**Canine Distemper Virus (Canine)**

**Synonyms**

Canine Morbillivirus infection  
Hard pad disease

**Disease Description**

**Definition**  
Canine distemper virus (CDV) is a highly contagious, multi-systemic disease that can affect many terrestrial carnivores.2,19,23 Dogs are the principal reservoir host. The disease occurs world-wide.2

**Etiology**  
Canine distemper virus is an RNA virus of the Paramyxoviridae family and *Morbillivirus* genus. CDV primarily infects carnivores. Infections have been reported in the cat, dog, jackal, coyote, hyena, lion, tiger, leopard, ferret, fox, weasel, raccoon, seal, sea lion, dolphin, giant panda, and certain primates.1,19,23,27,31 As the principal reservoir host, dogs are the likely reservoir for infection of wildlife.2

CDV’s single-stranded RNA genome encodes several structural proteins. Of these proteins, hemagglutinin (H) gene has the highest level of genetic variation. H gene is also important for antigenic recognition and viral interaction with the host cell’s receptors.19,21-23 Other genes of importance include F and P.23,29 Numerous lineages of CDV exist, namely America-1, America-2, America-3 (syn. Edomex), America-4, Artic-like, Asia-1, Asia-2, Europe-1, South America-1, Brazilian wild-type, and European wildlife.1,21-24,29 America-3 and America-4 strains are most common in the USA.23 Different strains of CDV vary in pathogenicity.2

Canine distemper virus can sometimes occur in combination with other respiratory infections. Coinfections are referred to as [*canine infectious respiratory disease complex*](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=193) and can include *Bordetella bronchiseptica*, *Streptococcus equi* sub. *zooepidemicus*, *Mycoplasma* spp., canine influenza virus, respiratory coronavirus, parainfluenza virus, adenovirus, and herpesvirus.18

**Disease Description in This Species**

**Pathophysiology**  
CDV is prevalent in respiratory secretions and is most commonly spread through aerosol or droplets. However, infected dogs can shed viral particles in nearly all bodily fluids.2,3,28 Within 24 hours of contact with respiratory tract epithelium, CDV multiples in tissue macrophages and is carried to local lymph nodes. Within a few days, the virus proliferates throughout lymphoid organs, including the spleen, mesenteric lymph nodes, and hepatic Kupffer cells. CDV then spreads hematogenously to epithelial cells of the respiratory, gastrointestinal (GI), and urogenital tracts, as well as the central nervous system (CNS).2,3 Epithelial and CNS tissues are typically infected by day 8 or 9 post infection.2

Ability of an infected animal to mount an immune response is critical in determining the extent of disease induced by the virus. If an animal can mount an effective cell-mediated and humoral immune response by day 14, no signs of clinical illness may be noted and the virus can be cleared from tissues. Dogs with mild to intermediate cell-mediated responses and delayed antibody titers will develop infection of epithelial tissues and show clinical signs. While the virus can eventually be cleared as antibody levels rise, it may persist for extended periods in uveal, CNS, and some integumentary tissues (e.g. footpads).2 Dogs that fail to mount an immune response by days 9-14 tend to experience severe clinical signs and can die acutely.3

**CNS Infection**  
Canine distemper virus most likely invades the CNS via hematogenous spread. Neurological signs may not be apparent if the host mounts an adequate immune response. CDV enters the perivascular space in the meninges, choroid plexus, and ependymal cells of the ventricular system. The virus enters cerebrospinal fluid (CSF) from the choroid plexus, thereby spreading to periventricular and subplial structures. CDV can spread via a neural route in [ferrets](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=5911) through olfactory neurons; it is not clear if this occurs in dogs.2

Acute encephalitis from CDV infection can occur early in the disease course in young or immunosuppressed animals. Multifocal lesions of gray and white matter develop. Neuronal necrosis occurs from the presence of inflammatory mediators and reactive cells.4,5 Lesions may occur in several areas within the CNS, including the olfactory bulb, brainstem, hippocampus, and cerebellum.5 Demyelination occurs from infection of microglial and astroglial cells in acute encephalitis cases.2

