



# Respiratory disorders of backyard poultry – Part 1 of 2: Viral Conditions

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Respiratory disorders in backyard poultry tend to not be problems that affect single birds, but rather diseases that affect the entire flock. These disorders are commonly caused by an infectious agent. The introduction of new birds or when birds return from exhibitions may introduce respiratory infections into the flock. Other sources of infection may include wild birds, rodents and fomites.

An extensive clinical history is required. In severe cases, it might be useful to visit the holding to inspect the birds & environment and to collect diagnostic samples. The examination procedure should follow the steps outlined in Table 1.

The clinical signs associated with the most common respiratory conditions are given in Table 2. As the clinical signs are often not pathognomonic, a necropsy of dead birds or diseased birds euthanased for diagnostic purposes followed by further laboratory tests is advantageous to make an aetiological diagnosis.

STEP	COMMENTS
Inspection of bird/flock from a distance	Special regard to general condition/morbidity, behaviour, breathing, respiratory sounds, head posture
Direct inspection of the bird (dead or alive)	Special regard to eye/conjunctiva, nostrils, sinuses, surrounding skin and feathers, exudates
Palpation of nostrils	Exudates, crusts
Sinuses	Grade of filling, squeezing of exudates
Trachea	Form, weakness
Skin	Thickness, crusts
Swabs of exudate for laboratory diagnostics	Swabs from birds in different disease phases to detect primary & secondary pathogens. Microbiology: swabs from nostrils, eyes and trachea. Virology: transport in special media or buffered saline with antibiotics PCR: wet swabs without media
Endoscopy	Individual birds
Blood samples for serology	Serum for the detection of specific antibodies to pathogens.
Necropsy	Freshly dead birds or diseased birds euthanased for diagnostic purposes. Samples in 10% formalin for histopathology

Table 1: Examination procedure for poultry with respiratory disease

CONDITION	CLINICAL SIGNS
Conjunctivitis	Ocular discharge, epiphora, swollen eyelids
Rhinitis	Nasal discharge, sneezing, staining or discharge on the skin/feathers around the nares, frequent head shaking or yawning to dislodge discharge, plugged nares, open-beak breathing.
Sinusitis	Infraorbital swelling
Tracheitis and Bronchitis	Dyspnoea, change in vocalization, breathing sounds, gasping, oral discharge, open-beak breathing, extended neck, deformed and weak trachea.
Pneumonia and Air sacculitis	Dyspnoea, tachypnoea, breathing sounds, open-beak breathing

Table 2: Clinical signs associated with respiratory diseases in poultry

## INFECTIOUS BRONCHITIS

Infectious Bronchitis (IB) is a cosmopolitan, common, highly contagious, acute disease of the respiratory tract of chickens. It is caused by a coronavirus which may also affect the urogenital tract. Transmission of the virus occurs via aerosol as well as by mechanical means such as contaminated feed trucks, visiting persons etc. Chickens of all ages are susceptible to the disease. It is highly contagious and quick virus replication and shedding leads to a rapid spread of the virus within a flock. Following a short incubation period, clinical signs develop within 24-48 hours. The disease is most severe in young chicks and can be fatal. Individual birds may remain infected, intermittently excreting the virus via the nose and faeces. This may result in the disease persisting within a flock over a long period. The tenacity of the virus outside the bird is low. It is susceptible to heat, lipid solvents and disinfectants.

Infection with IBV is initiated via the respiratory tract, where the virus replicates and produces typical lesions in the epithelial cells, followed by further dissemination and replication in the epithelia of the urogenital tract. Depending on the pathogenicity and tissue tropism, this can cause nephritis and or salpingitis. In very young chicks this inflammation may cause severe damage to the oviduct and can result in hens that are unable to produce eggs. The virus also persists in the GIT and results in similar inflammation. After recovery, a long-lasting immunity protects the birds against viral challenges. The damage to the respiratory epithelium caused by IBV strains often predisposes young chickens to secondary infections.

