

## COMMON INFECTIOUS CONDITIONS

The purpose of this section is to review the basics of some of the more common infectious diseases encountered in the clinic setting. You should have a thorough understanding of these conditions and be able to effectively communicate this information to clients using terminology and recommendations that are clear and realistic for the client.

The vast majority of animals coming in to the clinic have had little or no previous veterinary care or vaccination history. Many of the animals live outdoors and roam freely, coming in contact with other domestic and wild animals on a regular basis. The incidence of parasite infestation and infectious diseases are high. An important part of your role as a veterinary professional includes educating clients about the prevention of these conditions through good husbandry, vaccination and veterinary treatment.

### CANINE DISEASES

#### CANINE GASTROENTERIC VIRUSES

Viral diarrhea needs to be differentiated from diarrhea due to worms, diet or numerous other possibilities. Usually the wateriness, large amount, bloodiness and bad odor of the feces coupled with a profoundly ill animal point to a viral infection. The enteroviruses are very hardy and contagious and require meticulous sanitation to prevent transmitting the infection to other animals. Any animal exhibiting signs should be isolated from other patients and handled with appropriate infection-control precautions.

<b>Canine Parvoviral Enteritis (CPV, parvo)</b>	
Agent:	Canine parvovirus (non-enveloped DNA virus)
Incubation:	3 to 8 days (occasionally up to 14 days)
Effects:	Virus attaches to lining of the small intestine causing bleeding, fluid loss, and electrolyte loss. Symptoms include vomiting, diarrhea (usually bloody), anorexia, lethargy, fever and rapid dehydration. Neutropenia can be profound. All ages can be affected with high mortality in puppies less than 12 weeks.
Diagnosis:	ELISA antibody test (fecal snap test).
Treatment:	Supportive: Intravenous fluids, antibiotics, antiemetics and anti-diarrheals are all used.
Prevention:	Killed and modified live vaccines are available. Typical vaccination schedule is one injection at 6-8 weeks of age followed by boosters every 3 to 4 weeks until pups are 16 to 18 weeks old. Adults are generally boosted at one year then triennially.
Transmission:	Ingestion of infected feces is the most common means of transmission. The virus can remain infective for years in the environment and fomites can play a significant role in transmission. Shed in the feces up to 2 weeks post-recovery.
Notes:	Extremely hardy and capable of surviving in some conditions for up to a year. Sodium hypochlorite (household bleach) at a dilution of 1:32, or potassium peroxymonosulfate (Trifectant/Virkon-S) are the only reliably effective disinfectants.

<b>Canine Coronaviral Gastroenteritis</b>	
Agent:	Canine coronavirus
Incubation:	24 to 36 hours.
Effects:	Similar to parvo, but milder. Loss of appetite, vomiting, diarrhea, and depression occur. Feces may contain blood or mucus and often are yellowish. Usually fever is absent. Dehydration is the major problem. Mortality is not high, but can be fatal in puppies.
Treatment:	Fluids and antibiotics as in parvo
Prevention:	Killed virus vaccines are available.
Transmission:	Highly contagious, spread through infected feces and is shed for 2 weeks by infected animals. Coronaviruses do not persist in the environment like parvovirus.

## CANINE RESPIRATORY VIRUSES

Many of these infectious agents cause mild disease on their own, attacking the upper respiratory lining and make conditions suitable for *Bordatella bronchiseptica* and other bacteria to grow. Unfortunately, one of the respiratory viruses is canine distemper, and every case of canine upper respiratory disease must be considered a distemper suspect.

<b>Canine Distemper</b>	
Agent:	<i>Morbillivirus</i> (family Paramyxoviridae; enveloped RNA)
Incubation:	Clinical signs 1-4 weeks post infection. CNS signs may appear up to 3 months later (with or without preceding signs).
Effects:	<p>First symptom is a fever lasting 1 to 3 days with concurrent suppression of white blood cells. Thick, cloudy ocular-nasal discharge, depression, loss of appetite, and diarrhea are common. Some dogs develop thickened skin on the pads and nose ("hard pad").</p> <p>If the animal survives the initial disease course, nervous system symptoms may develop. These symptoms run from localized twitching in a muscle group to weakness/paralysis to convulsions/seizures. May last from 10 days up to several weeks or months. Neurological symptoms may disappear and then return.</p> <p>Mortality is often high in unvaccinated animals. Recovered animals may die from future complications. Old dog encephalitis is a separate nervous system problem that may occur years after the disease with no interim symptoms.</p>
Treatment:	Antibiotics for secondary bacterial infections, fluids for dehydration, and anticonvulsants and sedatives for nervous manifestations. Many animals will not respond or recover.
Prevention:	Modified live vaccines are available. Ideal course is to vaccinate every 2-3 weeks after weaning until 16 weeks of age. Vaccine is boosted at one year, then triennially
Transmission:	Spread primarily through aerosol droplets from infected animals. Infected dogs may shed the virus for months. The virus does not survive well in the environment.

