



INFORMATION SHEET

NEWCASTLE DISEASE (NCD)

Epidemiological Status

- Country free of Newcastle disease (ND) in commercial production poultry
 - **Last occurrence: July 2024, in the state of RS,** (recovery of the free country status on October 23, 2024, by self-declaration published by the World Organisation for Animal Health - WOAH)
- Infection with APMV-1 variant PPMV-1: found in pigeons and eared doves.

Reference documents

- [SDA IN nº 17, dated April 7, 2006, amended by SDA Ordinance nº 275, dated April 16, 2021;](#)
- [SDA IN nº 32, dated May 13, 2002;](#)
- [Surveillance plan for avian influenza and Newcastle disease \(2022\);](#)
- [Contingency plan for animal health emergencies - General Part \(2023\)](#)
- [Contingency plan specific to highly pathogenic avian influenza and Newcastle disease \(2023\);](#)
- [Standard Operating Procedure for Permanent Posts and Mobile Teams in an Animal Health Emergency specific to highly pathogenic avian influenza and Newcastle disease \(2023\);](#)
- [Manual on Collecting, Storing and Shipping Samples – PNSA – 2020;](#)
- [Official Letter - Joint Circular Letter Nº 3/2021/DSA/DIPOA/SDA/MAPA.](#)

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AGENT

Avian paramyxovirus serotype 1 (APMV-1)

Pathotypes: Viscerotropic Velogenic, Neurotropic Velogenic, Mesogenic, Lentogenic (respiratory), and asymptomatic (enteric).

Variant: Pigeon Paramixovirus - serotype 1 (PPMV -1)

SUSCEPTIBLE SPECIES

APMV-1: Domestic and wild birds. Chickens are most susceptible to velogenic strains and turkeys are most resistant. Wild birds mainly present the Lentogenic strains.

PPMV-1 variant: natural hosts are columbiformes (it could infect domestic and wild birds).

CLINICAL SIGNS AND LESIONS

APMV-1 infection shows varying morbidity and mortality according to the susceptible species, strains, and pathogenicity of the virus in each of the five pathotypes:

1) Velogenic Viscerotropic: severe and fatal disease, high mortality in chickens. Sudden death, apathy, inappetence, conjunctival hyperemia, respiratory signs, cyanosis, greenish diarrhea, decrease in egg production, and egg anomalies.

2) Neurotropic Velogenic: respiratory signs (sneezing, nasal discharge, noise in the lungs), swelling of the head and face, weakness, nervous signs (torticollis, leg paralysis and muscle tremors), high mortality (up to 100% of unvaccinated birds). Birds with sudden death or neurological signs have few or no macroscopic lesions.

Lesions from velogenic strains: mostly occur in chickens/hens. Edema on the head and periorbital and neck region; congestion and bruising in the tracheal mucosa and pharynx; diphtheria membranes in the oropharynx, trachea and esophagus; petechiae and ecchymosis in the proventriculus, hemorrhagic lesions, ulcers or necrosis in the cecal tonsils and lymphoid tissues of the intestinal wall (Peyer's patches); enlarged and friable spleen; pancreatic necrosis and pulmonary edema; swollen or reduced and hemorrhagic ovaries.

3) Mesogenic: mild respiratory signs, decrease in egg production, neurological signs; mortality is usually low (< 10%) and more common in young birds; more severe signs when there are co-infections.

4) Lentogenic (respiratory): Mild respiratory signs in young birds. Used as a vaccine strain.

5) Asymptomatic (enteric): causes subclinical enteric infections. Used as a vaccine strain.

PPMV-1 variant: pigeons can present clinical signs of depression, diarrhea, torticollis, ataxia and neurological signs and may reach elevated mortality. When domestic birds are infected with the PPMV-1 variant, they may be asymptomatic or present clinical signs and variable mortality.

SURVEILLANCE

The target diseases of Avian Respiratory and Nervous Syndrome (ARNS) surveillance are Avian Influenza (AI) and Newcastle disease (ND).

Goals:

- Early detection of AI and ND cases in domestic and wild bird populations.
- Demonstration of absence of AI and NCD in industrial poultry.
- Monitoring of the occurrence of viral strains of AI to support public health and animal health strategies.

Target population: birds for commercial production*, for subsistence, for exhibition, for ornamentation, for pets, and wild birds (free-living or captive).

***Definition of commercial production poultry** (according to the WOAHP definition of poultry): all birds reared for the production of any commercial products (meat, eggs, and others) or for breeding for these purposes, regardless of the number of birds on the property.