Chronic encephalitis is characterized by reduced CDV antigen expression; upregulation of major histocompatibility complex (MHC) class II molecular expression; and perivascular mononuclear infiltration. CDV virus is found predominantly in the follicular dendritic cells in chronic encephalitis. CDV antibodies interact with infected macrophages in the CNS, leading to release of oxygen radicals. Oxygen radicals in turn can cause destruction of myelin-producing oligodendroglial cells, resulting in an immune demyelination.2

“Old dog encephalitis” is a rare, chronic, progressive inflammatory disease of the cerebral hemispheres and brainstem. It occurs due to persistence of CDV in nervous tissue in immunocompetent dogs.2

**Immunosuppression**  
Canine distemper virus can cause significant immunosuppression because of its protein encoding and ability to infect lymphoid cells.18,19 This immunosuppression may predispose to other infections, such as respiratory tract viruses or bacteria. It is unclear how long a patient is immunosuppressed or to what degree immunosuppression correlates with severity of CDV infection.18

**Diagnosis**  
**Physical Examination Findings/History:** Findings vary depending on the virulence of the viral strain and immune status of the host. It has been estimated that >50% of CDV infections are subclinical because of an adequate host immune response.2 Respiratory signs are more common than neurological or GI signs.18

Dogs with mild cases of distemper may exhibit lethargy, decreased appetite, fever, coughing, dyspnea, and serous to mucopurulent nasal discharge.2 Fever may occur 3-6 days after infection, with a second peak several days later.3

More severe clinical disease typically occurs in young dogs with inadequate immunity. Fever, nasal discharge, serous to mucopurulent conjunctivitis (**Figure 1**), coughing, dyspnea, vomiting, diarrhea, tenesmus, weight loss, and dehydration may be noted. Secondary bacterial infections can worsen clinical findings.3

Neurological findings can occur 1-3 weeks after systemic disease or can coincide with systemic illness. Neurologic signs may be acute or chronic, and are typically progressive. Possible clinical abnormalities include hyperesthesia, cervical rigidity, vestibular signs, seizures, ataxia, cerebellar signs, paraparesis, tetraparesis, and myoclonus (i.e. involuntary rhythmic muscle twitching).2,3

Ocular findings can include keratoconjunctivitis sicca, anterior uveitis, active chorioretinitis, chorioretinal scars (**Figure 2**), and rarely retinal detachment.6 Optic neuritis may cause papilledema (**Figure 3**), and lead to blindness and optic atrophy.2

Dermatological findings include pustular dermatitis (**Figure 4**) in puppies, and nasal or digital pad hyperkeratosis (i.e. hardpad, **Figure 5**).3

Additional findings: Neonatal infections can cause enamel hypoplasia (**Figure 6**). Cardiomyopathy has occurred in experimentally-infected neonates. Growing puppies have developed hypertrophic osteodystrophy and metaphyseal osteosclerosis of long bones. Abortion and stillbirths can also occur. Oral ulcers are rarely reported.2

**Complete Blood Count:** Severe leukopenia is common. Other potential findings include anemia, thrombocytopenia, monocytosis, and neutrophilia.3,20,27

**Biochemistry Profile:** Results are normal or variable. Hyperphosphatemia, hypoproteinemia, and hypoalbuminemia have been reported.20

**Serology:** Antibody titer testing can indicate whether protective levels of antibodies against CDV are present. In-house test kits are available and are reliable.15,17 Antibody assays are helpful for determining protective status from prior vaccines in dogs in which vaccination may carry risks and for determining immunity of dogs entering shelters.17 Note that negative titers do not indicate susceptibility. Some immune dogs may have undetectable levels of antibodies but be able to mount an appropriate response when exposed to CDV. In-house tests may not be able to accurately differentiate between maternal and innate immunity in dogs 4-6 months of age.17 IgM levels can be detected in acute distemper cases but may be present for up to 3 weeks after vaccination against CDV. IgG titers are nonspecific. An elevated IgG titer can indicate current infection, previous infection, or previous vaccination.3

**Cytology:** CDV cytoplasmic and intranuclear inclusion bodies are occasionally found in cells on stained peripheral blood smears or conjunctival swabs/scrapings.2,27 Inclusion bodies are single, oval, gray bodies that are up to 3 µm in diameter. Inclusion bodies are more commonly found in lymphocytes and epithelial cells and less commonly in neutrophils (**Figure 7**), monocytes, eosinophils, and erythrocytes (**Figure 8**).2,20 Erythrocytic inclusions are eccentrically located, round, and light blue in color (**Figure 9**).2

