Vaccination Recommendations – Practice and Shelter-Housed Dogs

1. MIXING VACCINES. Can different types of vaccines be mixed in the same syringe?

No. Unless specifically stated on the product label (package insert), different vaccines should never be combined in the same syringe prior to administration.

2. MIXING VACCINES. Can different vaccines (not part of a single commercial product) be administered to the same dog at the same appointment?

Yes. Different vaccine types can be administered to the same patient at the time of the appointment. When feasible, they should be administered into separate sites that are drained by different lymph nodes. For example, if a combination modified-live virus (attenuated) vaccine (such as, canine distemper virus (CDV), canine adenovirus-2 (CAV2), canine parvovirus (CPV)) is administered subcutaneously (SQ) over the left shoulder, a killed (inactivated) leptospirosis or rabies vaccine could be administered SQ over the right shoulder.

3. REDUCED VOLUME. Does vaccine loss following intranasal or oral administration of vaccine (e.g., B. bronchiseptica) compromise the degree of immunity a patient derives from that dose?

During, or immediately after, oral or intranasal administration, loss of a small amount of vaccine is expected. All mucosal vaccines contain a concentration of attenuated (live) viruses/bacteria that exceeds the minimum concentration needed to immunize the individual dog. Assuming the vaccine is properly administered, post-administration loss of vaccine volume is not expected to compromise the immune response.

4. REDUCED VOLUME. Should a small breed dog receive the same volume of a parenterally administered vaccine as a larger breed dog?

Unlike pharmaceuticals (the dose of which is usually based on weight), a vaccine dose is not based on volume per body mass (size), but rather on the minimum immunizing dose (inactivated vaccine) or the minimum infectious dose (attenuated vaccine). In addition, arbitrary reduction of the volume of a vaccine dose has not been shown to reduce the risk of an acute adverse reaction or enhance safety.

IMPORTANT: The entire dose should be administered as directed by the manufacturer. Administering less than the prescribed dose may not induce a protective immune response (see also VACCINE ADVERSE REACTIONS).

5. ANESTHESIA and VACCINATION. Should vaccine be administered to the anesthetized patient?

Doing so is NOT generally recommended. There is a small risk that a post-vaccinal hypersensitivity reaction may lead to vomiting and an increased risk of aspiration. However, in the event there is limited opportunity to administer a vaccine to an individual dog (e.g., spay and neuter programs), administering vaccine during, or immediately on recovery from, anesthesia is acceptable.

6. PREGNANCY and VACCINATION. Should a pregnant dog be vaccinated?

Vaccination with modified-live virus (attenuated) and/or killed (inactivated) vaccines during pregnancy should be avoided, if possible, to avoid potential injury to the fetus. There are exceptions, especially in animal shelters, where vaccination is advised if the pregnant dog has never been vaccinated and there is significant risk for exposure to a highly pathogenic virus (e.g., canine distemper virus, canine parvovirus).

7. IMMUNE SUPPRESSION. Does glucocorticoid treatment interfere with vaccine immunity during the initial vaccination series (puppies) or following administration of a booster dose of vaccine (adult)?

Studies in dogs and humans suggest that short-term (days) glucocorticoid treatment, even at high doses (2.5 mg/kg) before or at the time of vaccination, does not have a significant suppressive effect on the humoral (antibody) following vaccination. In humans, reversible humor immune suppression following long-term (years) corticosteroid therapy has been reported.[90,95]

OPTION: It is reasonable to revaccinate 2 or more wk after long-term corticosteroid therapy has ended, especially when treatment occurred during administration of the initial series of core vaccines. Also, antibody testing (CDV-CPV-CAV2) could be performed 2 to 4 wk post-vaccination to assess the response of the individual patient following vaccination.

8. IMMUNE SUPRESSION. Should vaccine be administered to pets that are receiving immunosuppressive drugs or cytotoxic therapy (other than corticosteroids) for dogs with systemic disease such as cancer or immune-mediated disease?

Vaccines are only recommended for administration to healthy dogs. Dogs receiving immunosuppressive medications and chemotherapy should not be vaccinated. Doing so may result in a suboptimal immune response.[95]

OPTION: Antibody testing for canine distemper virus, parvovirus and adenovirus-2 (CDV-CPV-CAV2) could be utilized to determine the need for administering a booster dose; or, testing could be performed 2 to 4 wk post-vaccination to assess the response of the individual patient following vaccination.

