

DISEASE

LESIONS

DIAGNOSTIC & MANAGEMENT

### Infectious Coryza (Haemophilus paragallinarum)



**Young Leghorns or broilers:** depression, runny discharge of beak, and rarely swollen faces. **Adult Leghorns or breeders:** severe swelling of sinuses under the eyes with swelling of the surrounding tissue. Runny breathing and diarrhea are possible.

### Colisepticemia of Respiratory-Origin (Escherichia coli)



Signs are not specific and vary with age and other diseases also present. Birds that survive bloodstream infections develop thickened air sacs, heart sac and white films on the liver. Lesions sometimes include pneumonia.

### Mycoplasmosis (Mycoplasma gallisepticum)



Varies from no disease signs to difficult or noisy breathing, coughing, and/or sneezing. Runny noses and frothiness around the eyes may be present. Feed efficiency and weight gains are reduced. Decreased egg production in breeders and layers.

### Aspergillosis (Aspergillus fumigatus)



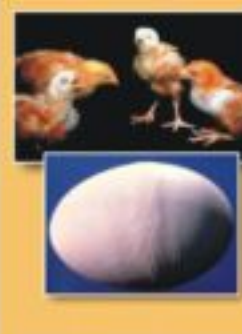
Difficult or rapid breathing, weakness (and other nervous system signs), lack of appetite, weight loss, and increased thirst. In chicks up to 6 weeks old, the lungs are often affected. In the eye form, matter at the corners of the eyes.

### Fowl Cholera (Pasteurella multocida)



Finding dead birds is often the first sign of disease. Fever, depression, appetite loss, sticky discharge from the mouth, ruffled feathers, diarrhea, and rapid breathing. If disease develops slowly, infections over the feet, hocks, or joints. Tendons and footpads are often swollen with cheesy material. There may be matter in the eyes or throat. Twisting of head and neck may be observed when brain, stars, or head bones are affected.

### Infectious Bronchitis (Coronavirus)



Young chickens with coughing, sneezing, and noisy breathing for up to 2 weeks. In layers, eggs are often misshapen, thin-shelled, and contain watery albumen. Wet eyes, gaping, face or head swelling are seen in most birds of all ages if secondary E. coli infection occurs.

### Infectious Laryngotracheitis (Herpesvirus)



Sudden onset of gasping, coughing, rattling, and stretching of the neck while breathing in. The mouth and beak may have blood that comes from the windpipe. Older strains produce few or no signs and lesions or reduction in egg production.

### Avian Pneumovirus (Metapneumovirus)



Head swelling, ocular and nasal discharge, conjunctivitis, sinusitis with dyspnea. Nervous signs such as torticollis and apathetic may be seen in less than 5% of the birds. Signs are not always present or obvious.

### Avian Influenza (Orthomyxovirus)



Signs range from a slight reduction in egg production or fertility to a severe disease with breathing, nervous system, and intestinal signs (greenish diarrhea), as well as bluish swollen feet, comb, and wattle; dark red staining of shanks and feet due to inferior bleeding; and blood stained nose or mouth discharges.

### Newcastle Disease (Paramyxovirus)



Neurotropic viruses produce breathing and nervous signs. Viscerotropic viruses cause sudden disease with breathing and intestinal signs (watery greenish diarrhea), and swelling of the tissues of the head and neck. Young chickens are affected more. Breathing signs include gasping, coughing, sneezing, and noise. Nervous signs include drooping wings, dragging legs, twisting of the head and neck, circling, depression, lack of appetite, and complete paralysis. Egg drop without recovery and eggs may be abnormal in color, shape, or surface, and have watery albumen.



Lesions often only in the sinuses under the eyes, with bits of sticky, gray, semi-fluid matter. In long term or complicated cases: sinus matter is firm and yellow. Other possible lesions: inflamed eyes, windpipe, airways, and air sacs.



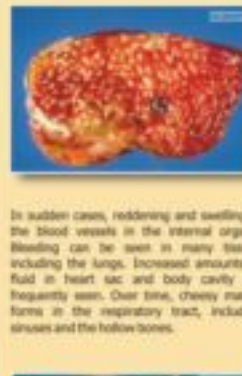
Following an infectious or non-infectious primary agent, the windpipe, lungs, and air sacs are affected (in addition to the heart sac and body cavities). Air sacs are often thickened and filled with cheesy material.



Inflamed eyes, sinuses, windpipe, and air sacs. When E. coli is a secondary invader, air sac and heart sac thicken and have a grey-white film on them. Sendar films also may cover the liver.



Lung lesions: cream-colored spots of various sizes, occasionally, growing fungus may be seen within air passages. Matter also may be found in the synovial sacs, liver, intestines, and occasionally the brain.