TRANSMISSION

A highly contagious disease, transmitted by direct contact between birds. Aerosols and respiratory secretions are the main routes of transmission, in addition to ocular secretions and feces of infected birds (fecal-oral route). There may be transmission by indirect contact (water, food, fomites, transit of people, equipment, materials, vehicles, clothing, products, insects, rodents and other pests, bedding, manure, and contaminated carcasses). Vaccinated birds can be unapparent carriers and sources of infection in susceptible flocks. It is a zoonosis that can cause transient conjunctivitis in humans.

Reservoirs: wild, ornamental, and pet birds (parrots can shed the virus intermittently for more than a year).

Incubation period: up to 21 days.

NOTIFICATION CRITERIA

Immediate notification to the Official Veterinary Service (SVO) of any suspected case of Newcastle disease (category 2 on the list of diseases in the appendix of MAPA IN nº 50/2013).

DIFFERENTIAL DIAGNOSIS

Compatible clinical signs may also be present in other diseases such as Avian Influenza (AI), Avian Infectious Laryngotracheitis (ILT), infectious bronchitis, encephalomyelitis, Gumboro disease (infectious bursal disease), poisoning, duck virus hepatitis, avian cholera (acute form).

LABORATORY DIAGNOSIS

- Detection of specific ribonucleic acid (RNA).
 - Determination of the intracerebral pathogenicity index (ICPI).
 - Genetic sequencing.
 - Viral isolation.
 - Hemagglutination inhibition for viral characterization.
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DEFINING A CASE

In Brazil, **all types of birds described in the target population** (commercial production, subsistence, exhibition, ornamental, pets, and wild birds) are part of the RNS surveillance; therefore, any suspected cases must be notified immediately to the SVO and probable cases must undergo laboratory diagnosis, according to the criteria defined below.

Suspected case of RNS: identification of at least one of the following criteria:

1. presence of clinical signs or lesions** (neurological, respiratory, or digestive) compatible with Avian Respiratory and Nervous Syndrome in any type of bird; or
2. mortality greater than or equal to 5% within 72 hours in at least one shed at the core breeding establishment for commercial production poultry; or
3. change in the production parameters, such as reduced ingestion of food and water and in egg production or an increase in malformed eggs, in commercial production poultry, associated with increased mortality; or
4. sudden and elevated mortality in subsistence, exposition, ornamental, companion and wild bird populations; or
5. abnormal behavior in wild bird populations, especially migratory waterbirds; or
6. positive lab test result, that is not a result of vaccination against ND, for any type of bird.

In notifications with proof of the occurrence of a non-infectious problem***, the official veterinary service may assess the need for on-site care.

*** lesions: to identify the presence of lesions compatible with ARNS, the official veterinarian should perform necropsies in birds with clinical signs or that recently died.*

****non-infectious problem: involves external factors like power outage, equipment failures, storms, damages to facilities, management error, refusal syndrome or others.*

Suspected case of ARNS at meatpacking plants: identification of poultry with clinical signs or lesions (neurological, respiratory or digestive), or even the presence of dying or dead birds on the receiving platform, compatible with ARNS. Other criteria for notification of a suspected case do not apply to meatpacking plants.

Probable case of ARNS: any suspected case that, following a clinical-epidemiological assessment done by the official veterinarian, is compatible with ARNS.

Newcastle disease is defined as an infection by virulent APMV-1 in **commercial production poultry**.

Confirmed case of NCD: isolation and identification or detection of specific viral RNA of APMV-1 that meets the virulence criteria according to chapter 10.9 of the Terrestrial Animal Code of the World Organization for Animal Health (WHO) in commercial-production poultry.

Confirmed case of virulent APMV-1 infection: Isolation and identification of the agent or detection of APMV-1 specific viral RNA that meets the virulence criterion in non-commercial poultry.

Confirmed case of PPMV-1 infection: isolation and identification of the agent with serological or molecular characterization of PPMV-1 in columbiformes.

Outbreak of NCD/APMV-1/PPMV-1: epidemiological unit where at least one case of NCD, APMV-1 or PPMV-1 has been confirmed, according to established criteria for defining cases.

Suspicion ruled out: suspicious case notified to the SVO that was not classified by the official veterinarian as a probable case of RNS.

NCD ruled out: probable case investigated by the SVO with results that do not meet the confirmed case definition criteria for NCD.

SAMPLE COLLECTION INSTRUCTIONS

Appropriate personal protective equipment must be used.

For laboratory investigation of probable cases, collect the following samples from birds with clinical signs or lesions compatible with AI and NCD or from recently deceased birds (with no evidence of organ autolysis):

- 30 individual trachea swabs divided into 6 pools (each pool with 5 swabs);
- 30 individual cloaca swabs divided into 6 pools (each pool with 5 swabs);
- 5 pools of digestive system organs (small intestine with pancreas and cecum with cecal tonsils), with 1 pool of organs for each sampled bird;
- 5 pools of respiratory system organs (lung and trachea), with 1 pool of organs for each sampled bird; and
- 5 pools of nervous system organs (cerebrum and cerebellum), with 1 organ pool for each sampled bird.