Clinical signs:

Morbidity and mortality in flocks reduce as the birds age. The characteristic respiratory signs are gasping, sneezing, tracheal rales and nasal discharge; wet eyes and swollen sinuses can sometimes be seen. Chicks demonstrate more severe respiratory signs, which can be associated with depression and decreased feed intake. Mortality due to exhaustion or asphyxiation may reach 25%. In chickens older than 6 weeks of age, the clinical signs are less pronounced or even absent. In laying hens, the predominant clinical sign is a drop in egg production associated with a high proportion of eggs with a thin, rough and misshapen shell. The albumen may also appear watery, and the hatchability of the eggs can be reduced. The drop in egg production is acute and usually lasts up to 3 weeks. A return to the pre-infection level of egg production takes 6-8 weeks, but occasionally this is never attained.

Differential diagnoses:

IB resembles other acute respiratory diseases such as Newcastle disease (lentogenic strains), Influenza A (low pathogenic strains), infectious laryngotracheitis (slow spread, more severe signs) and infectious coryza (facial swelling). The reduced number of eggs is similar to that seen with egg drop syndrome virus, but with the latter condition, the albumen is not affected.

Laboratory diagnosis:

The history, sudden onset of illness of many birds, clinical signs and pathology identified at postmortem only allow a tentative diagnosis. Definitive diagnosis of IB is most commonly made using PCR and serology.

Treatment:

As causal treatment is not possible, intensive supportive treatment is essential. Optimizing ventilation and heat supply for young chicks is most important. Hygiene should be optimal and secondary bacterial infections controlled. Poor feed consumption may be improved by moistening the feed. Individual birds should receive fluids and be force-fed as needed. Isolation of diseased birds may prevent further viral transmission.

Prognosis:

The prognosis is usually good in backyard flocks as clinical signs reduce over time and mortality is usually low. The occurrence of hens that do not go back inlay can be a problem for some owners. Establishing a vaccination protocol will overcome these issues.

### **INFECTIOUS LARYNGOTRACHEITIS**

ILT is a cosmopolitan viral respiratory disease that occurs in mild and severe forms, mainly in chickens. ILT has also been seen in pheasants and peafowl. The course of the disease may be acute to protracted. Turkeys and ducks may become infected and shed the virus but do not usually develop clinical signs.

ILT is caused by a Herpesvirus. It is transmitted horizontally by virus-excreting birds, as well as via contaminated equipment and litter. Vertical transmission has not been proven. The virus spreads through the flock by direct or indirect contact. Viral replication is limited to the epithelium of the respiratory tract, mainly the larynx and trachea, and results in severe epithelial damage and haemorrhage.

Viraemia has not been proven. Although chickens of all ages are susceptible to the disease, the most severe and characteristic signs are seen in adult birds. Clinical signs are observed following a 6-15 day incubation period with viral shedding occurring for up to 20 weeks post-infection. After recovery, the virus persists in the ganglion of the trigeminal nerve and may cause recurring infections. In the environment, the virus is fragile and easily destroyed by most disinfectants.

Clinical signs:

With severe infections, marked inspiratory dyspnoea with painfully doleful breathing sounds and expectoration of blood-stained mucus are characteristic. Birds demonstrate a penguin-like body posture. In laying hens, there is a drastic drop in egg production. Morbidity is high with mortality reaching up to 50% caused by sudden asphyxia or protracted by exhaustion after 1-2 weeks of illness. In mild cases, clinical signs include conjunctivitis, rhinitis, sinusitis and tracheitis. Generally, birds recover in about 2 weeks.

On postmortem, gross lesions vary from clear mucus in the trachea to severe haemorrhagic and/or diphtheric changes. Sometimes fibrinous plaques are present. Pneumonia and air sacculitis as well as haemorrhagic cloacal inflammation may sometimes be observed.

Diagnosis:

Tracheal haemorrhage in severe cases makes ILT the most likely diagnosis. Milder forms are similar to IB, ND and Influenza A. The diagnosis can be confirmed by histopathology, PCR or serology.

Treatment:

There is no specific treatment; however, vaccination of an apparently healthy chicken may be an appropriate measure to prevent further spread within the flock. Providing vitamin A in the drinking water may enhance the local immune reaction. Antibiosis may be needed. Individual birds may require force-feeding and fluid therapy. In severe cases with blocked airways, an air sac breathing tube may need to be placed to allow the bird to recover.