In sudden cases, reddening and swelling of the blood vessels in the internal organs. Bleeding can be seen in many tissues including the lungs. Increased amounts of fluid in heart sac and body cavity are frequently seen. Ovarian follicles, cheesy matter forms in the respiratory tract, including sinuses and the hollow bones.



Thick mucus in windpipe and air ways, generally without bleeding. A cheesy plug may be found in the windpipe of a young bird. Air sacs are thick and cloudy. Secondary bacterial infections in broilers produce cheesy films on air sacs, liver and heart sac. Some strains produce swollen, pale kidneys, with tubules and ureters swollen with white urates. In layers, plugging of ureters is associated with virus infection and certain dietary factors.



The entire breathing system may be affected, but lesions are most frequently observed in the voice box and windpipe. Lesions may vary from inflamed eyes and sinuses or thick mucus in the windpipe, to dry, hardened blood and mucus material being stuck inside the windpipe. Windpipe with disorganization and mucosal inflammation. Syncytial (multinucleate cell) formations are present. (Inflamed windpipe lying post-mortem and dies.)



Infection of the tracheal mucous-membrane epithelium may result in lesions of limited severity. Lungs, air sacs and other structures of the lower respiratory tract are not commonly affected. In chickens, the only significant lesions are associated with the swelling of the periorbital and infraorbital sinuses: yellow gelatinous to purulent exudate in the subcutaneous tissues of the head. In the reproductive system, the oviducts are not enlarged, typical lesions are not evident. In broiler or laying hens, variable extent of egg shell discoloration may be seen.



Lesions vary greatly depending on the virus and other infections. In mild cases, lesions are mainly in the breathing system (mainly sinuses). Inflammation with runny to very thickened mucous material may be noted. When sinuses are affected, runny nose is present. The windpipe lining can be thickened or bloody. Inflamed air sacs may occur, mainly with secondary infections (e.g., P. multocida, E. coli). Highly pathogenic viruses may result in sudden death with no lesions, but more likely, severe swelling and bleeding in internal organs and the skin (dry rough areas, bluish color, or bleeding in non-feathered skin) are seen.



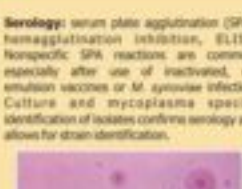
Reddening and mucus material may be seen in the air ways, with thickening or film on the air sacs. Lesions are highly variable, reflecting the variation in how different virus strains act. Tiny red spots may be seen on abdominal organ surfaces; bleeding of the stomach and intestinal lining and intestinal surfaces, with bleeding most prominent in lymphoid areas such as cecal tonsils.



Isolation of the bacteria (catalase-negative, nurse-coryne-dependent [V-factor = nicotinamide adenine dinucleotide-NAD]), in South Africa and Mexico: V-factor-independent H. paragallinarum must also be considered. Serology: agglutination, agar gel precipitation, or hemagglutination-inhibition. Molecular techniques such as restriction enzyme analysis and monoclonal antibodies.



Isolation of a pure culture of E. coli from heart blood, liver, lungs, or air sacs. Lesions in a fresh carcass indicate primary or secondary colibacillosis. Pathogenicity of isolates is established when parenteral inoculation of young chicks results in fatal septicemia or typical lesion within 3 days.



**Serology:** serum plate agglutination (SPA), hemagglutination inhibition, ELISA. Nonspecific SPA reactions are common, especially after use of inactivated, oil-emulsion vaccines or M. synoviae infection. Culture and mycoplasma species identification of isolates confirms serology and allows for strain identification.



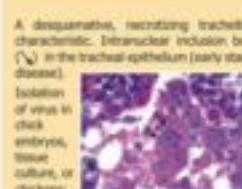
Fungus is demonstrated by culture or by microscopic examination of fresh preparations. Histopathological examination using a special fungus stain reveals granulomas containing mycelia.



Characteristic signs and lesions, and demonstration of gram-negative, bipolar organisms in blood and other tissues; definitive diagnosis requires isolation and identification of P. multocida.



Virus isolation, ELISA, hemagglutination-inhibition, or virus neutralization tests. Because the virus exhibits great antigenic variation, the serotype should be identified. Serotypes are identified with the aid of known serotype-specific chicken antisera in the virus neutralization test. A limited number of serotype-specific monoclonal antibodies (MAbs) have been developed for serotyping purposes. Reverse transcriptase polymerase chain reaction (RT-PCR) using specific oligonucleotide primers is also used.



A degenerative, necrotizing tracheitis is characteristic. Intracellular inclusion bodies (ICIB) in the tracheal epithelium (early stage of disease). Isolation of virus in chick embryos, tissue culture, or chickens, or by inoculation of the infraorbital sinus or vent of immune and susceptible birds. Field isolates and vaccine strains can be compared by restriction endonuclease analysis of viral genomes. Nucleic acid probes prepared from cloned genomic fragments of the virus can also be used for diagnosis.



