *actually* reduces the risk of causing an adverse reaction…if the patient is truly hypersensitive to one of the constituent proteins, the patient could still react if given 10% (0.1 mL) of the dose.

REF: 2011 AAHA Canine Vaccination Guidelines; available at: www.aahanet.org
REF: Guidelines for the Vaccination of Dogs and Cats. WSAVA, published in JSm Anim Pract. 51:1-32, 2010. Available at: www.wsava.org.

7. Effectiveness after re-constitution.

FICTION: Once re-constituted, MLV vaccines have a 'shelf-life' of several hours or, if kept in the refrigerator, several days.

FACT: Vaccines sold as a freeze-dried (lyophilized) product (typically MLV vaccines) should be used promptly…regardless of whether they are stored in the refrigerator. Especially important is the fact that once re-constituted (rehydrated with diluent), MLV vaccines are susceptible to degradation and may become completely inactive. In the case of canine distemper vaccines, for example, the re-constituted product can become inactive within 2 hours. *THEREFORE…* it is currently recommended to adhere to the following principle:

"1 HOUR…use it….or lose it!" …***regardless of how it's stored.***

REF: 2011 AAHA Canine Vaccination Guidelines; available at: www.aahanet.org

8. Canine *Bordetella* vaccination: IN or SQ?

FICTION: When immunizing dogs against *B. bronchiseptica,* the appropriate protocol entails administering an IN vaccine first…then, administering parenteral (injectable) vaccine for all subsequent boosters.

FACT: Although that was advocated (10 years ago), current studies have challenged that practice. When feasible, studies have shown that it is preferable to inoculate dogs against *B. bronchiseptica* and parainfluenza virus via the IN route. Not only does this rapidly (within 3 days) reduce the risk of clinical illness following exposure, but prevents post-exposure shedding. For high-density populations at risk of exposure to infectious respiratory disease, IN vaccination is recommended. Dogs that are deemed to be at risk of exposure, but aggressively resist IN vaccination, should be vaccinated parenterally.

REF: Davis R, Jayappa H, Abdelmagid OY, et al. Comparison of the mucosal immune response in dogs vaccinated with an intranasal avirulent live culture or a subcutaneous antigen extract vaccine of *Bordetella bronchiseptica. Vet Therap.* 8:32-40. 2007.
REF: Ford RB: *Bordetella bronchiseptica:* Beyond "Kennel Cough", J Bonagura and DC Twedt (eds). Kirk's Current Veterinary Therapy XIV. Saunders-Elsevier, St. Louis. 2009.
REF: Buonavoglia C and Martell V. Canine respiratory viruses. *Vet Clin N Am:Sm Anim Pract.* 38:355-273. 2007 (Review: 173 references)
REF: Keil DJ and Fenwick B: Canine respiratory bordetellosis: Keeping up with an evolving pathogen. In LE Charmichael (ed): *Recent Advances in Canine Infectious Diseases.* International Veterinary Information Service (www.ivis.org Document No. A0104.0100) 13 January 2000.

9. Leptospirosis vaccination.

FICTION: 2 opposing points of view commonly surface in discussions on leptospirosis vaccination: 1) I've never diagnosed a case in this practice, therefore, vaccination is not warranted…and…2) leptospirosis is a zoonotic disease therefore vaccination should be considered CORE.

FACT: As of Fall 2010, there are leptospirosis vaccines on the market that provide protection against the 4 serovars (*L. canicola, L. icterohaemorrhagiae, L. grippotyphosa, L. pomona*) most often recognized to be pathogenic for dogs (living in the United States). The so-called "2-way" vaccines (*L.canicola* and *L. icterohemorrhagiae*) are currently not recommended. *Reason: L.canicola* and *L. icterohemorrhagiae* infections are believed to be in significant decline while infection with *L. grippotyphosa* has been on the increase.