Prognosis:

In severe cases, the prognosis is poor, and euthanasia should be considered. In mild cases, the prognosis is good for the individual as supportive care will help the bird overcome the disease. It should be borne in mind that birds, once infected, are lifelong carriers.

### **AVIAN METAPNEUMOVIRUS INFECTION**

Diseases that are caused by avian metapneumoviruses include turkey rhinotracheitis, swollen head syndrome and avian rhinotracheitis.

The primary natural hosts are turkeys and chickens of all ages. Pheasants, guinea fowl and Muscovy ducks are also susceptible to the disease, whilst geese, other ducks and pigeons appear to be refractory to the virus. Once introduced, the virus spreads rapidly within a flock as well as to neighbouring flocks. Airborne spread, vertical transmission and transmission by wild birds have been suggested but not yet proven.

The virus is sensitive to lipid solvents and most disinfectants. Infection with AMPV alone induces only mild rhinotracheitis combined with complete deciliation of the trachea.

Poor management and concurrent infections significantly enhance the clinical signs, morbidity and mortality.

Clinical signs:

In turkeys, typical clinical signs include rales, sneezing, nasal discharge, foamy conjunctivitis, head shaking, swollen infraorbital sinuses and submandibular oedema. In chickens, the infection is associated with swollen head syndrome, which is characterized by swelling of the periorbital and infraorbital sinuses and can sometimes be complicated by CNS signs such as torticollis, disorientation and opisthotonus because of secondary *E. coli* infection. Laying birds may experience up to a 70% drop in egg production associated with poor eggshell quality and peritonitis. Morbidity is usually high, whilst mortality may reach 50% in turkeys and 4% in chicks.

The main findings on postmortem in turkeys are excess watery to mucoid exudates in the turbinates and trachea. The exudate can also be purulent. The major gross lesions encountered in chickens include extensive yellow gelatinous to purulent oedema in the subcutaneous tissues of the head, neck and wattles. Similar lesions may be seen in pheasants.

Diagnosis:

Laboratory diagnosis is made by PCR or ELISA. The most suitable samples for virus detection are the ocular/nasal secretions and tissues scraped from the sinuses/turbinates in mild cases.

Treatment & Prognosis:

Antibiotics should be used as almost all cases have secondary bacterial infections. The prognosis is good for chickens as the clinical signs decrease after several days. The virus is usually eliminated from the individual bird and the entire flock over time. In turkeys, the prognosis may be poor as they develop more severe clinical signs.

### **NEWCASTLE DISEASE**

ND is caused by an avian paramyxovirus. As an epizootic disease, ND is listed by the OIE and as such, is a controlled disease in South Africa. ND is encountered worldwide and the vast majority of, if not all, birds become infected. In domestic avian species, chickens and turkeys are highly susceptible to the virus, with young chicks more susceptible than adults. Waterfowl have mainly asymptomatic infections and serve as a virus reservoir, as do many other wild birds. ND virus varies widely in the type and severity of the disease it can produce. Velogenic strains cause a highly contagious, septicaemic peracute to acute disease associated with high mortality. Mesogenic strains are moderately virulent, and lentogenic strains are mildly so.

Clinical signs:

Depending on the virus pathotype, host species, age of the host, environmental stress and co-infections, the respiratory tract may be more or less involved in the disease pattern. After infection with velogenic strains (highly pathogenic), initial signs include oedema of the conjunctiva, as well as lethargy, inappetence and ruffled feathers. As the disease progresses, birds may develop severe dyspnoea and subcutaneous inflammation of the head and neck, often with cyanotic discolouration. These signs are often associated with enteritis, neurological signs and a dramatic fall in egg production. Mesogenic strains (medium pathogenicity) usually cause acute respiratory catarrhal disease and are sometimes associated with

nervous signs. Laying birds may show a reduction in egg production. The mortality rate is low (<10%). Lentogenic strains (low pathogenicity) usually only cause signs in young birds. Clinical signs may range from mild to serious respiratory disease with coughing, gasping, sneezing and rales.