<b>Canine Parainfluenza</b>	
Agent:	Canine parainfluenza virus (CPIV)
Incubation:	5 to 10 days
Effects:	Virus attacks the upper respiratory passages and produces mild disease on its own. More serious disease results from colonization by <i>Bordatella bronchiseptica</i> or other bacteria. Watery discharge from the nose and a cough are primary signs. Bacterial invasion turns discharges thick and cloudy.
Treatment:	See Infectious Tracheobronchitis.
Prevention:	Modified live virus vaccines are available. For adults, two initial vaccinations 2-4 weeks apart are necessary. Vaccine is boosted at one year, then triennially
Transmission:	Spread through aerosol droplets. Does not survive long in the environment.

<b>Canine adenovirus type 2</b>	
Incubation:	5 to 10 days.
Effects:	Virus attacks the lining of the upper respiratory system. Bacterial complication is common.
Treatment:	See Infectious Tracheobronchitis.
Prevention:	Modified live virus vaccines are given on the distemper schedule.
Transmission:	Aerosol transmission is most common. Short-lived in the environment.

<b>Infectious Tracheobronchitis (Kennel Cough, Canine URI)</b>	
Agent:	<i>Bordetella bronchiseptica</i> , canine parainfluenza virus, canine adenovirus-2, others
Incubation:	3 to 10 days
Effects:	Typically see harsh dry coughing followed by retching and gagging. Gentle palpation of the trachea will elicit coughing. Dogs may become depressed and stop eating, or may appear active and normal. Temperature is usually normal. Bronchopneumonia with fever, heavy nasal discharge, and severe depression may occur in young, stressed or geriatric animal. Mortality is low unless there are complications.
Treatment:	Cough suppressants control coughing spasms and break the cough cycle. Antibiotics used for secondary infection - generally more effective with inhalant administration.
Prevention:	Modified live intra-nasal and killed bacterin injectable vaccines are available. Vaccination does not completely prevent infection but reduces severity of signs. Intra-nasal produces faster immunity and gives better local immunity in the respiratory passages. Vaccine is best given twice yearly to dogs likely to be exposed.
Transmission:	Spread through aerosolized particles (coughing and sneezing). Fomite transmission is some concern. <i>Bordetella</i> may be shed up to 3 months post recovery.
Notes:	Although less common for cats to suffer clinical disease, they can be infected with <i>Bordetella</i> and may be carriers. <i>Bordetella</i> infection may contribute to URI in kittens.

## OTHER CANINE INFECTIOUS DISEASES

<b>Leptospirosis (Canine typhus, Infectious jaundice)</b>	
Agent:	<i>Leptospira canicola</i>
Incubation:	5 to 15 days.
Effects:	In severe cases, there is a sudden onset with weakness, anorexia, vomiting, fever of 103° to 105 °F and mild eye infection. After a few days, the temperature drops and the dog becomes depressed with difficulty breathing and severe thirst. Jaundice may appear as a first symptom or later. Abdominal pain, bloody urine, and urine casts result from kidney infection. Bloody vomiting and diarrhea are common. Chronic kidney disease and infection can result. Mortality is rarely over 10 percent.
Treatment:	Penicillin and many of its derivatives work well in the acute stage. Tetracycline derivatives or fluoroquinolones are used to eliminate the carrier state. Additional treatments are symptomatic (fluids for the dehydration, etc).
Prevention:	Bacterin vaccines are available that protect against most serotypes. Often in combination with DHPP vaccine. As the rate of adverse reaction is high with lepto vaccines, and it is not prevalent in many areas of the country, RAVS does not routinely vaccinate for leptospirosis.
Transmission:	Spread by infected urine contacting mucous membranes. Less commonly spread through contaminated food or water. The bacteria localize in the kidneys and can be shed in urine for months or years. It is often waterborne and survives extended periods in water. Dogs of all ages are affected with a much greater incidence in males. .
Notes:	Zoonotic

## FELINE DISEASES

### Feline Upper Respiratory Disease Complex

The viruses under this heading along with the bacterial *Chlamydia psittaci* cause the vast majority of upper respiratory disease in cats. Although symptoms are slightly different, in any individual animal it is not possible to say which disease is present on the basis of clinical symptoms alone. Of importance is the fact that all of the major respiratory pathogens can develop carrier states and chronic infections. Healthy looking animals may be constantly shedding virus and/or relapsing when subjected to stress.