**Radiography:** Alveolar or interstitial patterns are common on thoracic radiographs in dogs with pneumonia. Radiographic changes consistent with hypertrophic osteodystrophy may also be noted.2,3

**Cerebrospinal Fluid (CSF) Analysis:** CSF analysis may be normal in cases of acute, noninflammatory encephalomyelitis. With chronic CDV encephalomyelitis, elevated protein levels (>25 mg/dL) and cell counts (>10 cells/µL, primarily lymphocytes) are possible. Inclusion bodies may be noted in cells. CDV antibody levels can be measured in CSF. Antibody levels are not increased in CSF in vaccinated dogs or in dogs with systemic disease that do not have CNS infection. However, antibody levels can be increased secondary to blood contamination during CSF collection.2

**Necropsy:** Possible pathologic changes include diffuse interstitial pneumonia, enteritis, conjunctivitis, rhinitis, thymic atrophy, polioencephalomyelitis, leukoencephalomyelitis, demyelination, neuronal degeneration, and myelin degeneration.2

**Virus Isolation:** CDV is difficult to isolate from routine cell cultures.2

**Polymerase Chain Reaction (PCR) Assay:** PCR testing is a highly specific means of diagnosing CDV. PCR assays can be performed on whole blood, conjunctival swabs, buffy coat smears, and urine sediment.1,3,18,25,26 Using cut-off values of 107,903 viral particles can help real-time PCR discriminate between vaccine interference and wild-type infection.8 PCR assays are 30% more sensitive than immunofluorescent antibody (IFA) tests in diagnosing CDV.8

**IFA Test:** IFA assays can be performed on conjunctival, tonsillar, respiratory, and genital epithelium. Antigen can also be detected in urine sediment and buffy coat samples.3,28 Note that immunofluorescence is typically positive for only the first 3 weeks post infection in conjunctival and urinary epithelium samples.2 Buffy coat samples are usually positive 2-5 days post infection, after which antigen levels start to decrease 8-9 days post infection.2 CDV persists for at least 60 days in uveal tissue, CNS tissue, skin samples, and footpads.2

**Immunochromatography:** Immunochromatography employing two anti-CDV antibodies has been performed on conjunctival swabs.7 This test has greater sensitivity and specificity compared to nested PCR assays. Results on samples from nasal swabs and peripheral blood lymphocytes were less sensitive and less specific when compared to PCR assays.7

**Other Tests:** Virus neutralization and hemagglutination inhibition are the gold standard for accurately detecting protective levels of antibodies against CDV.15

**Signalment**  
Young or unvaccinated dogs are most susceptible to disease. No sex or breed predisposition has been reported.3

**Clinical Signs**  
Clinical signs vary depending on pathogenicity of the viral strain and immune response of the host. Older dogs that have some immunity are more likely to have asymptomatic or mild disease. Puppies are more likely to have severe clinical signs.9

Initial clinical signs can include lethargy, anorexia, fever, dehydration, oculonasal discharge, and coughing. Vomiting and diarrhea may also occur. Diarrhea can be hemorrhagic.2,3 Ocular changes include conjunctivitis, keratoconjunctivitis sicca, chorioretinitis, papilledema, retinal detachment, blindness, mydriasis, and retinal scarring.6,9 Pustular dermatitis can occur with epidermal infection. Hyperkeratosis of the nasal planum and footpads can be seen in conjunction with neurologic signs.2

Neurologic signs may occur 1-3 weeks after onset of systemic signs or several months after apparent recovery. Neurologic signs may include ataxia, myoclonus, seizures, paraparesis, tetraparesis, vestibular signs, and hypermetria.2,3,9

**Laboratory Profile**

Sodikoff's Laboratory Profiles of Small Animal Diseases: [Enteritis, Viral](https://www.vin.com/Members/CMS/project/DefaultAdv1.aspx?pid=9046&icustom=%7b%22profileid%22:%22378%22%7d)  
Sodikoff's Laboratory Profiles of Small Animal Diseases: [Respiratory Disease, Viral](https://www.vin.com/Members/CMS/project/DefaultAdv1.aspx?pid=9046&icustom=%7b%22profileid%22:%22416%22%7d)

