



# Vaccination and Antibody Titre Testing in Dogs

## A Summary of WSAVA Guidelines

### BACKGROUND

This article is a direct summary of the World Small Animal Veterinary Association's "Guidelines for the vaccination of dogs and cats" (J Small Anim Pract. 2016 Jan;57(1):E1-E45), which was compiled by an independent group of academic experts. The guidelines are intended to provide veterinarians with evidence-based scientific advice that allows development of vaccination schedules relevant to their local situation. The full article is available after the summary at: <http://www.vetqml.com.au/Portals/0/PDF/Publications/VacGuidesWSAVA2015.pdf>

This article focuses on **canine core vaccines** only – vaccines that protect animals from severe, life-threatening diseases with a global distribution. In dogs, these are **canine distemper virus (CDV)**, **canine adenovirus (CAV)**, and **canine parvovirus type 2 (CPV-2)**.

**Non-core vaccines** are those that are required by only those animals whose geographical location, local environment or lifestyle places them at risk of contracting specific infections (e.g. Parainfluenza virus, *Bordetella bronchiseptica*).

The WSAVA guidelines may, in some cases, appear contrary to those on the vaccine product datasheet, which is registered to describe the **minimum** duration of immunity (DOI) based on experimental infection challenge studies. This does **not** reflect the actual DOI of the vaccine. It is now widely accepted that most canine *modified-live virus* core vaccines have a minimum DOI of 3 years. In many cases the DOI is considerably longer than this, if not lifelong, for the majority of recipients irrespective of the vaccine manufacturer's recommendations. Veterinarians are encouraged to use a vaccine according to the WSAVA guidelines and *obtain written informed consent* from the owner to deviate from the vaccine manufacturer's recommendations. In a dog that is already protected it is not possible to obtain 'better' immunity by giving repeated vaccinations, and indeed the aim should be to reduce the 'vaccine load' on an individual animal to minimise the potential for adverse reactions. *Killed or inactivated vaccines* may be less likely to induce both cell-mediated and humoral immunity and generally have a shorter DOI.

### CANINE VACCINATION GUIDELINES

#### Puppy vaccination and the 6 or 12-month booster

Most puppies are protected by maternally derived antibody in the first weeks of life. This passive immunity will generally wane by 8-12 weeks of age to a level that allows active immunisation, although some puppies may have much higher titres of maternally derived antibody and be refractory to immunisation until >12 weeks of age. On the other hand, puppies with poor passive immunity may be at risk at an earlier age. There is therefore no single vaccination schedule that covers all situations. To account for the variation in maternally derived antibody, the WSAVA guidelines recommend:

- ✓ Initial core vaccination at 6-8 weeks of age.
- ✓ Subsequent vaccinations every 2-4 weeks thereafter until 16 weeks of age or older.

Depending on when the initial vaccination is given, the number of vaccinations may vary (up to 4 puppy vaccinations at 4-week intervals if starting at 6-7 weeks of age).

Traditionally, a 'booster' vaccination has been given at 12 months of age or 12 months after the last puppy vaccination. This vaccination was given to ensure that any puppies that failed to respond to the puppy vaccinations would develop protective immunity. In a protected dog immunity cannot be further 'boosted'. This potentially leaves a window of up to 12 months where the puppy may be unprotected. The current WSAVA guideline is that:

- ✓ The 'booster' vaccination is given at 26 weeks of age
- ✓ The next core vaccination would not be required for at least another 3 years.

This does not preclude an annual health check at the time when animals reach skeletal maturity (12-16 months).

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## Adult dogs

It is now recognised that dogs that have responded to modified live virus core vaccines maintain immunity for many years.

### Core vaccines

- ✓ Following the 26 or 52-week booster, subsequent revaccinations are given at intervals of 3 years or longer
- ✓ An adult dog that had received a complete puppy vaccination course, including a 26 or 52-week booster, but has not had a booster for many years, requires only a single dose of modified live virus core vaccine to develop protective immunity
- ✓ An adult dog or puppy >16 weeks of age and of unknown vaccination status only requires a single dose of modified live virus core vaccine to develop protective immunity.

### Non-core vaccines

- ✓ Killed vaccines or those containing bacterial antigens (e.g. Bordetella, parainfluenza virus) require more frequent boosters to develop protective immunity
- ✓ In an adult dog or a puppy >16 weeks of age, two doses will usually be required to develop protective immunity.

### Antibody testing to assess immunity to canine vaccines

Testing is available for detection of protective antibodies to CDV, CAV and CPV-2. In addition to traditional 'gold-standard' virus neutralisation (VNT) and haemagglutination inhibition (HI) tests, there are now two commercially available kits that can be used patient-side. These kits have been validated for use in practice and shelter settings and are accurate when compared with the gold-standard tests.