<b>Feline Viral Rhinotracheitis (FVR, Feline herpes virus-FHV, Feline URI)</b>	
Agent:	Feline herpesvirus-1 (enveloped DNA virus)
Incubation:	Usually 2-6 days; recrudescence usually observed within ~7 days after a stressful event.
Effects:	URI: Sneezing, ocular and nasal discharge, conjunctivitis, fever, anorexia, rarely oral ulceration. Corneal ulceration is particularly suggestive of herpes. Can cause chronic rhinitis/sinusitis. Mortality is low with more deaths in kittens and elderly cats.
Treatment:	Supportive/symptomatic therapy. Antibiotics are used in cases of secondary infection. Assisted feeding and fluids may be necessary. Topical anti-viral ophthalmics may inhibit development of corneal ulcers if given when signs first appear.
Prevention:	Modified live injectable vaccines available. Vaccine does not necessarily prevent infection but reduces severity of disease. Vaccinate kittens at 6-8 weeks old and every 3 to 4 weeks until 12 weeks old. After the kitten series and a 1 year booster, triennial vaccination is recommended. Modified live intranasal vaccines give faster response, but may generate sneezing 4 to 7 days post-vaccination. Oral lysine administration may help reduce frequency and severity of recurrence in chronic disease.
Transmission:	Causes 40 to 45 percent of feline URI. Direct contact, aerosol droplets from sneezing and indirect contamination through objects and caretakers are the major routes of infections. Virus does not last long in the environment. A large percentage of cats will remain chronic carriers and intermittently shed the virus, particularly when stressed.

<b>Feline Calicivirus (FCV, Feline URI)</b>	
Agent:	Feline calicivirus (non-enveloped RNA virus)
Incubation:	2 to 6 days. Average is shorter than for FVR.
Effects:	Fever, sneezing, conjunctivitis, lack of appetite, and depression are common. Some strains cause salivation and ulcers on the tongue, nostrils and hard palate while others produce pneumonia, especially in kittens. Some strains cause limping/ polyarthritis  Superficial lesions heal rapidly and the cat will eat again 2 to 3 days after the beginning of symptoms. Mortality is higher than in FVR and may reach 30%.
Treatment:	Symptomatic as for FVR.
Prevention:	Modified live virus vaccines available. Usually included with injectable FVR vaccine. Intranasal vaccine is also available.
Transmission:	Accounts for 40 to 45 percent of all feline URI. Virus is shed continuously by infected cats and spread via aerosol droplets and contaminated objects. Virus can be shed for long periods after apparent recovery. Resistant to standard disinfectants and can persist in the environment for several weeks. Bleach (1:32) or potassium peroxymonosulfate are effective disinfectants.
Notes:	Recently, several highly virulent strains of calicivirus have been recognized. These strains are associated with systemic vascular compromise, edema, high fever and death in up to 60% of infected cats.

<b>Feline Pneumonitis</b>	
Agent:	<i>Chlamydophila psittaci</i> (intracellular bacteria)
Incubation:	5 to 10 days
Effects:	Conjunctivitis is the most common symptom (initially unilateral). Fever may develop. Recovering animals may relapse, and disease may become chronic. Mortality is low.
Treatment:	Tetracycline is considered the most effective broad-spectrum antibiotic for this disease.
Transmission:	Accounts for 5 to 10 percent of infectious feline URI. Spread through aerosol droplets and contaminated objects.
Notes:	Zoonotic, but is rarely transmitted from cats to human.