Diagnosis:

Clinicians should collect serum, and cloacal and tracheal swabs for submission to the closest state veterinarian.

### **AVIAN INFLUENZA**

Depending on their virulence, AI viruses cause different diseases. Highly Pathogenic Avian Influenza:

HPAI provokes highly lethal, systemic disease which is listed by the OIE and as such is a notifiable disease in most countries.

Clinical signs that would be highly suspicious of HPAI when seen in multiple birds:

- Sudden deaths
- Swelling of the head, eyelids, comb, wattles and hocks
- Purple discolouration of the wattles, comb and legs
- Gasping for air
- Coughing, sneezing and/or nasal discharge
- Stumbling or falling

Low Pathogenic AI causes mild to moderate respiratory disease in poultry.

At necropsy, fibrinous inflammation of the upper respiratory tract and air sacs with excess mucus in the larynx and trachea can be found. Fibrinous sinusitis is usually present, with pancreatitis, nephritis, splenic hyperplasia and catarrhal enteritis observed later in the disease course.

Diagnosis:

Clinicians should collect cloacal swabs for submission to the closest state veterinarian.

### **REFERENCES:**

1. Govender K. 2025. *Personal communication*.
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3. Smith *et al*. 2009. *Basic poultry production and management*. UP course notes.



# MULTIPLE-CHOICE QUESTIONS

## QUESTION 1

Which of the following diseases occur worldwide?

- a. Newcastle disease
- b. Infectious bronchitis
- c. Avian influenza
- d. Infectious laryngotracheitis
- e. All of the above

## QUESTION 2

Once infected with IBV, how long do clinical signs take to show?

- a. 2-3 days
- b. 5-7 days
- c. 24-48 hours
- d. 2-4 hours
- e. 36-72 hours

## QUESTION 3

Mrs. Chetty brings in a Lohmann Brown layer that she acquired at 16 weeks of age. She complains that the hens' eggs are misshapen, and the shell is rough. What is the most likely explanation for this?

- a. The hen is an Infectious Bronchitis survivor
- b. The hen is infected with ILTV
- c. Malnutrition
- d. The hen has scar tissue in the urogenital tract
- e. It is normal in some hens

## QUESTION 4

Which of the following is true?

- a. ILT affects turkeys more than chickens
- b. Waterfowl do not shed virus
- c. Pheasants are immune to ILT
- d. ILT is a peracute disease
- e. ILT affects mainly chickens

## QUESTION 5

Which of the following is false?

- a. Adding Vitamin A to drinking water can help with a bird's immunity to ILT
- b. Tracheal haemorrhage on necropsy makes ILT a likely diagnosis
- c. Some cases of ILT require air sac intubation
- d. There are no vaccines available for ILT
- e. Recovery from ILT is generally around 2 weeks

## QUESTION 6

Which of the following diseases is not caused by avian metapneumoviruses?

- a. Egg drop syndrome
- b. Turkey rhinotracheitis
- c. Swollen head syndrome
- d. Avian rhinotracheitis
- e. All of the above are caused by AMPVs

## QUESTION 7

Which of the following are resistant to AMPVs?

- a. Golden Pheasants
- b. Muscovy Ducks
- c. Indian Runner Ducks
- d. Turkeys
- e. Splash Orpington Chickens

## QUESTION 8

Which of the following statistics is correct for AMPVs?

- a. Laying birds can have an 85% drop in egg production
- b. Mortality rate in turkeys is 4%
- c. Mortality rate in chicks is 4%
- d. Morbidity rate in turkeys is 4%
- e. Morbidity rate in chicks is 4%

## QUESTION 9

Regarding Newcastle Disease: which of the following is true?

- a. It is a notifiable disease
- b. It is caused by an orthomyxovirus
- c. Waterfowl are most severely affected
- d. Melogenic strains cause the most severe disease
- e. Tracheal swabs cannot be used for virus isolation

## QUESTION 10

When should HPAI be suspected?

- a. Sudden deaths in multiple birds
- b. Purple discolouration of the wattles
- c. Dyspnoea
- d. Ataxia
- e. All of the above



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