9. VACCINATION INTERVAL. Can vaccine be administered weekly to puppies that may be at high risk of exposure to an infectious pathogen?

Regardless of the vaccine being administered (parenteral), a minimum vaccination interval of 2 wk is recommended. REASON: Transient, post-vaccination down-regulation of the immune response and cytokine production may compromise the effect of a second vaccine dose administered within 10 to 12 days following administration of the first dose.

10. VACCINATION INTERVAL in SHELTER-HOUSED DOGS. How does the 2-wk minimum vaccination interval recommendation apply to shelter-housed dogs?

Dogs arriving at shelters are typically vaccinated against canine distemper virus, parvovirus and adenovirus-2 (CDV-CPV-CAV2) on intake. If placed within 2 wk of intake, rabies vaccine is typically administered at the time of release for dogs >12 wk of age. Vaccination against rabies at the time of release is recommended even though a prior vaccine dose may have been administered within the past 2 wk.

11. ROUTE OF ADMINISTRATION. Should an inactivated (killed) Bordetella bronchiseptica vaccine, intended for parenteral administration, be administered by the intranasal (IN) route?

No. Doing so will not stimulate a protective immune response to Bordetella bronchiseptica.

12. VACCINATION SITE. Have vaccination site recommendations been stipulated for the dog as they have for the cat?

Vaccination guidelines for the dog do not specify injection-site recommendations. However, veterinarians are strongly encouraged to document the inoculation site and vaccine type in the patient's medical record.

13. VACCINATION SITE. Should a disinfectant (e.g., alcohol) be applied to the injection site before administering a vaccine?

Because disinfectant might inactivate a modified-live virus (attenuated) product and is not known to provide any benefit to the patient, doing so is not generally recommended.

14. PROTOCOL. When should the last dose of core vaccines be given during the initial (puppy) series?

The last dose of core vaccines is generally recommended for administration at or near 16 wk of age, regardless of the number of doses previously administered. However, unpublished studies suggest that a small percentage of dogs, vaccinated at 16 wk of age, still may not develop a protective immune response to CDV and/or CPV due to interference from Maternally Derived Antibody (MDA).

In practice locations where cases of CDV or CPV have occurred among properly vaccinated dogs, protocols should be amended to include an additional dose of a combination core vaccine administered to all dogs at 18 to 20 wk of age.

15. PROTOCOL. Will a single dose of modified-live virus (MLV) canine distemper virus, parvovirus and adenovirus-2 (CDV-CPV-CAV2) or recombinant canine distemper virus (rCDV) vaccines provide any benefit to the dog?

In the absence of Maternally Derived Antibody (MDA) (especially dogs >20 wk of age), one dose of a MLV canine core vaccine (CDV-CPV-CAV2) or recombinant (rCDV) vaccine is expected to provide a protective immune response.[3,5,9]

However, administration of 2 doses of a core vaccine, 3 to 4 wk apart, is an acceptable alternative for young adult dogs receiving initial doses of core vaccines.

16. PROTOCOL. Should young dogs presented with clinically significant nutritional deficiency receive a vaccine dose?

In practice, the post-vaccination immune response in a severely malnourished animal cannot be accurately predicted. Post-vaccination antibody response can be inexpensively measured to provide information on the individual animal's response following administration of core vaccines (canine distemper virus, parvovirus, and adenovirus-2).[114,118]

It has been shown that certain severe deficiencies of vitamins and trace minerals (e.g., Vitamin E/Selenium) can interfere with the development of a protective immune response to certain vaccines, especially in puppies. Known or suspected nutritional deficiencies should be corrected by appropriate nutritional supplementation. Subsequently, the dog should receive the appropriate vaccines at the most appropriate interval.

17. PROTOCOL. Is there any benefit to the simultaneous administration of different types of vaccine for the same disease to a patient at the same appointment? (e.g., injectable and intranasal B. bronchiseptica vaccines).

Doing so is not considered harmful. However, in dogs, beneficial effects associated with simultaneous administration of different vaccine types of antigen for the same disease have not been documented.

18. PROTOCOL. Can a vaccine be administered to a dog that is infected (and clinically ill) as a means of "treating" the clinical disease or shortening the course of infection?

Administering vaccine to clinically ill patients as a means of treating the disease is neither effective nor is it recommended. By the time clinical signs develop, the infection is well established.

