

## Virulent Newcastle Disease: Information for Veterinarians

Virulent Newcastle disease (VND), previously known as exotic Newcastle disease and sometimes referred to as Asiatic or Doyle's form of Newcastle disease, is a contagious and fatal disease affecting all species of birds.

**Definition:** VND is a virulent strain of the Newcastle disease virus and is one of the most serious disease of chickens throughout the world. This pathotype of Newcastle disease has two forms and can be characterized by viscerotropic lesions (produced in the gastrointestinal tract) or neurotropic lesions (in the brain). In susceptible chickens, morbidity rates approach 100% and mortality rates may exceed 95%.

**Etiology:** Caused by a virus of the Paramyxoviridae family, it will remain viable at a pH of between 2 and 12, and for 3 hours at 132.8° F, or for 30 minutes at 140° F. Antigenically similar strains differ in pathogenicity and are classified as lentogenic, mesogenic, and velogenic on that basis. These pathotypes are categorized by their level of virulence: lentogenic viruses are low virulence; mesogenic and velogenic viruses are virulent (VND).

**Host:** All birds, both domestic and wild, are susceptible to VND. The mortality and morbidity rates vary drastically between species and with the strain of virus. For example, in poultry, chickens are very susceptible to the disease, while ducks and geese tend to be more resistant. Mortality rates in psittacine birds have ranged from zero up to 75% prior to depopulation. Certain psittacine birds, especially Amazon parrots, have been demonstrated to shed VND virus intermittently in excess of one year.

**Transmission:** Within an infected flock, VND is transmitted by direct contact, contaminated feeding and watering equipment, and by aerosols produced by coughing, gasping, and other disturbances of respiration. Dissemination between flocks over long distances have been due to movement of contaminated equipment and service personnel such as vaccination crews. Movement of carrier birds and those in an incubating stage account for most of the outbreaks in the pet bird industry.

**Clinical Signs:** There may be considerable variation in the severity of clinical signs, depending on species, age, vaccination, and natural resistance of the birds, as well as the virulence of the VND strain. Certain species demonstrate a period of depression, diarrhea, and loss of appetite. Edema of the tissues around the eye, especially of the lower eyelid, are common. Straw colored exudate may flow from the mouth or nasal openings. Respiratory distress may vary from mild to severe. Clinical signs in turkeys and pet birds are usually mild. Torticollis, paralyzed wings and/or legs are commonly seen 10-20 days following onset of clinical signs.



Conjunctivitis and edema of the eyelids



Excessive fluids are commonly seen in the respiratory tract



Normal appearing chicken with a pale comb



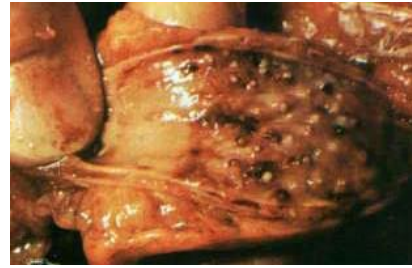
Twisting of the head and neck (torticollis)

**Differential Diagnosis:** The clinical signs and course of VND closely resemble those of a number of other avian diseases including fowl plague, laryngo-tracheitis, the diphtheritic form of fowl pox in poultry, psittacosis, and Pacheco's disease in parrots. This makes laboratory confirmation of a presumptive field diagnosis mandatory.

**Gross Lesions:** Hemorrhage may be seen throughout the G.I. tract. These hemorrhagic areas tend to ulcerate and then become areas of necrosis as the disease progresses. These areas are most commonly seen at the junction of the esophagus and proventriculus, Peyer's patches, and cecal tonsils. Edema is present in the subcutaneous tissues of the face and neck. The tracheal lesions are usually hemorrhagic without free blood in the lumen of the trachea. Postmortem examinations of the pet birds many times fail to exhibit any of these lesions or are not as pronounced as those seen in chickens.



Hemorrhage and erosions in the esophagus



Hemorrhage in the lining of the proventriculus

Hemorrhage in the mucosa of the trachea in a chicken



Areas of hemorrhage such as this may be Virulent Newcastle Disease seen throughout the gastrointestinal tract, and may change to ulcerated areas and then to necrotic areas as the disease progresses



Hemorrhage is commonly seen in the proventriculus and especially at the junction between the esophagus and proventriculus



Hemorrhage in the small intestine

**Laboratory Confirmation:** The surest method for confirmation of VND is the isolation and identification of the causative virus. Specimens for attempting viral isolation should be selected from cases in the early or even the prodromal stages of the disease. The VND viral strains are widely distributed in the avian body, and can be isolated from the lungs, trachea, spleen, terminal gut, and brain. Tissue triturates or media from cloacal and tracheal swabs are inoculated into 8-11 day embryonated chicken eggs, and after a variable period of incubation, depending on the virulence of the strain, the virus will be found in the amniotic-allantoic fluids, which are then tested for avian erythrocyte agglutinating activity. Subsequently, it is determined if the hemagglutination reaction is inhibited by known Newcastle disease antisera. To confirm diagnosis, identification of an isolate such as VND is established by the rapidity of killing day-old specific-pathogen-free (SPF) chicks inoculated by the intracerebral route, the intracerebral pathogenicity index, or by the presence of a specified amino acid motif at the cleavage site of the fusion protein (F) precursor (FO).

**Human Health:** VND is not a food safety concern, and no human cases of Newcastle disease have ever occurred from eating poultry products. Properly cooked poultry products are safe to eat. In very rare cases, people in close contact with sick birds can become infected—symptoms are usually very mild, and limited to conjunctivitis and/or influenza-like symptoms.

**Reporting:** This is a reportable disease under emergency conditions; suspect cases must be reported to CDFA within 24 hours.

To report an unusual number of sick or dead birds, call:  
**Sick Bird Hotline**  
**(866) 922-2473**

**CDFA Animal Health Branch**  
Headquarters - (916) 900-5002  
Redding District - (530) 225-2140  
Modesto District - (209) 491-9350  
Tulare District - (559) 685-3500  
Ontario District - (909) 947-4462  
**USDA-APHIS-VS** (916) 854-3950 or (877) 741-3690

For more information and updates on VND, please visit:  
[https://www.cdfa.ca.gov/ahfss/Animal\\_Health/Newcastle\\_Disease\\_Info.html](https://www.cdfa.ca.gov/ahfss/Animal_Health/Newcastle_Disease_Info.html)

CDFA Animal Health Branch: [www.cdfa.ca.gov/ah](http://www.cdfa.ca.gov/ah)