Whether or not to recommend the vaccine remains a complex question when attempting to assess exposure risk and regional prevalence. The fact that a practice has never diagnosed a case of leptospirosis is, obviously, no guarantee that it won't do so in the future. The MAJOR limiting factor regarding leptospirosis diagnosis is the lack of a point-of-care diagnostic test (…that may be changing soon!). Current diagnostic tests (MAT and PCR) must be sent out to a qualified laboratory…yet, the clinician is faced with a patient that has an acute life-threatening illness. Canine leptospirosis is quite likely "under" diagnosed in the US.

On the other hand, leptospirosis is a zoonotic disease…and vaccination is justified in areas where risk exists…the problem here is, considering the lack of testing conducted in practice, where is the risk? In addition, leptospirosis vaccines are among the most reactive vaccines in the inventory. The decision to vaccinate…or not to vaccinate…remains the discretion of the clinician and the owner. When the decision to vaccinate is made, there are some considerations worth noting:

All leptospirosis vaccines are killed. Most contain adjuvant. The Merial-Recombitek® 4 LEPTO is not adjuvanted. There are no attenuated or recombinant leptospirosis vaccines available today.

Because duration of immunity (DOI) information on the 2-way leptospirosis vaccines had never been defined, veterinarians and academicians have questioned the need to administer leptospirosis vaccine every 6 months (or more often) to sustain a protective level of immunity. Recently (August 2010), the Recombitek® 4 Lepto vaccine (Merial) was released in the US; this product does carry a label claim of 15.5 months DOI for *L. grippotyphosa*. Data is available that demonstrates a 12 month DOI for serovars *L. canicola* and *L.icterohemorrhagiae.* Other manufacturers are currently seeking or have recently obtained 12 month DOI labeling. Unique among the currently licensed leptospirosis vaccines, challenge studies conducted at Cornell have shown that the Recombitek® 4 Lepto vaccine does prevents infection as well as shedding of spirochetes.

REF: Minke JM, et al. Onset and duration of protective immunity against clinical disease and renal carriage in dogs provided by a bi-valent inactivated leptospirosis vaccine. *Vet Microbiol.* 120:137-145, 2009.
REF: Greene CE, et al. Leptospirosis. Chpt 44, in CE Greene (ed): *Infectious Diseases of the Dog and Cat.* 3rd Edition. Saunders-Elsevier, St. Louis, 2006, pp. 402-417.
REF: Product Label/Package Insert: Recombitek® 4 Lepto

10. Vaccination against Lyme disease.

FICTION: Lyme disease vaccination poses greater risk to the patient than the infection.

FACT: Canine Lyme borreliosis (aka, Lyme disease) is real. What's more, canine infections are occurring in regions of the US and Canada (especially Southern Ontario) that have not previously had the disease. Regionally speaking, infection risk is expanding significantly.

The published data is clear on the fact that the commercial vaccines for Lyme disease do a relatively good job of protecting dogs...for about 12 months. It is not expected that 100% of the patients vaccinated will develop protective immunity to Lyme borreliosis. Two vaccine types are on the market: a killed, whole spirochete and a recombinant OspA (outer surface protein-A). All vaccines depend on the same antigen, OspA, to immunize. Killed, whole spirochete vaccines contain numerous excipient proteins + adjuvant. Anecdotal reports from practitioners suggest that inactivated Lyme vaccine seem to be associated with a higher risk of acute-onset (1-3 days) vaccine adverse reactions.

None of the vaccines used in the US today cause a False '+' test result on the IDEXX 3Dx or 4Dx test for Lyme borreliosis.

Administration of a Lyme vaccine should NOT be used as part of the *treatment* for Lyme disease!

REF: Hebert D and Eschner A. Seroprevalence of *Borrelia burgdorferi*-specific C6 antibody in dogs before and after implementation of a nonadjuvanted recombinant outer surface protein A vaccine in a Rhode island small animal clinic. *Vet Therap.* 11:E1-E8, 2010.

REF: Wikle RE, et al. Canine Lyme disease: one-year duration of immunity elicited with a canine OspA monovalent lyme vaccine. *Intern J Appl Res Vet Med*. 4:23-30, 2006.

