

## Dog vaccination

**The purpose of giving a vaccine is to obtain immunity/protection against a disease without risking going through the course of the disease.**

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A vaccine is used to stimulate the immune system so that the one being vaccinated becomes immune without having to undergo the disease.

### **Why should we vaccinate?**

Many infectious diseases are harmless, but there are also infectious diseases that can cause serious illness or even death to the ones that are infected. If the individual survives the disease and fully heals, the body will have formed what is called immunity. This means that if you are exposed to the same microbe at a later stage, the body will recognize this and stop the infection before the individual show sign of illness.

### **What happens to the dog's body when it receives a vaccine?**

When the body is given a vaccine, the immune system, which specializes in biological warfare, recognizes the vaccine as a foreign substance. The cells of the immune system react with proteins on the surface of the infectious agent, and an activation of the immune system is initiated. The cells of the immune system are further stimulated to form antibodies against the foreign proteins and memory cells. When the dog is later exposed to the same infection, the antibodies that were formed after vaccination can directly neutralize the infection. In addition, the memory cells will rapidly produce large amounts of specific antibodies to neutralize the microbe so that the dog does not develop a disease.

### **What is herd immunity?**

Herd immunity is a term used in immunology to describe the effects of mass vaccination. If a sufficient number of dogs are vaccinated, the disease will not have enough individuals for carrying the infection, which means that those who are not immune (unvaccinated) will not be exposed to infection. When most people vaccinate their dogs, there will be few cases of disease in the population. If the proportion of individuals being vaccinated goes down, it will be an increase in the number of illness cases. It is therefore important that those who can vaccinate their dog, do so. To achieve good herd immunity and to prevent outbreaks of disease, at least 85 % of individuals in a population must be vaccinated.

### **Why do I get different recommendations regarding vaccination?**

Since it became a common practice to vaccinate dogs, the recommendations have varied a lot. A selection of the foremost immunologists in veterinary medicine was therefore set up to draw up guidelines and recommendations based on research-based information on the subject. The first guidelines from this group The World Small Animal Veterinary Association (WASVA) were finalized in

2007. The guidelines are continually revised in line with the latest research in the field and the latest update was published in January 2016.

### How often should my dog be vaccinated?

The newborn puppy receives antibodies (maternal antibodies) through the mother's colostrum for the first 24 hours. These antibodies are vital and protect the puppy from infection during the first weeks of life, but will also block the puppy's own production of antibodies and thus the ability to respond to vaccination. Gradually, the maternal antibodies break down in the puppy's body and eventually a period is obtained when there are not enough maternal antibodies to protect the puppy from infection, but enough to block the puppy's own response to the vaccine. This is called the puppy's "susceptibility window" and means the puppy is extra susceptible to infections at this time. It was previously believed that this window was when a puppy was 8-10 weeks old, but recent research has shown that there are individual differences and some puppies still have maternal antibodies up to 15 weeks of age. That is, many puppies will form enough own antibodies at vaccination when they are 12 weeks old, but since research shows that not everyone does, it is also recommended to vaccinate at 16 weeks of age.

NOTE: Local conditions may require the veterinarian to recommend other vaccination intervals.

