Vaccinations for Dogs and Cats

WHY DO WE VACCINATE OUR PETS?

Vaccination is a fundamental component in preventing or reducing the severity of common infectious diseases in our pets. Many of the diseases for which we vaccinate can cause severe illnesses that are potentially deadly. If given properly, for most pets, vaccines are highly effective at preventing the physical suffering and potential loss of life caused by certain infectious diseases, as well as the associated financial and emotional costs to pet owners.

VACCINATION OF PUPPIES AND KITTENS

Puppies and kittens are born with almost no antibodies to protect them against infectious diseases. Within the first day of life, they acquire antibodies from their mothers through nursing (colostrum). These maternal antibodies provide some protection against infectious diseases as young animals' immune systems develop, but start to become progressively depleted within a few weeks. Maternal antibodies interfere with the development of immunity after vaccination, such that vaccines given to very young puppies and kittens may NOT be effective. As their immune systems develop, maternal antibodies decline, and puppies and kittens become able to respond to vaccines by developing their own immunity against disease.

Because of maternal antibodies and the way that the immune system develops and is stimulated by vaccines, we must give a **series of vaccines** at specific intervals to puppies and kittens in order for them to develop adequate immunity. Ideally, we begin vaccinating puppies and kittens at 8 weeks of age, and give vaccine boosters for certain vaccines every 3-4 weeks, with the last vaccines given at or just past 16 weeks of age.

VACCINATION OF ADULT DOGS AND CATS

Adult dogs and cats should continue to receive vaccines to maintain their immune protection against certain infectious diseases. Some vaccines need to be given every year, while others may be given every 3 years after an appropriate initial series.

If your pet is at least 16 weeks old and has never received vaccines (or did not have an appropriate initial vaccine series as a kitten or puppy), he/she will need a vaccine booster 3-4 weeks after initial vaccination before starting an annual or every 3-year schedule.

GENERAL GUIDELINES

Prior to your pet receiving vaccines, tell your veterinarian if he/she is currently or has recently been sick, has previously had allergic reactions to any vaccine(s), or has any other chronic medical issues.

Please bring any records you have of your pet's previous vaccinations, especially his/her most recent vaccinations.

If possible, try to schedule vaccine appointments for a day when you will be able to monitor your pet, particularly for the first few hours after vaccination.

VACCINES FOR CATS

CORE VACCINES: RABIES, FVRCP

RABIES

Rabies virus, in the rhabdovirus family, causes a disease that is nearly uniformly fatal. **All mammals, including humans, can become infected with rabies**. Most domestic animals become infected with rabies from the bite of an infected animal. Much less commonly, transmission can occur through ingestion of tissue from an infected animal or aerosol exposure. Certain wildlife species, such as bats, raccoons, skunks, foxes, and coyotes are more common sources of rabies infection.

The virus incubates in the body of the bitten animal for a variable period of time (weeks to months) prior to causing signs of disease. The length of the incubation period is somewhat related to where on the body the bite occurred but is not possible to predict with any certainty.

The signs of the disease can also vary widely. Classically, the progression of rabies infection has been divided into 3 phases: prodromal, furious/excitative, and paralytic/dumb, each of which may last a few days. Animals with rabies may appear to progress through these phases or only some of the many possible signs may be seen.

Rabies primarily targets the central nervous system (brain and spinal cord). Most commonly, animals showing signs of rabies will have **abrupt changes in behavior and progressive paralysis**. Signs of rabies can include fever, increased reactions to sounds or sights, restlessness, aggressive or biting behaviors, hypersalivation, uncoordinated walking or movements, weakness or paralysis of legs, face, or lower jaw, difficulty eating or drinking, changes in vocalization, coma, or sudden death. Once signs of rabies are apparent, there are no effective treatments, and death occurs within 10 days.

RABIES VACCINATION

The **rabies vaccine is required by law for dogs and cats**. It is available in two forms, which are licensed to provide immunity against rabies for 1 year or 3 years. Kittens and adult cats receiving their first rabies vaccine will require a rabies booster 1 year after initial vaccination. All dogs and cats are required to maintain current rabies vaccination status throughout their lives, and may be vaccinated either annually or every 3 years based on which vaccine is used and local regulations.