REF: Greene CE and Straubinger RK. Borreliosis. Chpt 45, in CE Greene (ed): *Infectious Diseases of the Dog and Cat.* 3rd Ed. Saunders-Elsevier, St. Louis. pp. 417-435, 2006.

11. Overdue for booster vaccination.

FICTION: A dog or cat that is overdue for CORE vaccines must re-start the initial 3-dose series to be immunized.

FACT: Regardless of the number of weeks, months, or years *overdue* a dog may be, administration of a single dose (MLV or Recombinant CDV), is expected to rapidly induce a protective level of antibody. The reason: immune "memory" persists for many years.

Immune memory following administration of an inactivated (non-core) vaccine, eg, leptospirosis or lyme disease, is relatively short-lived compared with that associated with attenuated vaccines. *Therefore,* dogs that have not received a dose of vaccine in more than 2 years should receive 2 "initial" doses, 2 to 6 weeks apart to re-induce protective immunity.

Overdue for RABIES: In the event a dog or cat has exceeded the 3-year vaccination interval required by State or local statutes for RABIES, most States/municipalities consider a single dose to be all that is required to 'boost' the patient's immunity to rabies. *However*, rabies vaccination requirements do vary from State to State and even among different cities/counties within a State. It's important to check the official position of your State/municipality by contacting the State Dept of Public Health or the State Public Health Veterinarian when making these types of vaccination decisions.

REF: Ford RB: Overdue for vaccination. *Today's Veterinary Pract.* 2(6):2012.

12. Breed-specific vaccination recommendations.

FICTION: The initial vaccination series in Dobermans and Rottweilers should be continued until 20 or 24 weeks of age.

FACT: Today, most authors agree that these breeds do NOT have a uniquely higher risk of acquiring parvovirus following exposure nor are they more likely than any other breed to fail to be immunized following parvovirus vaccine administration. The high disease incidence and the frequency of vaccine failures recognized in the late 70's and early 80's is not considered to be a concern today.

13. Onset of immunity following vaccination.

FICTION: Post vaccinal onset of immunity is not predictable.

FACT: Consider the following:

- KILLED VACCINE-assuming no maternal antibody, 2 doses are required, 2 to 4 weeks apart, *then* about 10 days later (~ 24-25 days minimum)
- MODIFIED-LIVE-assuming no maternal antibody, about 5 to 7 days post vaccination (earlier for some infections such as distemper).
- RECOMBINANT Vectored-same as MODIFIED-LIVE. Exception: The recombinant canine distemper virus (rCDV) vaccine has been shown to immunize dogs in the presence of maternal antibodies. rCDV is indicated in high exposure risk environments.
- RABIES…the unique 'exception': In most locations in the world, onset of immunity to rabies following administration of the INITIAL vaccine is determined *by law…not by serological response (Ab).* In most locations…a dog and cat will be considered (by law) to be immunized 28 days following the initial vaccination.

REF: Greene CE and Schultz RD. Immunoprophylaxis. Chpt 100, in CE Greene (ed): Infectious Diseases of the Dog and Cat. 3rd ed. pp. 1069-1119, 2006.
REF: Larson, L and Schultz, RD. Effect of vaccination with rCDV vaccine immediately before exposure under shelter-like conditions. *Vet Therap* 7(2):113-118, 2006.
REF; Pardo MC, Tanner P, Bauman J, et al: Immunization of puppies in the presence of maternally derived antibodies against canine distemper virus. *J Comp Path.* 137:S72-S75, 2007.
REF: Compendium of Animal Rabies Prevention and Control . MMWR Recomm Rep. 2011 Nov 4;60(RR-6):1-17.

14. Antibody titers as a valid assessment of immunity.

FICTION: Antibody titers can be used in place of annual vaccination boosters to assess immune status of the individual patient.