The pool must only consist of swabs from birds of the same species.

When there are not enough birds to form a pool, as defined above, take samples from all existing birds, without mixing samples from different species.

Samples sent for virus diagnosis should be kept refrigerated (2 to 8°C) for up to 96 hours (considering the travel time to the laboratory) or frozen at -80°C, or at lower temperatures, if there is a need to store them for longer periods of time. It is not recommended that swabs and organs be kept at -20°C (regular/household freezer).

Swabs with plastic sticks are recommended, in the following order of performance: flocked nylon, polyurethane, unflocked polyester or rayon. Natural cotton swabs and swabs with wooden sticks may not be used, since they can interfere with the performance of laboratory tests and they will be discarded.

Means of conservation/shipping:

- Minimum Essential Medium (MEM), BHI (Brain Heart Infusion) Broth, or TPB (Tryptose Phosphate Buffered) Broth, containing antibiotics and formulated according to the [Manual for Collecting, Storing and Shipping Samples \(PNSA\)](#);
- Universal Transport Medium (UTM) or Viral Transport Medium (VTM).

For further details, see the following documents: [Manual for Collecting, Storing, and Shipping Samples \(PNSA\) – 1st Edition – 2020](#).

OFFICIAL LABORATORY

The Federal Laboratory for Agricultural Defense in Campinas – LFDA-SP is the official laboratory for diagnosing samples of probable cases of RNS.

APPLICABLE MEASURES

Suspected cases found at poultry meatpacking plants: as established in [Official Notice - Joint Circular Letter No. 3/2021/DSA/DIPOA/SDA/MAPA](#).

Investigation of probable cases of RNS: collection of samples for laboratory diagnosis, isolation of the lot of animals (epidemiological unit), interdiction (temporary closing) of the epidemiological unit, tracking of all incoming and outgoing people and materials, investigation of epidemiological links. Depending on the evaluation and approval of the SVO, the lot may be immediately culled after the collection of samples for diagnosis, as a preventive measure for avoiding possible dissemination of the agent.

Outbreaks of ND (commercial production poultry) and virulent APMV-1 (birds not for commercial production, except wildlife): elimination of the susceptible birds in the epidemiological unit; destruction of carcasses and all products and byproducts, as well as production system waste; disinfection; fallowing, application of biosafety measures; and surveillance around the outbreak. For commercial poultry production farms, an animal health emergency is declared and the measures described in the [AI and ND Contingency Plan apply](#).

Outbreaks of virulent APMV-1 **in birds not for commercial production**, except wildlife: elimination of the susceptible birds in the epidemiological unit, destruction of carcasses and all products and byproducts, as well as production system waste, disinfection, fallowing, and other measures at the discretion of the official veterinary service, considering the risk of transmission to commercial production poultry.

Outbreaks of virulent APMV-1 or PPMV-1 in wildlife birds: epidemiological surveillance in the area around the outbreak (3km) and intensification of biosafety measures in commercial production poultry farms. Measures do not apply to outbreaks located in an urban zone.

Emergency measures do not apply to **non-virulent APMV-1** outbreaks, regardless of the poultry population affected. Depending on the situation, other measures, such as suspending transit until there are no clinical signs, may be applied at the discretion of the official veterinary service.

CONCLUDING THE INVESTIGATION

In any suspected cases of RNS that have been ruled out, the investigation can be concluded immediately.

For probable cases of ARNS, investigation be finalized after a conclusive negative diagnosis for AI and ND.

An outbreak of NCD will only be closed after the elimination of susceptible animals in the epidemiological unit, proof of absence of viral transmission, and conclusion of surveillance procedures in health emergency zones, according to the [AI and NCD Contingency Plan](#).

APMV-1 or PPMV-1 outbreaks in birds that are not for commercial production can be finalized after two incubation periods have passed without any new cases.

NOTIFICATION TO THE WORLD ORGANIZATION FOR ANIMAL HEALTH (WOAH)

The Brazilian Delegate to the WOAH (director of the Department of Animal Health) must immediately notify the WOAH of infection by the virus causing Newcastle Disease (APMV-1, which meets the WOAH criteria of virulence in commercial production poultry). Infection by the virulent pigeon variant (PPMV-1) in commercial production poultry is considered an outbreak of ND, with immediate notification of the WOAH.

The incidence of confirmed cases of any APMV-1 or PPMV-1 in birds not for commercial production, including wild birds, does not affect the epidemiological status of ND in the country.