FVRCP (Feline Viral Rhinotracheitis, Feline Calicivirus, Panleukopenia)

FVRCP VACCINATION:

Ideally, we begin vaccinating kittens against FVRCP at 8 weeks of age, and give vaccine boosters every 3-4 weeks, with the last vaccine given at or just past 16 weeks of age.

If your cat is at least 16 weeks old and has never received vaccines (or did not have an appropriate initial vaccine series as a kitten), he/she will need an FVRCP vaccine booster 3-4 weeks after initial vaccination.

Adult cats should continue to receive vaccines to maintain their immune protection. After an appropriate initial series, FVRCP vaccine should be boostered 1 year later, and may then be given every 3 years to maintain immunity.

FELINE VIRAL RHINOTRACHEITIS / FELINE HERPESVIRUS (FVR/FHV) FELINE CALICIVIRUS

The FVRCP vaccine helps protect against feline viral rhinotracheitis (FVR), also known as feline herpesvirus (FHV), as well as feline calicivirus (FCV). These two viruses are responsible for most of the upper respiratory tract infections seen in cats. Cats with upper respiratory disease may be co-infected with these viruses as well as other bacteria that cause upper respiratory disease.

Cats can become infected with upper respiratory tract viruses through direct exposure to other infected cats, inhalation of aerosolized viruses, or contact with objects contaminated with viral particles (cages, food bowls, toys, etc.). Most cats are exposed to FHV and/or FCV during their lifetime, usually as kittens. Signs of upper respiratory disease include sneezing, runny nose, runny and/or red eyes, and fever. FCV is also associated with ulcers of the mouth and chronic oral inflammation. Some cats will develop more severe respiratory disease or severe systemic disease, which require more aggressive treatment and can be fatal.

After infection with these viruses, many cats can remain carriers of the viruses and can potentially develop upper respiratory disease later in life (often triggered by stress). These cats can continue to shed viral particles and be a source of infection to other cats.

The FVRCP vaccine does not prevent the development of upper respiratory disease in all cats, but should decrease the severity of the disease and thus is recommended for all cats.

PANLEUKOPENIA

Panleukopenia, also known as feline distemper, is the disease caused by infection with feline parvovirus (FPV). Much like its close relative, canine parvovirus, FPV is highly contagious, potentially deadly, present in many environments, and very resistant to being degraded by most disinfectants.

Most cats are exposed to FPV through contact with the feces, urine, and/or saliva from infected cats. The virus targets rapidly dividing cells, particularly those in the gastrointestinal tract and bone marrow. A few days after infection, some cats develop a mild infection where no signs are apparent, whereas others, especially kittens, develop severe disease and may die. Signs of FPV include fever, decreased appetite, lethargy, vomiting, and/or diarrhea, which may be bloody. Some will also develop oral ulcers jaundice, or secondary bacterial or viral infections. For cats with severe panleukopenia, hospitalization and aggressive supportive care are often necessary. Exposure of a pregnant cat to FPV can result in death or central nervous system disease in her kittens.

Vaccination is highly effective at preventing panleukopenia infection and disease and is recommended for all kittens and cats.

OPTIONAL VACCINE FOR CATS:

FeLV

Feline Leukemia Virus (FeLV) is one of the two major retroviral diseases of cats. FeLV causes a serious disease that can take many different forms, and once persistently infected, most cats do not survive longer than 3 years. FeLV can lead to anemia (decreased red blood cells), cancer, and suppression of the immune system, making cats prone to developing other secondary infections.

Most cats become infected with FeLV through prolonged direct contact with the saliva or nasal secretions of another infected cat. Occasionally, cats may be infected through the bite of an infected cat, and an infected mother cat can transmit FeLV to her kittens through her milk. A few days after infection, cats may develop a fever, decreased appetite, vomiting, diarrhea, and/or enlarged lymph nodes. Once infected, the virus can spread to the bone marrow, where it can remain latent for years prior to causing other signs of disease. Kittens younger than 4 months old appear more susceptible to infection with FeLV.

Many cats are able to fight off infection with FeLV. Some of these cats will gain some immune protection against FeLV whereas others will not and could become infected again.