**Etiology**

Canine distemper virus

**Breed Predilection**

None

**Sex Predilection**

None

**Age Predilection**

Juvenile

**Clinical Findings**

Abdominal pain  
Anisocoria, pupils unequal  
Anorexia, hyporexia  
ATAXIA, INCOORDINATION, DYSMETRIA  
Behavior abnormal, behavioral change  
Blepharospasm, eye pain  
BLINDNESS OR OTHER VISUAL DEFICIT  
Blindness partial, visual deficit  
Central nervous system (CNS) signs  
Cervical pain  
Cervical rigidity  
Circling  
CONJUNCTIVITIS  
Corneal ulcer, keratitis  
COUGHING  
Crackles, rales ausculted  
Cutaneous crusts, scabs  
Cutaneous erythema, hyperemia  
Cutaneous hyperkeratosis  
Cutaneous papules  
Cutaneous pustules, pyoderma  
Cutaneous ulcers  
Dehydration  
Depression, lethargy  
DERMATITIS  
Dermatitis pustular  
DIARRHEA  
Disorientation  
DYSPHAGIA, SWALLOWING DIFFICULT  
DYSPNEA, RESPIRATORY DISTRESS  
Ecchymoses, purpura, bruising  
Edema conjunctiva, chemosis  
EDEMA or SWELLING  
Edema or swelling cutaneous  
Epiphora, lacrimation increased  
Excoriation, self mutilation  
Fecal incontinence  
Feces foul odor  
Feces mucus covered, mucoid  
FEVER  
Footpad keratosis, hardpad  
Forelimb lameness  
Forelimb weakness  
GAIT ABNORMAL  
Hair coat poor  
Head pressing  
HEAD TILT  
Hematochezia  
Hemiparesis, hemiparalysis  
HEMORRHAGE  
Hindlimb lameness  
Hindlimb weakness  
HYPERKERATOSIS  
Hyperreflexia  
HYPERSALIVATION  
Hypothermia  
Keratoconjunctivitis  
Keratoconjunctivitis sicca  
LAMENESS  
LYMPHADENOPATHY  
Melena  
Miosis  
Mucous membranes pale  
Muscles flaccid  
MYDRIASIS  
Myoclonus, chorea  
NASAL DISCHARGE  
Nasal discharge mucoid  
Nasal discharge mucopurulent  
Nasal discharge purulent  
Nasal planum hyperkeratosis  
Nausea  
NYSTAGMUS  
OCULAR DISCHARGE  
Ocular discharge mucoid  
Ocular discharge purulent  
Opisthotonos, opisthotonus  
Oral mucosal ulcers  
Oral mucosal vesicles  
PAIN  
PARALYSIS OR PARESIS  
Paraparesis, paresis  
Proprioception abnormal  
PRURITUS  
Pupillary light reflex absent  
Pupillary light reflex decreased  
RESPIRATORY, BREATHING, PULMONARY SOUNDS ABNORMAL  
SEIZURES, CONVULSIONS  
Sneezing  
Strabismus, eye deviation  
Stupor  
TACHYCARDIA  
Tachypnea, hyperpnea, polypnea  
TENESMUS  
Tetraparesis, quadriparesis  
TREMORS  
UVEITIS  
Uveitis, anterior  
VOMITING  
Weakness  
Weight loss  
ZZZ INDEX ZZZ