## OTHER FELINE INFECTIOUS DISEASES

<b>Feline Panleukopenia (FPV, Feline distemper, Feline infectious enteritis)</b>	
Agent:	Parvovirus. Closely related to canine parvovirus (non-enveloped DNA virus)
Incubation:	3 to 14 days
Effects:	Virus primarily attacks the lining of the gastrointestinal tract causing sloughing of the intestinal epithelium. Symptoms include depression, anorexia, vomiting and profuse, usually bloody diarrhea, causing severe dehydration and malnutrition.  Signs can manifest acutely and death can occur within twelve hours. Mortality can reach 60-90% in kittens. Infections of pregnant cats or newborn kittens can result in damage to the cerebellum and related problems with coordination and mobility.
Diagnosis:	Marked leukopenia, anemia, and thrombocytopenia are generally seen. The CITE <sup>®</sup> fecal antibody test for canine parvovirus can be used to cross-detect FPV.
Treatment:	Supportive: fluids, nutrients, antibiotics and possible blood transfusion.
Prevention:	Modified live and killed virus vaccines available. Modified live is recommended for higher titers and better ability to overcome maternal antibodies. Vaccinate kittens as early as 6 weeks of age and then every 3 to 4 weeks until 12 weeks old. A booster vaccine is recommended 1 year later and then revaccination every 3 years.
Transmission:	Highly contagious. All secretions of infected animals are loaded with virus. Shedding can precede clinical signs by several days and continue up to six weeks post recovery. Virus is extremely resistant-bleach (1:32) is required to disinfect contaminated surfaces.

<b>Feline Leukemia Virus (FeLV)</b>	
Agent:	Feline leukemia virus (enveloped RNA retrovirus)
Incubation:	Up to four weeks from exposure before detectable by antigen test. Development of clinical signs may not occur for months after infection.
Effects:	High percentage infected cats will develop some type of immunity and be unaffected. Some will be chronic shedders of virus, however. Of those who develop disease, the most common effect is severe immune suppression resulting in death from secondary disease. A small percentage will develop leukemia or other cancers.
Diagnosis:	ELISA serum antigen test
Treatment:	Symptomatic treatment for chronic disease problems with specific treatment being given for each secondary disease. Mortality in cats showing disease is 100%.
Prevention:	A killed virus vaccine and a recombinant DNA transdermal vaccine are available. Doses are given as early as 8 weeks of age and boosted 3 to 4 weeks later. Annual revaccination is necessary for cats at risk of exposure.
Transmission:	Spread primarily through direct contact with saliva or blood. Repeated exposure often is necessary to transmit the disease. Virus does not survive long in environment. Cats may be viremic and appear healthy for extended periods, but are infectious.

<b>Feline Immunodeficiency Virus (FIV) (sometimes called Feline AIDS)</b>	
Agent:	Feline Immunodeficiency virus (enveloped RNA retrovirus)
Incubation:	Antibodies first detected 2-4 weeks post infection; clinical signs usually develop within 3-6 years. Infected cats may appear healthy for extended periods, but are infectious.
Effects:	<p>Early in disease, may see generalized but usually temporary enlargement of the lymph nodes, often accompanied by fever.</p> <p>Health may deteriorate progressively or be characterized by recurrent illness interspersed with periods of relative health. Sometimes not appearing for years after infection, signs of immunodeficiency can appear anywhere throughout the body.</p> <p>Immune suppression leads to chronic health problems and opportunistic infections. Many FIV-positive cats have chronic gingivitis/stomatitis. Other chronic problems, such as diarrhea, skin disease, respiratory and eye infections have been seen and slow but progressive weight loss is common.</p>
Diagnosis:	ELISA serum antibody test
Treatment:	There is no cure for FIV. Specific treatment is aimed at secondary diseases/symptoms.
Prevention:	Vaccine exists. May be useful for cats at high risk. Not widely used (see note).
Transmission:	Not highly contagious. Transmitted primarily through biting and mating.
Notes:	<p>-NOT a zoonotic disease.</p> <p>- No current tests can distinguish between FIV antibody from vaccination and antibody from disease.</p>

