Case Definition

Newcastle Disease (ND)
(Notifiable)

April 2025

1. **Disease Information**
   - **1.1 General Disease and Pathogen Information:** For the purposes of this document, ND will refer to an infection of poultry by the Newcastle disease virus (NDV), an avian paramyxovirus serotype 1 (APMV-1) that meets the virulence criteria defined by World Organisation of Animal Health (WOAH) in Article 10.9.1 of Infection with Newcastle virus. In the United States, ND was last reported in domestic poultry in January 2020. Newcastle disease virus is economically important for the poultry industry. Outbreaks of ND have occurred in California, Nevada, and Arizona between 2002 and 2003, Texas in 2003, and California between 2018 and 2020. Infection occurs through direct contact with fecal excretions and respiratory secretions of infected birds. Contact with contaminated feed, water, and other fomites allows for indirect transmission. The incubation period is 21 days, as defined by WOAH. The virus survives in the environment from days to months in the presence of organic matter, and up to years in feather follicles or temperatures <0°C.
   - **1.2 Clinical Signs:** General clinical signs include respiratory distress, decreased egg production, depression, neurological signs, and diarrhea.
     - **1.2.1** Clinical presentation may vary significantly based upon vaccination status and immune status. High mortality may occur in unvaccinated poultry.
     - **1.2.2** APMV-1 viruses have been shown to infect over 200 species of birds. Psittacine species exhibit variable susceptibility to virulent APMV-1 viruses and may chronically shed virus. An APMV-1 variant specific to columbid species (pigeons and doves) is referred to as pigeon paramyxovirus-1 (PPMV-1) and may cause variable clinical disease in poultry. A species-adapted virus is also found in double crested cormorants. These lineages are distinguishable by genomic sequence.
2. **Laboratory Criteria**
   - **2.1 Agent Isolation and Identification:** Refer to Avian Sample Collection for Influenza A and Newcastle Disease for preferred samples. Nucleic acid detection of NDV by real-time reverse transcription polymerase chain reaction (PCR) is preferred. Virus isolation can be attempted using embryonated chicken eggs. Negative results from gallinaceous poultry in the face of clinical signs require confirmatory testing (refer to section 4.2). All non-negative PCR samples and serological positives from official program testing and foreign animal disease investigations must be forwarded to the National Veterinary Services Laboratories (NVSL) for confirmatory testing.

2.2 Agent Characterization: Virulence can be determined by sequencing the fusion gene, followed by amino acid sequence analysis of the fusion protein cleavage site. Partial sequencing should be followed by whole genome sequencing. The intracerebral pathogenicity index (ICPI) is the definitive assessment for virulence and is most appropriately used at the beginning of the outbreak from an index case.

2.3 Serology: Serum tested by enzyme-linked immunosorbent assays (ELISA) or hemagglutination inhibition tests are primarily used for monitoring vaccine titers. Serology may also be useful in monitoring for past infection of vaccinated birds.

3. Case Classification

3.1 Suspect Case: Poultry with

3.1.1 clinical signs compatible with ND; **OR**

3.1.2 detection of APMV-1 by PCR targeting the matrix gene; **OR**

3.1.3 epidemiological information indicating exposure to NDV that requires further evaluation and/or testing.

3.2 Presumptive Positive Case: Poultry with a detection of NDV by the fusion-target PCR that targets the fusion gene with or without compatible clinical signs.

3.3 Confirmed Positive Case: Poultry from which NDV has been identified at the NVSL by

3.3.1 viral genome sequence characterization of the fusion cleavage site consistent with a virulent NDV, per WOAH; **OR**

3.3.2 having an ICPI of 0.7 or greater in 24- to 40-hour-old chicks from specific pathogen free (SPF) eggs, per WOAH.

4. Reporting Criteria: Newcastle disease (ND) is a U.S. foreign animal disease (FAD) that is immediately reportable under the APHIS National List of Reportable Animal Diseases (NLRAD).

4.1 NLRAD reporting in accordance with the proposed NLRAD System Standards for notifiable diseases; and by APHIS to the World Organisation for Animal Health (WOAH); **AND**

4.2 FAD or Emerging Disease Incidents (EDI) also follow standard procedures according to Policy for the Investigation of Potential Foreign Animal Disease/Emerging Disease Incidents.