However, among kenneled or shelter-housed dogs, vaccination of the entire population at the first signs of onset of disease may mitigate risk of an outbreak.

19. PROTOCOL. Are certain breeds (e.g., Doberman Pinscher, Rottweiler) subject to a unique vaccination protocol to assure they are properly immunized?

No. Breed-specific protocols are not deemed necessary today. Historical failure of parvovirus vaccines to immunize Doberman Pinschers and Rottweilers were ultimately determined to be the result of select breeds or lines within breeds that were genetically incapable of responding to parvovirus vaccine and, as such, were susceptible to fulminant disease if exposed.

Although uncommon, genetic “non-responders” still exist within the canine population (multiple breeds) throughout the world. There is no unique vaccination protocol that will induce immunity.

In practice, identification of genetic “non-responders” is based on the lack of an adequate (“positive”) antibody test result following vaccination. See the section on ANTIBODY TESTING versus VACCINATION.

20. MATERNAL ANTIBODY. If a puppy fails to receive colostrum (Maternally Derived Antibody) during the first 3 days of life, will it derive any passive antibody protection from the dam?

A puppy receives little to no immune protection in the absence of colostrum. Approximately 95% of passive antibody for a newborn puppy is obtained from the colostrum, which is absorbed via the intestine into the systemic circulation during the first 4 to 6 hr of life.[2]

21. MATERNAL ANTIBODY. When vaccinating young dogs, what is the “Window of Susceptibility?”

Maternally derived antibody (MDA) represents “passive” immunity (mostly colostrum derived) that naturally declines during the first few months of life. There is a point at which the antibody level falls below the “threshold” for protection against natural challenge. However, the level of antibody remaining may be sufficient to interfere with vaccine antigen, thereby preventing a protective immune response following vaccination. The “window of susceptibility” occurs between the age at which MDA falls below protective levels and the age at which vaccination actually immunizes the pup. Despite having been “vaccinated,” the dog is not immunized and remains susceptible to infection if exposed during this period.

22. MATERNAL ANTIBODY. If a puppy fails to receive colostrum (Maternally Derived Antibody or MDA), should it be vaccinated during the first few weeks of life?

In practice, colostrum-deprived puppies should not be vaccinated until 6 wk of age. In the absence of MDA, certain modified-live virus vaccines, when administered to colostrum-deprived pups as early as 2 wk of age, could (although rarely) infect certain tissues (e.g., heart, central nervous system) with clinical consequences.

In Shelter Medicine protocols, because of the population density and exposure risk, administration of core vaccines to dogs as young as 4 wk of age is common.

23. MATERNAL ANTIBODY. How can colostrum-deprived puppies be protected against the core diseases?

In puppies, maternal immunity is almost exclusively derived from colostrum ingestion. Historically it had been reported that maternally derived antibody is adequately absorbed within the first 24 hr of life. More recently, it has been shown that newborn puppies should have access to colostrum as their first meal within the first 4 to 6 hr of life as colostrum absorption is maximal during this critical period and much reduced thereafter.[2]

If homologous colostrum (from the mother of the puppies) is not available, oral heterologous colostrum (2–3 ml per 100 g of body weight) from another bitch (this may be frozen; remains effective for up to 1 yr) is the ideal replacement. Colostrum should be administered within the first 4 to 6 hr after birth and not later than 24 hr after birth

Alternatively, if heterologous colostrum is not available, serum from a dog with appropriate titers can be administered, subcutaneously or intraperitoneally (3 to 4 mL/100 g of body weight).

Another option includes intravenous administration of citrated plasma from a dog with appropriate titers at 3 to 4 mL/100 g of body weight. This may be repeated twice daily for up to 3 days.

There is weak evidence that colostrum from other species or artificial colostrum is effective.

24. MATERNAL ANTIBODY. Can maternally derived antibody (MDA) interfere with active immunization by both modified-live virus (attenuated) and killed (inactivated) vaccines?

Maternally derived antibody variably interferes with immunization subsequent to both modified-live virus (attenuated) and killed (inactivated) vaccine administration. The ability of MDA to interfere, and the duration of interference, are determined by several factors, including the bitch's immune status, her willingness to nurse in the first 3 days post-partum, and the amount of colostrum received by the individual pup.[2,14]

Young dogs (particularly those less than 12 wk of age) vaccinated with an inactivated vaccine may experience MDA interference with the first dose. In such cases, the priming immune response does not occur. The second dose, therefore, would not immunize.