It is important to test any new cat for FeLV and FIV (another retrovirus) prior to vaccination, bringing them into your household, or having them meet other cats. Some cats may test positive for FeLV but later fight off the infection, so your veterinarian may want to retest later. Other cats may test negative with a very recent or latent infection, but develop signs of FeLV in the future.

The best way to prevent FeLV is to keep your cat from being exposed to infected or potentially infected cats. Vaccination is recommended if your cat is at risk of exposure to FeLV. Cats that go outside, live with other cats that go outside, or live with a cat with FeLV or unknown FeLV status are at risk of exposure. When the vaccine is first given, it requires a booster vaccine 3-4 weeks later. After this, the vaccine is given every year for cats that continue to have an exposure risk.

VACCINES FOR DOGS

CORE VACCINES FOR DOGS:
RABIES, DHPP (CDV, CAV-2, Canine Parvovirus, Canine Parainfluenza)

RABIES

Rabies virus, in the rhabdovirus family, causes a disease that is nearly uniformly fatal. **All mammals, including humans, can become infected with rabies**. Most domestic animals become infected with rabies from the bite of an infected animal. Much less commonly, transmission can occur through ingestion of tissue from an infected animal or aerosol exposure. Certain wildlife species, such as bats, raccoons, skunks, foxes, and coyotes are more common sources of rabies infection.

The virus incubates in the body of the bitten animal for a variable period of time (weeks to months) prior to causing signs of disease. The length of the incubation period is somewhat related to where on the body the bite occurred but is not possible to predict with any certainty.

The signs of the disease can also vary widely. Classically, the progression of rabies infection has been divided into 3 phases: prodromal, furious/excitative, and paralytic/dumb, each of which may last a few days. Animals with rabies may appear to progress through these phases or only some of the many possible signs may be seen.

Rabies primarily targets the central nervous system (brain and spinal cord). Most commonly, animals showing signs of rabies will have **abrupt changes in behavior and progressive paralysis**. Signs of rabies can include fever, increased reactions to sounds or sights, restlessness, aggressive or biting behaviors, hypersalivation, uncoordinated walking or movements, weakness or paralysis of legs, face, or lower jaw, difficulty eating or drinking, changes in vocalization, coma, or sudden death.

Once signs of rabies are apparent, there are no effective treatments, and death occurs within 10 days.

RABIES VACCINATION
The **rabies vaccine is required by law for dogs and cats**. It is available in two forms, which are licensed to provide immunity against rabies for 1 year or 3 years. Puppies and adult dogs receiving their first rabies vaccine will require a rabies booster 1 year after initial vaccination. All dogs and cats are required to maintain current rabies vaccination status throughout their lives, and may be vaccinated either annually or every 3 years based on which vaccine is used and local regulations.

DHPP VACCINATION
The DHPP vaccine (also known as DA_2PP or "5-in-1") contains components for vaccination against:

- Canine Distemper Virus (CDV)
- Canine Adenovirus type 2 (CAV-2)
- Canine Parvovirus
- Canine Parainfluenza

Ideally, DHPP vaccine is given as part of the puppy series, with the first vaccine given at 8 weeks, and then a booster vaccine given every 3-4 weeks through 16 weeks of age. After an appropriate initial series, DHPP vaccine should be given annually or every 3 years to maintain immune protection.

If your dog is at least 16 weeks old and has never been vaccinated (or did not have an appropriate vaccine series as a puppy), he/she will need a vaccine booster 3-4 weeks after the initial DHPP vaccination before starting on an annual or every 3-year schedule.

The DHLPP vaccine (also known as DA_2PPL or "6-in-1") contains all of the above components PLUS leptospirosis vaccine, which is an optional vaccine. It can be substituted for the DHPP vaccine for puppies or dogs 12 weeks of age or older.

DISTEMPER (CDV)

Canine Distemper Virus (CDV) causes canine distemper, which is a highly contagious disease of dogs. CDV can also affect many other mammals, including other canids (such as foxes or wolves), mustelids (such as ferrets or skunks), raccoons, exotic cats, and even dolphins and whales. CDV can cause severe multisystemic disease affecting the **respiratory, gastrointestinal, and/or nervous systems**. Distemper is **fatal in 80-90% of infected puppies and about 50% of infected adult dogs.**

Puppies and unvaccinated dogs are at greatest risk of infection and severe disease, but dogs of any age (including vaccinated dogs) can be infected. It is very important that dogs are properly vaccinated against CDV, as infectious viral particles are present in many environments.

