

## Template/Example Canine Distemper Protocol

Date Written:

Author/Approved by:

Date Revised:

Date Implemented:

**Purpose:** The purpose of this document is to guide treatment and testing for distemper in dogs.

### **Definitions:**

- Polymerase Chain Reaction (PCR): Laboratory test that looks for DNA (genetic material).
- PPE: Personal Protective Equipment. This may include gowns, booties or boots, and disposable gloves. It serves the purpose to protect the wearer from contamination as well as the puppies from cross-contamination

### **Background:**

Distemper is a viral infection that typically causes some or all of the following signs in most cases: upper respiratory, lower respiratory, gastrointestinal, or neurological; however, it can infect *any* organ system of dogs and subsequently cause a wide variety of signs (including skin lesions, urinary tract/kidney involvement, and transplacental infection). It is commonly spread through aerosolization of respiratory secretions, though it is also shed in other bodily fluids. Survival in adult dogs can be greater than 90% with aggressive treatment, but mortality in puppies often approaches 50% or more. It poses a challenge in shelter settings because of the potential for extended periods of shedding even after clinical recovery (weeks to months); during this period, dogs are still considered contagious.

Routine vaccination is effective and is recommended as a core vaccine for owned and shelter dogs. Despite this, however, many dogs entering shelters are not protected; previous studies report that 57% to 62% of dogs do not have a protective antibody titer to CDV upon entering shelters. Current shelter guidelines recommend vaccination upon intake, and though some protection is gained rapidly and can prevent mortality, protective antibody titers to prevent infection take several days.

Testing using a CDV PCR test has the potential to be complicated due to the fact that modified live vaccines may cause a positive PCR result, and a cut-off value is given on test results; however, low viral counts (below the cutoff) also occur with early or late infection. If clinical signs are present or if dogs come from a high-risk situation, every positive result should be treated as real infection until proven otherwise.

### **Procedures:**

#### Initial Testing:

- Any dogs that demonstrate clinical signs consistent with distemper (pneumonia, upper respiratory disease and from an area of concern) should receive a CDV Quantitative

RealPCR (Idexx test code 3265). If desired by the veterinarian to also evaluate for other causes of respiratory disease, a full Canine Respiratory Disease (CRD) RealPCR Panel may be submitted to Idexx (test code 2524).

- Rechecks for serial monitoring of shedding in distemper positive patients should be a CDV Quantitative RealPCR (test code 3265) only (not full respiratory panel). See next section for retesting guidelines.
- Instructions for swab collection can be found at: <https://vetmed-maddie.sites.medinfo.ufl.edu/files/2014/10/Collection-of-Swabs-for-Diagnosis-of-Respiratory-Pathogens-by-PCR.pdf>
- Individual sample tubes should be labeled with the dog's ID number and name, then placed into a ziploc bag with the individual submission form, then placed in a styrofoam container with ice packs. The Styrofoam container should then be placed in a cardboard box for shipping.
- If multiple samples (from multiple dogs) are being submitted, an Idexx batch form may be used. If an outbreak is suspected, also collect information on signs, the date signs started, animal location in the shelter when signs started, and vaccinations; keep this information in a spreadsheet.
  - Individual samples should be labeled with the dog's ID number and name, then put into a ziploc bag also labeled with ID number and name.
  - All sample ziplocs should be collected in a larger gallon ziploc, and this should be placed into a styrofoam container with ice packs.
  - The submission form should be placed in a ziploc and placed on top of the styrofoam; both should then be placed in a cardboard box for shipping.
- The box should be shipped overnight to the Idexx lab in Sacramento. Samples must be delivered to FedEx by 7pm for arrival the next morning.
- Preprinted labels are available – contact Idexx to obtain labels that bill to Idexx for shipping.
- Lab address:
  - Molecular Diagnostics
  - IDEXX Reference Labs
  - 2825 KOVR Drive
  - West Sacramento, CA 95605
- Send samples out Monday through Friday only; otherwise, samples will be sitting for too long (either with FedEx or with the lab).

### Serial/Recheck Testing

- Any dog that has been diagnosed with distemper will need two negative PCR tests to be cleared (and leave isolation).
- Recheck CDV should be a CDV Quantitative RealPCR (NOT the full CRD Panel), test code 3265.
- Rechecks are based NOT on clinical signs, but on the initial CDV viral count and whether viral counts are increasing or decreasing on subsequent testing.
- *CDV viral count <10,000 on the initial CDV PCR test: Repeat test in 1 week.*

- If second test is positive, then the dog is truly infected; continue serial testing.
- If second test is negative, then the dog may have had a false positive result (from vaccine interference, if applicable) or a transient infection that has resolved. Retest in 1 week - a second negative means the dog is cleared.
- *CDV viral count 10,000 to 1,000,000 on initial PCR*: Repeat the test in 2 weeks to determine if the viral count is decreasing or increasing. This will provide an estimate of how long the dog will be infected.
  - If the count is decreasing, repeat testing in 2 weeks.
  - If the count is increasing, then repeat testing in 3 weeks. Continue at 3-week intervals until the count starts to substantially decrease, then switch to 2-week intervals.
  - When a negative test is reached, repeat again in 1 week. Two negative tests a week apart means the dog is no longer shedding and is cleared.
- *CDV viral count >1,000,000 on initial PCR*: Repeat the test in 3 weeks to determine whether the viral count is decreasing.
  - If increasing, then repeat test again in 3 weeks.
  - If decreasing, switch to testing at 2 weeks intervals.
  - Each dog will need 2 negative tests one week apart to be cleared

### Treatment:

Treatment for canine distemper is supportive; there is no direct treatment for the viral component of the disease. Treatment is aimed at controlling clinical signs and supporting the dog through the illness.