**Diagnostic Procedures**

|  |  |  |
| --- | --- | --- |
| **Diagnostic Procedures:** |  | **Diagnostic Results:** |
| Pulse oximetry, blood gas analysis |  | Hypoxemia, blood oxygen decreased |
|  |  |  |
| Complete blood count (hemogram) |  | ANEMIA |
|  |  | Inclusion bodies in lymphocytes |
|  |  | Lymphopenia |
|  |  | Monocytosis |
|  |  | Neutrophilia |
|  |  |  |
| Urinalysis |  | Urine specific gravity increased |
|  |  |  |
| Radiography of skeleton - bone/joint involved |  | Heterotrophic osteodystrophy |
|  |  |  |
| Radiography of thorax |  | Bronchopneumonia |
|  |  | PULMONARY INFILTRATE, PNEUMONIA |
|  |  | Pulmonary interstitial pattern |
|  |  |  |
| Ocular examination |  | Aqueous flare |
|  |  | Chorioretinal scars |
|  |  | Chorioretinitis |
|  |  | Edema optic disc, papilledema |
|  |  | Optic disc atrophied |
|  |  | Optic neuritis |
|  |  | Retinal degeneration |
|  |  | Retinal detachment |
|  |  | Retinal hemorrhages |
|  |  | Retinal hyperpigmentation |
|  |  |  |
| Pulse oximetry, blood gas analysis |  | Hypercapnia/hypercarbia, carbon dioxide increased |
|  |  |  |
| Serology for specific disease |  | Distemper serology positive in serum, cerebrospinal fluid |
|  |  |  |
| Serum biochemistries |  | Hyperglobulinemia |
|  |  | Hypoalbuminemia |
|  |  | Hypoglobulinemia |
|  |  | Hypoproteinemia |
|  |  |  |
| Ultrasonography of abdomen |  | Intestinal bowel loops fluid filled |
|  |  |  |
| Fluid analysis, cerebrospinal (CSF) |  | Cerebrospinal fluid (CSF) distemper titer increased |
|  |  | Cerebrospinal fluid (CSF) lymphocytic pleocytosis |
|  |  | Cerebrospinal fluid (CSF) mononuclear pleocytosis |
|  |  | Cerebrospinal fluid (CSF) protein increased |
|  |  | CSF pleocytosis, cells increased |
|  |  |  |
| Biopsy and histopathology of lesion/affected tissues |  | Pharyngitis |
|  |  |  |
| Biopsy and histopathology of muscle, nerve, or neural tissue |  | DEMYELINATION |
|  |  | Nonsuppurative encephalomyelitis |
|  |  |  |
| Biopsy and histopathology of small intestines |  | Intestinal hemorrhage |
|  |  |  |
| Electron microscopy |  | Canine distemper virus observed |
|  |  |  |
| PCR assay |  | Canine distemper virus detected by PCR |
|  |  |  |
| Necropsy |  | Bronchiolitis |
|  |  | Encephalomyelitis |
|  |  | Gliosis |
|  |  | Meningitis |
|  |  | Meningoencephalitis |
|  |  | Neuronal degeneration |

**Treatment / Management**

**SPECIFIC THERAPY**  
No specific therapy is currently available for CDV and management is primarily supportive.1 Ribavirin is an antiviral medication that inhibits CDV replication *in vitro* but it has not been thoroughly evaluated in infected dogs.10,16 Further studies are needed.

**SUPPORTIVE THERAPY**  
Fluid therapy (IV, SC) may be needed to correct dehydration and replace ongoing losses.9 Coupage and nebulization may be beneficial in cases of bronchopneumonia.9 CDV pneumonia is commonly complicated by secondary bacterial infection, so broad spectrum antibiotic therapy may also be indicated. Antibiotic therapy may be required for several weeks, possibly as combination therapy. Common options include:2,3,9

1) Ampicillin or amoxicillin 20 mg/kg PO, IV, SC q 8 hrs2  
2) Doxycycline 5-10 mg/kg PO, IV q 12 hrs2  
3) Cephapirin 10-30 mg/kg IM, IV, SC q 6-8 hrs2

For more information on treating pneumonia, please refer to the Canine VINcyclopedia chapter on [Pneumonia](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=576).

Antiemetic therapy is indicated for patients that are vomiting.