Serology includes ELISA, virus neutralization, and immunofluorescence. Isolation of the virus is difficult but possible from nasal secretions or tissues from affected sinuses. Polymerase chain reaction techniques have been developed for molecular identification.



Agar gel precipitation test to detect antibodies is useful for screening where vaccination is not used. Isolation of the virus in embryonating chicken eggs results in allantoic fluid that agglutinates red blood cells. The hemagglutination is not inhibited by Newcastle disease antiserum. H5 and H7 types may become highly pathogenic. Human infections and deaths have occurred with some H5 and H7 types.



Isolation of the hemagglutinating virus identified by inhibition with Newcastle disease antiserum. Virulent and mesogenic virus isolates all injected 10-day-old chicken embryos in 2-4 days, lentogenic isolates usually in 4-6 days or not at all.

Characteristics of the pathogens and main disease impact when no secondary pathogen is involved

	Infectious Coryza	Respiratory Colisepticemia	Mycoplasmosis (MG)	Aspergillosis	Fowl Cholera	Infectious Bronchitis	Infectious Laryngotracheitis	Avian Pneumovirus	H5-path Avian Influenza	Virulent Newcastle
<b>Pathogen</b>										
<b>Resistance of pathogen in the environment</b>	Low	High	Low (>5 days)	High	Low unless in dead birds or moist soil	Moderate (36 days reported in winter)	Low	Moderate (good in cool and moist conditions)	Low	Low
<b>Transmission</b>	Horizontal	Environmental-contaminant	Horizontal and vertical	Environmental-contaminant	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
<b>Infectiousness (how contagious)</b>	Moderate to high	-	Moderate	-	High	Very high	Very high	Very high	Very high	Very high
<b>Incubation Period</b>	1 - 2 days	Less than 2 days	6 - 21 days	About 2 days	< 2 days	18 - 36 hours	6 - 12 days	5 - 7 days	About 3 days	2 - 15 days
<b>Age at Risk</b>	All ages	All ages	> 3 weeks	> 7 days	> 3 weeks	All ages	> 3 weeks	All ages	> 2 weeks	> 1 week
<b>Morbidity</b>	High	Low	High	Variable	High	Very high	Very high	Low	Very high	Very high
<b>Mortality</b>	Variable	Low	Low	Variable	High in older birds	High if < 3 weeks of age	Low to 50% depending on strain	Low	Depends on strain	Very high
<b>Egg Production Drop</b>	10 - 40%	-	1 - 25%	Hatchability issue	1 - 20%	5 - 50%	1 - 25%	Reduction	Reduction	Can reach 100%
<b>Abuse/Condemnations</b>	-	Low unless act as secondary agent	High if disease within 2 weeks of slaughter	Can be elevated (sinusitis)	-	Can be elevated depending on secondary agent	-	-	-	-



Treatment when an outbreak occurs, and general control and prevention measures

	Infectious Coryza	Respiratory Colisepticemia	Mycoplasmosis (MG)	Aspergillosis	Fowl Cholera	Infectious Bronchitis	Infectious Laryngotracheitis	Avian Pneumovirus	H5-path Avian Influenza	Virulent Newcastle
<b>Face of an outbreak</b>	Antibiotics. Relapses can occur after treatment stops.	Antibiotics	Antibiotics. Improve environment (ventilation)	Call affected birds; clean and disinfect farm, use a fungicide	Antibiotics. Improve sanitation	No treatment, but antibiotics may be used for secondary agent	No treatment	No treatment. Antibiotics may be used for secondary agent	No treatment. Antibiotics may be used for secondary agent	No treatment
<b>Control &amp; Prevention Biosecurity (traffics and pest control; sanitation) should always be a priority</b>	Vaccination. Depopulation of affected flocks followed by cleaning and disinfection	Vaccination works but because E. coli is usually a secondary agent, emphasis should be on controlling the primary agent	Vaccination. Monitoring of breeders; destroying eggs of infected breeders	Emphasis on egg and hatchery sanitation. Use only dry litter and moist-free feed. Good ventilation.	Vaccination. Call and remove sick and dead birds. Review rodent control program.	Vaccination	Vaccination of layers, if broilers are vaccinated, < 4 weeks of age.	Vaccination	Vaccination, if allowed; monitoring of flocks in at risk areas. Reportable disease.	Vaccination, if allowed; monitoring of flocks in at risk areas. Reportable disease.

\* For aspergillosis, because it is mainly a problem associated with a contaminated environment (e.g., litter), the emphasis should be on the environment, including proper sanitation (hatchery) and ventilation (green net).