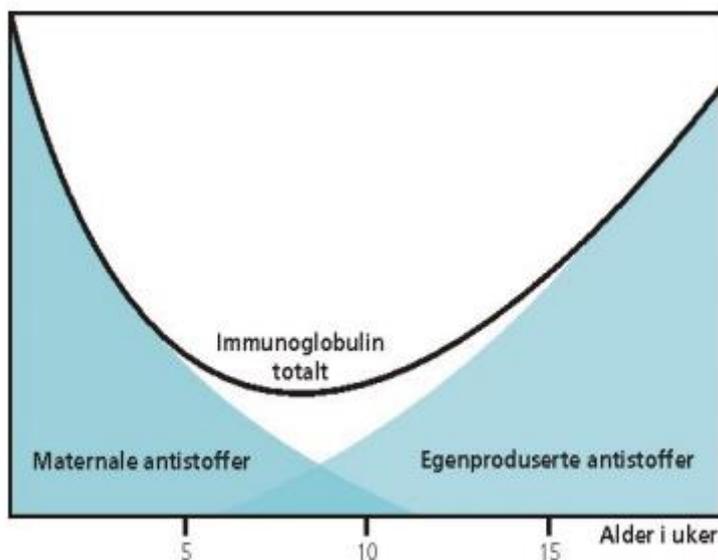
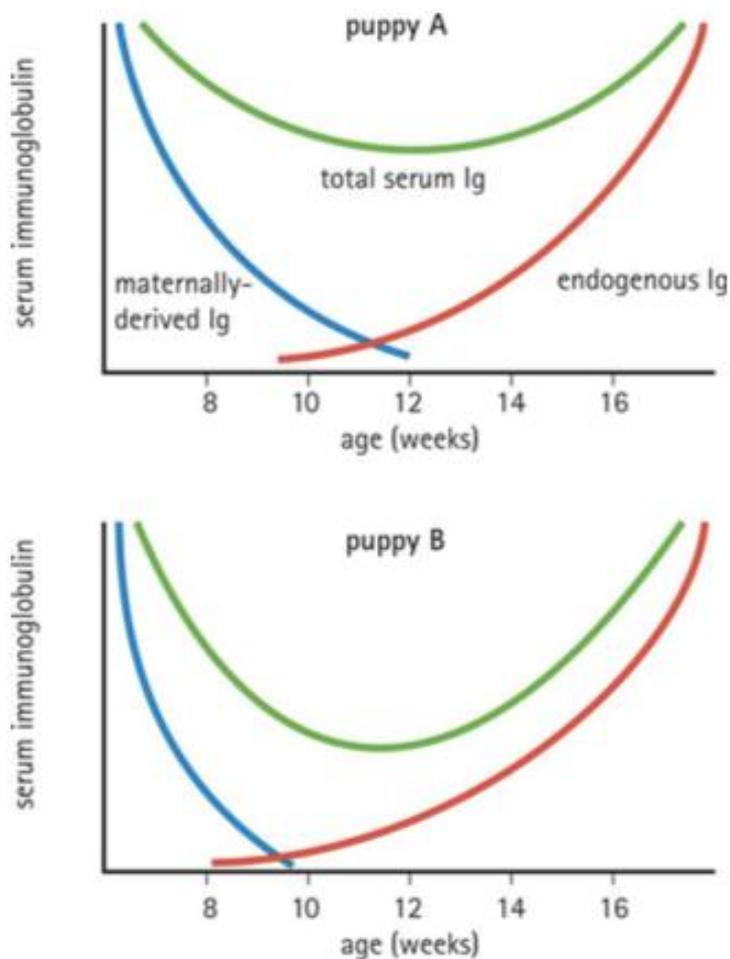


Figure 1: Schematic representation of antibody development in puppies during the first weeks of life.  
Source: R. Gudding, *Immune prophylaxis in veterinary medicine*



From Day/Schultz: Veterinary Immunology, Fig 254  
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Figure 2: An example of two puppies with different degradation of the maternal antibodies, where Puppy B has a "susceptibility window" after 10 weeks of age, while Puppy A has it after 12 weeks of age.

### Different types of vaccine

Vaccines are divided into three different groups

1. Core vaccines are the recommended vaccines that all dogs should receive at suggested intervals to maintain protection against infectious diseases of global importance.

In Norway this includes the following vaccines: Canine Distemper Virus (CDV), Canine Adeno Virus (CAV1 and CAV2), and Canine Parvo Virus (CPV2).

Canine Distemper Virus causes a serious illness that infects directly between dogs (coughing and sneezing) or indirectly through objects (food- and water bowls), clothing or hands. Infected animals can secrete virus for months after being infected, and virus can be transmitted from mother to fetus during pregnancy. The virus attacks the respiratory, digestive and nervous systems of dogs.