CDV infection generally occurs when a dog breathes viral particles through the nose or mouth (aerosol exposure). A few different courses of CDV are possible, depending on the infected dog's age and immune response, as well as the viral strain. Early signs of CDV infection can include lethargy, fever, runny eyes or nose, cough, decreased appetite, vomiting, or diarrhea. Other signs can relate to the nervous system, including behavior changes, seizures, uncoordinated walking, or repetitive muscle movements or twitches. Some dogs may appear to recover from CDV, only to develop nervous system or other signs a few weeks or even years later.

CANINE ADENOVIRUS

Canine adenovirus type 1 (CAV-1), also known as infectious canine hepatitis is a potentially deadly disease that is rarely seen due to the effectiveness of vaccination. The CAV-2 component of the DHPP (or the DHLPP) vaccine provides protection against both CAV-2 (a virus that causes respiratory disease) AND effectively protects against CAV-1, which is a closely related virus. Some intranasal vaccines for "kennel cough" or infectious tracheobronchitis also contain vaccine against CAV-2.

CAV-1 is generally transmitted through contact with virus shed from an infected animal's urine. CAV-1 may cause various clinical syndromes, ranging from mild gastrointestinal signs to more severe systemic disease that can often be fatal within a few days. Early signs may resemble those of other infectious diseases (fever, lethargy, vomiting, or diarrhea). Dogs who recover from the mild form may develop eye changes 1-2 weeks later; those that recover from the severe form may develop eye changes and/or have ongoing disease of the liver or kidneys. Rarely, CAV-1 can cause a respiratory disease. In very young puppies, CAV-1 may cause sudden death with no prior signs.

CANINE PARVOVIRUS

Canine parvovirus (CPV) is a highly contagious intestinal disease. Puppies and young dogs are particularly susceptible to infection. Without treatment, most dogs will die from parvovirus. With early diagnosis, hospitalization and aggressive treatment, many dogs can survive, but some will still die despite intensive care.

Parvovirus is spread through oral contact with the viral particles from the feces, saliva, or vomitus of an infected dog. A few days after infection, dogs develop fever, lethargy, decreased appetite, vomiting, and diarrhea, which is often bloody and voluminous. CPV affects rapidly dividing cells, particularly those in the gastrointestinal tract and bone marrow, and leads to damage of the protective lining of the gastrointestinal tract as well as suppression of the immune system. This can promote the development of systemic bacterial infection (sepsis), which, coupled with significant fluid losses from vomiting and diarrhea, can lead to severe dehydration, shock and death. In very young puppies, parvovirus can also cause severe damage to the heart muscle that results in death.

CPV viral particles are present in many environments. They can persist for many months in the soil or on contaminated objects (clothing, toys, shoes, etc.), and are difficult to destroy with many household disinfectants. This makes appropriate vaccination particularly important to help prevent parvoviral infection and disease.

PARAINFLUENZA

Canine parainfluenza virus is one of the causes of "kennel cough" (infectious tracheobronchitis) in dogs. This virus is spread through inhalation of aerosolized respiratory secretions from infected dogs. Infection with parainfluenza on it's own will generally lead to a mild, self-limiting respiratory disease that can cause runny eyes and nose as well as coughing. When dogs are infected with parainfluenza as well as other components of "kennel cough," pneumonia is more likely to develop. While not necessarily considered a "core" vaccine, parainfluenza is generally included in the distemper combination vaccines (DHPP, DHLPP).

OPTIONAL VACCINES FOR DOGS

LEPTOSPIROSIS

Leptospirosis is a bacterial disease caused by Leptospira bacteria. Dogs generally become infected by contact with the urine from an infected animal, such as another dog, wildlife, farm animal, or rodents. Any environment contaminated by infected urine can serve as a source of infection. Dogs are at greater risk if they drink or spend time in/around slow moving or stagnant water, in which the Leptospira bacteria are better able to persist in the environment. People can also become infected with leptospirosis, and infected dogs can serve as a possible source of human infection.