25. ROUTE of ADMINISTRATION. Will the oral administration of canine parvovirus (CPV) vaccine induce protective immunity?

No. CPV vaccines, when administered orally, will not immunize. All commercially available CPV vaccines must be administered by the subcutaneous or intramuscular route.

26. ROUTE of ADMINISTRATION. Can the intranasal B. bronchiseptica vaccines be administered by the oral route?

Doing so is not likely to induce a protective immune response. This off-label route of administration is not recommended.

27. ROUTE OF ADMINISTRATION. Can the oral B. bronchiseptica vaccine be administered by the intranasal route?

This off-label route of administration is not recommended due to the high concentration of avirulent-live bacteria in each dose. Efficacy and safety studies of doing so have not been published.

28. DURATION of IMMUNITY. What is the duration of immunity (DOI) conferred by the various B. bronchiseptica vaccines?

The only published studies available today address the DOI of the B. bronchiseptica vaccine licensed for administration by the intranasal route. Challenge studies support a DOI of 12 to 14 months following a single intranasal dose.[72,75,79]

DOI of the oral and parenteral vaccines has not been determined by challenge study.

29. DURATION of IMMUNITY. What is the duration of immunity conferred by leptospirosis vaccines?

In general, leptospirosis vaccination provides protective immunity in most dogs for up to 12 mo. On initial vaccination, 2 sequential doses, administered 2 to 4 wk apart, are required. The quality and duration of immunity induced by individual serovars may also vary within an individual dog. Annual revaccination is recommended for dogs considered to be at risk for exposure.[45,52]

30. DURATION of IMMUNITY. What is the duration of immunity conferred by Lyme disease (B. burgdorferi) vaccines?

In general, the various Lyme disease vaccines available today provide immunity lasting approximately 1 yr. On initial vaccination, 2 sequential doses, administered 2 to 4 wk apart, are required regardless of the vaccine administered. Annual vaccination is recommended for dogs considered to be at risk for exposure.[58]

31. What is NON-STERILE IMMUNITY?

Several canine vaccines serve only as an aid in the prevention of clinical signs, rather than complete (absolute) prevention of infection. Non-sterile immunity is a term that has been used to describe the quality of immune response following vaccination. It occurs when a vaccine diminishes the severity of disease but does not completely prevent infection, development of clinical signs, or shedding following exposure (e.g., canine influenza virus, Lyme disease, leptospirosis, and parainfluenza virus vaccines).[5,9]

32. What is STERILE IMMUNITY?

Certain canine vaccines are highly immunogenic and provide complete protection from infection. Sterile immunity implies no risk of developing clinical illness and shedding if the vaccinated patient is subsequently exposed to the pathogen (e.g., canine parvovirus (CPV) and canine distemper virus (CDV) vaccine).[5,9]

33. CROSS-PROTECTION. Does cross-protection between strains occur with the Canine Influenza Virus (CIV) vaccines?

Inactivated vaccines exist for both the H3N8 and H3N2 strains of canine influenza virus. Currently, there is no evidence in support of cross-protection induced by either vaccine.

34. CROSS-PROTECTION. Does the 2-serovar leptospirosis vaccine (L. canicola and L. icterohaemorrhagiae) cross-protect against any of the other leptospira serovars that can infect dogs (e.g., L. pomona or L. grippotyphosa)?

No. When vaccinating dogs for leptospirosis, a 4-serovar vaccine should be used rather than a 2-serovar vaccine.

35. VACCINE RISK TO HUMANS. Is there a known risk to humans who experience inadvertent exposure to an attenuated (intranasal or oral) canine vaccine containing Bordetella bronchiseptica?

Transient shedding of attenuated (avirulent live) B. bronchiseptica is likely to occur following intranasal and oral administration to dogs. However, the actual risk to humans, if exposed to attenuated bacteria, has not been definitively established.[86,94,105]

Infection risk to immune compromised persons from the transient post-vaccination bacterial following intranasal or oral B. bronchiseptica vaccine has been raised as a concern by physicians (oncologists, transplant specialists, etc.).

Veterinarians who are concerned over the risk to humans who could have post-vaccinal contact with a dog may elect to administer inactivated (parenteral) B. bronchiseptica vaccine, which is not associated with bacterial shedding following administration.