<b>Feline Infectious Peritonitis (FIP)</b>	
Agent:	Feline Enteric Corona Virus (FECV) (enveloped RNA virus). FECV mutates in some cats to cause FIP
Incubation:	Clinical signs due to FECV infection rarely seen. FIP usually develops within 6-18 months after infection.
Effects:	<p>The original infection usually has no symptoms. The disease may have a very slow onset with a low-grade non-responsive fever leading into depression, loss of appetite, an excessive number of white blood cells, and a higher fever.</p> <p>The most common form of the disease, the dry form, produces adhesions between organs in the chest and/or abdomen. The wet form produces large amounts of yellowish fluid and distension in these same areas. Mortality is extremely close to 100%</p>
Diagnosis:	Positive FECV titers do NOT indicate FIP infection. Diagnosis of FIP is made on the basis of multiple laboratory and clinical findings.
Treatment:	Symptomatic therapy to make the cat comfortable as all therapy is generally ineffective.
Prevention:	Modified live intranasal vaccine is available but not generally recommended
Transmission:	<p>FECV is transmitted by contact with feces or fomites. FIP is rarely transmitted as such. Cats in <i>stable households</i> with FIP positive cat are at little increased risk for contracting disease.</p> <p>Cats with FECV may shed for months, although recognizable clinical signs due to infection are rare. Shed usually stops w/in a year if cat is removed from multiple cat environment, preventing re-infection. Virus does not survive well in environment.</p>
Notes:	Although serology can detect a history of exposure to FECV, they do not distinguish between FECV infection/exposure and FIP. Factors influencing mutation of FECV to FIP in an individual are not clear. There does seem to be a genetic component.

## OTHER CONDITIONS

<b>Ringworm</b> (Dermatophytosis-external fungal infection)	
Agent:	<i>Microsporum canis</i> (50%), <i>M. gypseum</i> , <i>Trichophyton mentagrophytes</i>
Incubation:	1-3 weeks
Effects:	Spots of hair loss with scaling and crusting, particularly around the face and ears.
Diagnosis:	About half of all <i>M. canis</i> strains (which causes 50% of infections) will fluoresce under a Wood's lamp. Fungal culture and microscopic identification is definitive.
Treatment:	Usually self-limiting, but may take up to 3 months to clear. Topical therapy is aimed at preventing spread and speeding recovery. Lime-sulfur dip is economical, safe and most effective treatment. Other topicals are not generally effective. Oral anti-fungals are used for severe cases (itraconazole is drug of choice).
Transmission:	Contact with infected animals, contaminated objects, or soil-borne organisms. Contact only sometimes results in infection. Immune-compromised individuals are most susceptible. Cats can remain infectious for several weeks following clinical recovery  Fungal spores are highly resistant and can persist in the environment. Repeated applications of bleach at high concentration (1:10) is necessary for inactivation.
Notes:	Zoonotic. Particularly a concern in young children and immunocompromised.

<b>Rabies</b>	
Agent:	<i>Rhabdoviridae</i>
Incubation:	Usually 2-8 weeks.
Effects:	Attacks nervous system causing encephalitis. In the first stage of disease symptoms includes behavioral changes, fever, and chewing at the bite site. In the paralytic or "dumb" form, an inability to swallow progresses to paralysis and death. The furious form is characterized by irrationality, aggression, and loss of fear. Convulsions and paralysis lead to death. Animals rarely live beyond 10 days after onset of signs
Prevention:	Killed virus vaccine given every 1 to 3 years. First vaccination is given at 3 to 4 months of age. Both dogs and cats should be vaccinated. State requirements often specify the age of initial vaccination, type of vaccine needed, and route of administration.
Transmission:	Transmitted in saliva from the bite of an infected animal. The virus will begin shedding in saliva a short time before clinical signs develop, usually less than 10 days. Rarely, transmission is through contamination of a pre-existing wound with the virus. Transmission through solid organ transplantation has also been documented
Notes:	Every animal bite is a rabies possibility. Mortality is 100% in domestic animals and humans. See 'Zoonotic Infections' page for information on rabies and humans.

<b>Rickettsial Disease</b>	
Agent:	Various-include <i>Ehrlichia canis</i> ; <i>Rickettsia rickettsii</i> (Rocky Mountain Spotted Fever).
Incubation:	2 to 3 days.
Effects:	Fever, depression, and anorexia are common. Bleeding disorders and chronic wasting occur in the worst cases. Mortality rare in acute cases, more common in chronic cases.
Treatment:	Tetracycline. Blood transfusions and supportive therapy may be necessary.
Prevention:	Effective tick control will help prevent disease.
Transmission:	These are tick-borne diseases. Ticks carry the rickettsia for months after feeding on an infected dog. Blood transfusions from infected animals are also implicated.
Notes:	Several rickettsial diseases are also serious public-health concerns in humans. Rocky Mountain Spotted Fever is zoonotic and generally shows no symptoms in dogs.