- Mild upper respiratory signs
  - This includes any dog showing only mild respiratory signs, including ocular discharge, nasal discharge, sneezing, or cough, but is otherwise BAR and eating/drinking.
  - **Doxycycline 10mg/kg SID x 10 days**
  - Topical antibiotic medications can be used for ocular signs (BNP, tobramycin, etc.)
- Systemic signs
  - This includes dogs that develop a fever either while on doxycycline or have a fever that does not respond in 24 hours to doxycycline treatment
  - This can also include dogs with upper respiratory signs that then progresses to include gastrointestinal signs (inappetance, vomiting, diarrhea)
  - Additional treatments:
    - **Subcutaneous fluids (120ml/kg/day divided BID to TID) or IV fluids (boluses or continuous)** to maintain hydration.
    - Anti-emetics/gastrointestinal protection for patients not eating or vomiting
      - **Maropitant (Cerenia) 1mg/kg PO, SQ, or IV SID**

- Ondansetron (Zofran) 0.5 - 1mg/kg IV or SQ BID OR Dolasetron (Anzemet) 0.5mg/kg IV or SQ SID
  - Famotidine 1mg/kg IV, SQ, or PO BID OR Omeprazole 1mg/kg PO BID OR pantoprazole 1mg/kg IV SID
- Lower respiratory signs
  - This includes dogs with moderate to severe tachypnea or dyspnea, likely related to CDV pneumonia.
  - Oxygen therapy should be considered for patients with severe lower respiratory signs (via nasal canula or oxygen cage); if this is not available in-house, transfer to a critical care facility or consider humane euthanasia.
  - Consider dexamethasone SP 0.1-0.2mg/kg IM or IV (anti-inflammatory dose), particularly if heartworm positive, followed by tapering dose of prednisone when appetite returns.
  - **Clavamox 12.5mg/kg PO BID or ampicillin 22mg/kg SQ or IV BID to TID and Enrofloxacin 10mg/kg PO, IM, or IV** for broader spectrum coverage (for pneumonia)
  - Nebulization with saline and coupage BID to TID
- Neurological signs
  - For active seizure activity: Diazepam 5-10mg/kg IV, intranasal, or rectally
  - For longer-acting control:
    - Phenobarbital 10-20 mg/kg IV once to effect then 2-8 mg/kg PO q 12 hrs
    - and/or levetiracetam (60mg/kg IV bolus, then 20-30mg/kg PO or IV q8h or equivalent for BID extended release tablets)
  - For tremors:
    - Methocarbamol 55-220mg/kg IV initially, do not exceed 330mg/kg/day; can also be used in a CRI
    - Methocarbamol 330mg/kg PO **divided** BID for ongoing control
  - Refractory and severe neurological signs causing significant reduction in quality of life warrant the consideration of euthanasia. Mild signs may not impact quality of life, but they may or may not resolve with recovery – some dogs have permanent mild neurological signs (typically tremors) but live normal lives. Mild neurological signs alone do not warrant euthanasia.

#### Isolation and Management:

- Dogs with any respiratory signs should be isolated from general population.
- PPE in the isolation area consists of: gloves, gown or coveralls (coveralls preferred), shoe covers.
- PPE should be changed in between individual patients or litters housed together to prevent spread of other illness.
- Dogs in isolation should be cared for by either separate staff or last in the order of animals cared for separate staff is not possible to prevent spread of distemper to the healthy population.

- During recovery, distemper dogs may be housed with fully vaccinated (at least two vaccines including one as an adult dog within the last 3 years), otherwise healthy adult dogs (over one year of age, no immunocompromising conditions or medications, no significant chronic health issues). See Canine Distemper Virus for Fosters document.

### Exposure and Quarantine

- Dogs that are exposed to a distemper positive dog should be evaluated and handled based on risk.
- Puppies (< 6 months of age) are considered high risk, regardless of vaccine status.
- Adult, healthy dogs are considered fully vaccinated and low risk if:
  - Dogs recently entering a shelter are older than 6 months and have received an intake vaccine AND a booster vaccine two weeks (or more) after the initial vaccine.
  - Dogs have been in a home or at the sanctuary for an extended period and are considered current on their DHPP vaccine through a booster within the last year (or within the last 3 years for 3 year labeled vaccines).
  - Low risk dogs that have been exposed should be monitored for any clinical signs but do not need to be quarantined.
- Antibody titer testing may be used at the discretion of the veterinarian for adult dogs only.
  - If greater than a week since exposure, titer testing cannot distinguish between antibodies induced due to active infection and vaccine-induced (or induced from prior exposure).
  - Paired antibody and PCR testing may be used to eliminate the need for quarantine in exposed, adult dogs. A protective titer and **concurrent** negative PCR test may replace quarantine.
  - Antibody titer testing does not yield predictable results in puppies due to inability to distinguish between transient maternal antibodies and long-lasting vaccine-induced antibody protection.
- High risk dogs that have been exposed to a positive dog should be quarantined for 14 days after the exposure.
  - If at any point, they develop clinical signs consistent with distemper, they should be tested at that time.
  - If no clinical signs develop, at the end of 14 days, they should be tested (CDV only PCR test).
  - If negative, they may be cleared from quarantine.
  - If positive, move to isolation and follow the serial testing protocol outlined above.

### **References:**

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