FACT: It depends! …specific limitations apply to titers when assessing the immune status of an individual patient. Fact: titers for CDV, CPV, and feline parvovirus (panleukopenia) correlate extremely well with immunity...dogs/cats that have a "positive" titer are considered immune…quite likely for many years. Fact: a "negative" titer does not always correlate with susceptibility. Antibody is protein and does dissipate over time. Animals that were previously vaccinated may lose Ab over time; however, immunologic "memory" (B-lymphocytes) is retained for many years for these 3 diseases. Exposure to virulent virus in a previously vaccinated, but antibody negative patient, typically results in a rapid anamnestic 'boost' of antibody titer and a protective immune response. Annual or triennial boosters are merely a form of immunologic insurance for these 3 diseases.

For other diseases, antibody titers are *not* good correlates of protective immunity. Feline herpesvirus-1 and feline calicivirus titers can be obtained, but are not recommended for the assessment of the individual patient's immunity to those diseases. FeLV titers are not valid at all because of the lack of a valid test method. Leptospirosis titers are routinely performed but generally are used to define exposure/infection…not immunity. See RABIES TITERS (next question).

REF: Greene CE and Schultz RD. Immunoprohylaxis. Chpt 100, in CE Greene (ed): Infectious Diseases of the Dog and Cat. 3rd ed. pp. 1069-1119, 2006.

Indications for the use of Antibody Titers in Clinical Practice

- To determine whether or not a puppy or kitten was immunized following administration of the initial vaccine series, a titer can be submitted 2 or more weeks following the last dose of the initial series.

- To assess whether an adult animal has maintained an antibody titer (CDV, CPV, Feline parvovirus) following previous vaccination (e.g., years earlier, with no recent revaccination).

- Veterinarians may elect to determine titers, rather than administer booster vaccines in patients with a history of having had a vaccine reaction -or- having been treated for and recovered from an immune-mediated disorder (e.g., hemolytic anemia or thrombocytopenia) can be tested.

REF: 2011 AAHA Canine Vaccination Guidelines; available at: www.aahanet.org

15. Rabies titers to assess immunity.

FICTION: Rabies titers can be used to assess immunity.

FACT: Rabies titers can NOT, legally, be used to assess immunity. States/local municipalities generally do not accept FAVN (fluorescent antibody virus neutralization) rabies titer results as a replacement for vaccination or as an index of immunity in a dog/cat. FAVN test results (only provided in the US by Kansas State University and DoD [military members only]) are used to comply with requirements on the exportation of animals to designated Rabies-Free areas of the world.

COST: $83 (January 2013 price); expect 3 to 4 weeks for results.
1-2 mL serum (shipped on a cold-pack)
NEW: A sample submission package, RabPak, is available for an additional fee.
Attn: FAVN Rabies Laboratory
Kansas State Veterinary Diagnostic Laboratory
Mosier Hall O-245
1800 Denison Avenue
Kansas State University — Phone: 785-532-4483
Manhattan, KS, USA 66506-5601 — Forms: www.vet.ksu.edu\rabies

REF: Compendium of Animal Rabies Prevention and Control . MMWR Recomm Rep. 2011 Nov 4;60(RR-6):1-17.

16. Legal Considerations.

FICTION: Because recommendations contained within the Canine (AAHA) and Feline (AAFP) Vaccination Guidelines *differ* from the manufacturers' recommendations listed on the package insert, I'm subject to legal liability if I choose to follow the Guidelines.

FACT: It is fact…the Guidelines do make recommendations that, in part, differ from the manufacturer's recommendations. Specific examples include: Boosters of CORE vaccines can be administered every 3 years (or longer) vs. (manufacturer) "annual booster recommended".

Guideline recommendations on the frequency of vaccination are based on several studies that substantiate these recommendations. In addition, each of the major vaccine manufacturers has reviewed these recommendations in advance of publication. As stated in the context of the Guidelines: "veterinarians have considerable latitude in the selection and use of veterinary biologic products licensed for dogs [and cats], with rabies vaccine being a noted exception, and that these Guidelines, although not intended to dictate an exclusive protocol or standard, do meet accepted standards of professional practice."

REF: 2011 AAHA Canine Vaccination Guidelines; available at: www.aahanet.org