After infection, Leptospira may severely damage the kidneys, liver, and/or blood vessels and lead to kidney and/or liver failure, internal bleeding, and death. Signs are variable, and can include fever, lethargy, vomiting, diarrhea, jaundice, eye inflammation, changes in drinking/urinating, or muscle stiffness/pain. Some dogs with leptospirosis may have no external signs of disease, but may still be able to shed infectious Leptospira bacteria in their urine. Leptospirosis can be treated with antibiotics, and with severe disease, hospitalization and aggressive care are required to attempt to limit organ damage.

The vaccine against leptospirosis provides protection against the main types of Leptospira. However, there are other strains of infectious Leptospira for which the vaccine provides no protection. Also, the vaccine may not prevent dogs from becoming carriers who can shed Leptospira bacteria in their urine.

Allergic reactions to leptospirosis vaccinations are more common than reactions to most other vaccines. **Small/toy breed dogs may be at increased risk of allergic reactions to leptospirosis vaccination**. It is important to assess each dog's risks of contracting leptospirosis prior to giving the vaccine.

The first time a dog receives the leptospirosis vaccine, he/she will need a booster vaccine 2-4 weeks later. After this initial series, the vaccine should be given every year.

BORDETELLA

Bordetella bronchiseptica is the main type of bacteria involved in the development of "kennel cough" or infectious tracheobronchitis (ITB). In addition to Bordetella, other viruses and bacteria (CAV-2, parainfluenza, Mycoplasma) can also cause ITB, and one or more of these may be involved the development of disease.

ITB is highly contagious via inhalation of aerosolized microbes or direct contact with infected animals or their secretions. ITB is more likely to develop in multiple dogs when large numbers of dogs are housed together, such as in shelters or kennels. Generally, a few days after exposure, dogs will develop a mild respiratory tract infection. Signs of ITB are coughing, runny nose, and occasionally red, runny eyes. With mild ITB, dogs generally will maintain a good attitude and appetite, and most infections will clear with time and supportive care. Occasionally, more severe infections, such as pneumonia may occur; these require more aggressive treatment. In addition to the general signs of ITB, dogs with more severe cases may also develop a fever, loss of appetite, lethargy, and shortness of breath.

Vaccination against Bordetella will not reliably prevent ITB infection but should help lessen the severity of the disease. Most boarding facilities, doggie day care centers, and some groomers

require Bordetella vaccination. There are 2 types of Bordetella vaccine, injectable and intranasal. The injectable vaccine only provides protection against Bordetella. The intranasal vaccine (squirted into the nose) also vaccinates against CAV-2; this route of vaccination may lead to better immunity but some dogs will not tolerate how it is administered. Bordetella vaccines are labeled for 1 year of immunity, though some kennels require vaccination with Bordetella every 6 months as it is thought that for some dogs protection may not last a full year.

LYME

Lyme disease is caused by a bacterium called Borrelia burgdorferi. The bacteria are transmitted when an Ixodes species tick that harbors the bacteria bites a dog and feeds on its blood. The risk of infection increases the longer that the tick is able to feed on the dog's blood, and generally the tick must feed for 12 or more hours in order to transmit Lyme disease. People can also become infected with Lyme disease, but infected dogs are not known to be a direct source of infection to people.

Most dogs that become infected with the Borrelia bacteria never develop any signs that could be attributed to Lyme disease. For the small minority that do, signs of disease can include lameness, swelling, or pain of one or more joints, fever, depression, and decreased appetite. Sometimes signs can seem to go away, but then come back a few weeks later. Rarely, Lyme disease has been associated with kidney, heart, or nervous system disease. Most cases of Lyme disease respond readily to antibiotic treatment, but dogs may remain infected, and could have a recurrence of disease signs in the future.

There is great debate about the effectiveness and potential risks of vaccination against Lyme disease. The Lyme vaccine has been associated with more adverse reactions than most other vaccines, and could potentially cause a Lyme-like illness. Whether your dog receives the vaccine or not, **tick prevention is the most important component in the prevention of Lyme disease** and other diseases that are transmitted through tick bites. In areas with ticks, topical flea/tick products as well as tick collars can be used. Talk with your vet about the various options for tick prevention to determine which is best for your dog/household.