Dexamethasone may be given once at a dose of 1-2 mg/kg IV to temporarily halt neurologic signs associated with cerebral edema.2

Anticonvulsant therapy is indicated for seizures. Diazepam (5-10 mg IV or rectally) and other medications can be administered for [status epilepticus](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=487). Phenobarbital (10-20 mg/kg IV once to effect then 2-8 mg/kg PO q 12 hrs) or other anticonvulsants may be used for [acute](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=1740) and [maintenance](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=1739) therapy.2,9

**MONITORING and PROGNOSIS**  
Antibody titer testing can be used to determine if enough circulating antibodies are present to protect against CDV infection.15

Prognosis varies depending on the viral strain and immune response of the host.3 Neurologic sings are the most important factor affecting prognosis.2 Prognosis for dogs with neurologic signs is considered guarded to poor.2,9 Mortality rates of approximately 50% are reported.3 Older dogs that have an adequate immune response may have asymptomatic or mild disease. Puppies or those with an inadequate immune response tend to develop more severe disease.2 Dogs recovering from CDV are likely immune to reinfection for long periods of time and may be immune for life.9

**Preventive Measures**

CDV is an enveloped virus that is susceptible to many disinfectants. Good hygiene practices (e.g. handwashing, wearing gloves and protective clothing) are recommended when handling infected dogs.2

Hospitalized dogs must be isolated from the general population.2 Infectivity can persist for extended periods. Dogs usually shed the virus in bodily secretions for 1-2 weeks after acute illness. Dogs with neurologic signs can shed virus for longer periods of time.2 Extended quarantine may be necessary.

**Vaccination**  
Vaccination is the cornerstone for preventing CDV and vaccines are considered core vaccines by the American Animal Hospital Association (AAHA). Either a modified live (MLV) or a canarypox recombinant CDV (rCDV) vaccine can be used.9 Note that dogs with a body temperature >39.7°C (103.46°F) at the time of vaccination tend to mount a poor response.13

**MLV:** Onderstepoort strain was adapted from chick embryo cells. This vaccine produces lower levels of humoral immunity but does not cause postvaccinal disease.2,3 Rockborn strain is derived from canine cells. This vaccine tends to produce a higher level of antibody response, inducing complete immunity in virtually 100% of susceptible dogs. Fatal [postvaccinal encephalitis](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=186" \t "_blank) has been reported in rare cases.2,3,29 MLV for CDV is particularly susceptible to failure if not used within 1 hour of reconstitution.14

**rCDV:** Recombinant poxvirus-vectored vaccine is associated with the fewest side effects.2 Also of importance, rCDV vaccine has been proven to immunize puppies with active maternal immunity.13

**Guidelines:** Current AAHA guidelines recommend vaccinating dogs at 6-8 weeks of age and repeating the vaccine q 3-4 weeks until 14-16 weeks of age. Dogs then receive a vaccine 1 year after the initial series and q 3 years thereafter.9,13 Maternal antibodies are typically absent by 12-14 weeks of age. In dogs >16 weeks of age, the initial series can consist of two vaccines given 2-4 weeks apart.2 Majority of dogs develop protective antibody titers within 1-2 weeks following vaccination.11 Both MLV and rCDV vaccines are acceptable per AAHA standards.13

**Adverse Events:** [Hypertrophic osteodystrophy](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=1319) and [juvenile cellulitis](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=1240) have been associated with distemper vaccination in young dogs. Signs usually occur approximately 10 days following vaccination and have been occurred with all MLV vaccine strains.2,14 As such, rCDV is recommended over vaccination with MLV versions.14

**Vaccine Failure:** Distemper infections in adult dogs with prior vaccination histories are becoming more common. Causation is unclear but improper handling and storage of vaccines may play a role. Administration of the third puppy vaccine prior to 16 weeks of age may theoretically contribute to poor immunity. Maternal antibody interference is suspected in these cases.18,22 Additionally, studies of genotypic strains indicate a possible role in vaccine strains and efficacy. Studies are inconclusive as to whether vaccines made with America-1 and America-2 strains are less effective than once thought against other known strains (e.g. Asia-1) or against new emerging strains.22,26 No breed predisposition for vaccine failure is reported for CDV.13

**Special Considerations**

**Zoonotic Potential**  
It was once speculated that CDV caused multiple sclerosis (MS) in humans; however, no substantial evidence exists for this theory and it is losing favor.2,3,12 Some concern exists for zoonosis because of recent CDV infections in primates. As CDV is a *Morbillivirus* spp., similar to human measles virus, additional concern has been raised due to recent disfavor of routine measles vaccination by many in the human population. At this time, no evidence exists that CDV can colonize humans.30-32