Symptoms of Canine Distemper Virus include eyesore, fever, nasal secretion, cough, lethargy, decreased appetite and vomiting. As the virus attacks the nervous system, the dog will develop neurological symptoms such as walking in circles, muscle twitching, seizures with frenetic chewing and drooling, and partial or full paralysis. A dog infected with Canine Distemper Virus will usually die, and the surviving dogs usually suffer permanent, irreversible brain damage.

Parvo is a very contagious disease that can affect all dogs, but unvaccinated dogs and puppies under 4 months are most at risk. The virus infects via direct contact between dogs/dog feces with viruses, or through contaminated things in the environment such as food bowls, clothes or hands. The virus attacks the dog's digestive system. The virus is very resistant and can withstand heat, cold, drought and moisture well and can therefore survive in the environment for a long time. Symptoms of Parvo are severe lethargy, decreased appetite, abdominal pain and bloating, fever or low body temperature, vomiting, and severe bloody diarrhea. Persistent vomiting and diarrhea can lead to rapid dehydration, and damage to the intestines and immune system which can lead to septic shock (blood poisoning). There is no medicine that cures Parvo, so treatment will be symptomatic. Intensive treatment is required over many days, even then there will still be some dogs that will die from the disease.

Canine Adeno Virus is a disease that transmits via urine from an infected dog. The virus attacks the inside of the blood vessels, liver, kidneys, spleen, lungs and sometimes other organs. Symptoms range all the way from mild fever and redder mucosa than normal, to severe general impairment, severe reduction in white blood cells, disorders of the blood coagulation system and death. Very young puppies are most prone to infection and serious illness. Dogs that survive the disease will receive permanent kidney damage and corneal blisters as a result of immune-complex formation. In addition, they also continue to excrete viruses in the urine at least 6 months after the disease start.

Neither Canine Distemper, Parvo virus nor Canine Adeno Virus in dogs can infect from dog to human. For these diseases, WSAVA recommends first vaccination at the age of 6-8 weeks, then to repeat vaccination every 2-4 weeks until the puppy is 16 weeks or older. Then revaccination at approximately 1 year of age, and further revaccination every 3 years. In Norway, it is common to vaccinate at the age of 8 and 12 weeks, and in recent years it is recommended also vaccinating at the age of 16 weeks by most veterinarians. Talk to your veterinarian about when it will be appropriate to vaccinate your dog.

2. Non-core vaccines/additional vaccines are vaccines given to dogs based on a risk assessment on the individual's lifestyle and geographical location, and on the basis of the "risk-benefit ratio" (the risk of being vaccinated and susceptible, or the risk of being vaccinated and developing a bad vaccine response, contrary to the benefit of being protected from the infection in question).

In Norway, these vaccines against Canine Parainfluenza Virus (CPIV) and Bordetella bronchiseptica (Bb) which are part of the kennel cough complex. In Norway it is just as common to give the dogs these two vaccines as the core vaccines. For Canine Parainfluenza Virus vaccination, WSAVA recommends vaccinating the first time at 6-8 weeks of age, then repeat vaccination every 2-4 weeks until the puppy is 16 weeks or older. Then revaccination at 1 year of age, and further annual revaccination. Bordetella bronchiectasis vaccine can be given as early as 3 weeks of age, then annual revaccination. In Norway, it has been common to administer these additional vaccines at the same interval as the core vaccines, but with annual revaccination.

Other available vaccines include rabies, leptospirosis, leishmaniasis, borrelia and canine herpes virus. Talk to your veterinarian about the need to vaccinate your dog with any of these, or other vaccines. If

you are going abroad with your dog, rabies vaccination is mandatory for travel to most countries (See the Food Safety Authority's website for more information on this).

3. Non-recommended vaccines are vaccines that have little or no scientific evidence that they will work well enough.

**sources:**

WSAVA Vaccination Guidelines 2015.  
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Norwegian Institute of Public Health  
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Large Norwegian lexicon