- ✓ A negative test result indicates that the dog has little or no antibody and revaccination is recommended
- ✓ A positive antibody titre (irrespective of titre value) indicates that the dog is immune and revaccination is not required.

### Applications for use of antibody testing

#### 1. Determining protective immunity in the puppy

Test at least 4 weeks after the 16 week puppy vaccination. A positive test result confirms successful vaccination. The 26 or 52 week booster would not be required and the next core vaccine could be given 3 years later (or antibody testing could be repeated at this time). A negative test result indicates revaccination is required (preferably using a different product) with retesting 4 weeks later. If the pup again tests negative, it should be considered a 'non-responder' that may be incapable of developing protective antibody immunity (although cell-mediated immunity may confer some protection).

Other than the dog being a genetic 'non-responder', also consider vaccine failure due to an error in production of a batch of vaccine (rare), or more commonly post-production factors such as incorrect storage, transportation, and handling (e.g. failure to keep cold). Remember that 'Vaccination does NOT always equal immunisation'.

Broad estimates of proportion of genetic non-responders are 1 in every 5,000 dogs for CDV, 1 in every 100,000 dogs for CAV, and 1 in every 1,000 dogs for CPV-2.

#### 2. Determining whether revaccination is required in an adult dog; assessing immunity in dogs of unknown vaccination history; assessing immunity in dogs with history of adverse reaction or chronic/systemic illness

Rather than automatically administering core vaccines every 3 years, serological testing can be performed. If protective antibody is present vaccination is not required. This can be rechecked again every 3 years in lieu of automatic revaccination. The testing interval is reduced to annually for dogs > 10 years to ensure that aging of the immune system is not an issue. For those concerned about antibody waning within the 3-year inter-vaccine period, antibody testing could be performed annually, but the WSAVA guidelines make the point that "if you were to collect and analyse the data generated within your practice, you will quickly find that annual testing is unjustified".

A negative test result indicates the dog should be revaccinated unless there is a medical reason for not doing so. However, it is important to note a negative test result in a previously vaccinated dog does not necessarily mean that the dog is unprotected and at risk. Memory B-lymphocytes can persist for longer than antibody. Exposure of dogs with this 'immunological memory' to virulent virus is expected to rapidly boost the dog's antibody response and protect against disease.

Although the cost of antibody testing is relatively expensive in comparison to the cost of a vaccine, the WSAVA encourages the use of 'evidence-based medicine'. Testing for antibody status (e.g. at 20 weeks after the puppy vaccinations or in adult dogs) is better practice than simply administering a booster vaccine on the basis that this would be 'safe and cost less'.

#### 3. Management of infectious disease outbreaks in shelters (see overleaf)

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## Management of dogs in the shelter environment

### Admission of healthy dogs into the shelter

Guidelines for vaccines to be used in shelters is provided in the WSAVA paper (Tables 2 and 4).

For puppies entering shelters, core vaccinations may be started as early as 4-6 weeks of age, and (where funding permits) if the puppy remains in the shelter revaccination should be every 2 weeks until it reaches 20 weeks of age.

For an adult dog entering the shelter, if there is documented evidence of vaccination, there is no reason to revaccinate with core vaccines.

### Managing an infectious disease outbreak in a shelter (CDV, CAV, CPV-2)

In the face of a disease outbreak, all dogs in the shelter should be tested for antibody. Dogs that test positive are protected and will not develop disease or die. They should be separated from dogs that test negative who may be at risk. Dogs that test negative should not be adopted out of the shelter until after the incubation period for the virus (at least 2 weeks for CPV, at least 6 weeks for CDV). They should be vaccinated and retested after the incubation period to confirm they are then antibody positive.

In the face of an outbreak, if dogs are to be admitted to the shelter only antibody-positive animals may enter the shelter safely as they are protected from the disease. Antibody negative animals should be vaccinated and sent to foster homes until they become test positive.

## ANIMAL CARE BEYOND VACCINATION

Unfortunately, many clients have come to believe that vaccination is the main reason for an annual veterinary visit. As the veterinary community moves towards three yearly core vaccinations, it is imperative that clients are educated on the importance of maintaining annual veterinary visits. These visits should include taking a detailed history, a thorough physical examination, assessment and discussion about dental care, nutrition, parasite prevention, behavioural concerns etc. Discussing vaccination is simply one part of the annual health check and should be focused on tailoring vaccination protocols to that particular dog for that particular year based on age, breed, health status, environment (risk of exposure to pathogens), lifestyle (contact with other animals) and travel habits (i.e. a risk assessment). While a dog won't receive core vaccines every year, most non-core vaccines (e.g. Bordetella) require annual administration if it is deemed important that the animal should be vaccinated against such organisms.