**Other Resources**  
Recent Message Boards discussions on [canine distemper virus](https://www.vin.com/members/search4/default.aspx?rows=25&sort=1&pg=1&snip=1&rnw=0&IS=0&fpop=1&q=canine+distemper+virus&hdlr=vinmost&lyr=3&specs=10&fldrs=-1&src2s=2&auth=&docids=)  
Recent Message Boards discussions on [canine distemper virus signs](https://www.vin.com/members/search4/default.aspx?rows=25&sort=1&pg=1&snip=1&rnw=0&IS=0&fpop=1&q=canine+distemper+virus+signs&hdlr=vinmost&lyr=3&specs=10&fldrs=-1&src2s=2&auth=&docids=)  
Recent Message Boards discussions on [canine distemper virus vaccination](https://www.vin.com/members/search4/default.aspx?rows=25&sort=1&pg=1&snip=1&rnw=0&IS=0&fpop=1&q=canine+distemper+virus+vaccination&hdlr=vinmost&lyr=3&specs=10&fldrs=-1&src2s=2&auth=&docids=)  
Medical FAQ on [Coughing, Sneezing, Gagging](https://www.vin.com/doc/?id=9809055&pid=11200)  
Recent Conference Proceedings on [canine distemper virus](https://www.vin.com/members/search4/default.aspx?rows=25&sort=1&pg=1&snip=1&rnw=0&IS=0&fpop=1&q=canine+distemper+virus&hdlr=vinmost&lyr=3&specs=10&fldrs=-1&srcs=8&auth=&docids=)  
[Pathology Case 95](https://www.vin.com/members/boards/DiscussionViewer.aspx?DocumentId=5372737&SAId=1&ViewAll=1)

Small Animal Radiology & Ultrasonography: [Diseases Associated With Linear and Reticular Interstitial Patterns – Viral Pneumonia](https://www.vin.com/doc/?id=7551930&pid=15756)  
Client education materials on [distemper in dogs](https://veterinarypartner.vin.com/default.aspx?pid=19239&id=4952099)  
Mentor Procedures video on [cerebrospinal fluid collection](https://www.vin.com/doc/?id=8639905&pid=262)  
Mentor Procedures video on [canine neurological examination](https://www.vin.com/doc/?id=8549726&pid=262)

Video of puppy with [canine distemper](https://www.vin.com/Members/CMS/document/default.aspx?pid=81&catid=&objectid=4914&objecttypeid=10&redirectFromMiscDefault=1&calc=)  
Videos of dogs with probable [CDV-induce myoclonus](https://www.vin.com/members/search4/Default.aspx?rows=50&sort=1&pg=1&snip=0&rnw=1&IS=0&fpop=0&q=distemper+myoclonus&hdlr=vinmost&lyr=-1&specs=10&fldrs=-1&src2s=1&src2s=29&auth=&docids=)  
For more images see these slideshows in the Image Library:  
[Blood Smear Cytology, Infectious Diseases - Dog](https://www.vin.com/Members/Presenter/presenter.aspx?xmlPath=%2fmembers%2fslideshow%2fSlideShowData.ashx%3fProjectId%3d24562&cache%3dfalse)  
[Pneumonia, Viral - Dog](https://www.vin.com/Members/Presenter/presenter.aspx?xmlPath=%2fmembers%2fslideshow%2fSlideShowData.ashx%3fProjectId%3d30490&cache%3dfalse)

**Differential Diagnosis**

[Bordetellosis](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=213)  
[Contagious infectious respiratory disease complex](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=193)  
[Coronavirus](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=190)  
[Inflammatory bowel disease](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=1205)  
Intestinal parasites  
Neoplasia  
[Neosporosis](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=1167)  
Other causes of encephalitis, meningoencephalitis  
Other causes of myoclonus  
Other causes of [optic neuritis](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=178)  
Other causes of [pneumonia](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=576)  
[Parvovirus](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=1165)  
[Pneumonia](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=576)  
[Rickettsial infections](https://www.vin.com/Members/Associate/Associate.plx?Book=1&BrowseChapter=134&SpeciesID=1&ShowA=1#Jump)  
Toxins that cause CNS signs  
[Toxoplasmosis](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=238)  
[Vaccine-induced distemper encephalitis](https://www.vin.com/Members/Associate/Associate.plx?DiseaseId=186)

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