

# Chlamydiosis (Avian)

*Psittacosis, Ornithosis*

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## Importance

Avian chlamydiosis is a bacterial infection that may cause severe disease in some birds and be carried asymptotically by others. Chlamydiosis can result in serious economic losses in turkey or duck operations. It is also a significant human zoonosis. Many infections spread to humans from pet birds (particularly psittacine birds), turkeys, or ducks. Untreated cases may be fatal.

## Etiology

In birds, chlamydiosis results from infection by *Chlamydophila psittaci* (order Chlamydiales, family Chlamydiaceae). This organism, previously known as *Chlamydia psittaci*, is a Gram negative, coccoid, obligate intracellular bacterium. There are at least six avian serotypes.

## Species affected

Avian chlamydiosis occurs in most birds, but is particularly common in psittacine birds, pigeons, doves, and mynah birds. This disease is sometimes seen in ducks and turkeys but only rarely in chickens.

## Geographic distribution

Avian chlamydiosis can be found worldwide. *C. psittaci* is particularly common in psittacine birds in tropical and subtropical regions. This disease is present in the United States. In a 1982 survey, *C. psittaci* was isolated from 20–50% of necropsied pet birds in California and Florida.

## Transmission

*C. psittaci* is transmitted frequently by the inhalation of infectious dust and occasionally by ingestion. Fomites can also spread chlamydiosis, and biting insects, mites, and lice may be important in mechanical transmission. Birds can be asymptomatic carriers; carriers shed *C. psittaci* intermittently, particularly when stressed. One form of the organism, the elementary body, can survive in dried feces for months.

## Incubation period

The incubation period in cage birds is usually three days to several weeks. However, in latent infections, active disease may be seen years after infection.

## Clinical signs

In turkeys, ducks, and pigeons, the clinical signs can include depression, ruffled feathers, weakness, inappetence, weight loss, nasal discharge, respiratory distress, yellowish–green or green diarrhea, and unilateral or bilateral conjunctivitis. Egg production is decreased. Nervous signs may be seen, including transient ataxia in pigeons and trembling or gait abnormalities in ducks.

In pet birds, common symptoms include anorexia, weight loss, diarrhea, yellowish droppings, sinusitis, respiratory distress, nervous signs, and conjunctivitis. Asymptomatic infections and mild infections with diarrhea or mild respiratory signs may also be seen. Residual disturbances in feathering may be apparent in survivors.

## Post mortem lesions

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Post-mortem lesions in birds can include pneumonia, airsacculitis, hepatitis, myocarditis, epicarditis, nephritis, peritonitis, and splenitis. In turkeys, an enlarged and congested spleen may be the only lesion. Wasting, vascular congestion, fibrinous airsacculitis, fibrinous pericarditis, fibrinous pneumonia with congestion of the lungs, or fibrinous perihepatitis may also be seen in turkeys. In pigeons, common lesions include hepatomegaly, airsacculitis, enteritis, and conjunctivitis with swollen and encrusted eyelids. The spleen may rupture. In cage birds, the liver may be enlarged and yellow with focal necrosis. The spleen is often enlarged, with white foci. Airsacculitis, pericarditis, and congestion of the intestinal tract can also be seen in this species.

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## Morbidity and Mortality

Morbidity and mortality vary with the host species and pathogenicity of the serotype. Young birds tend to be more susceptible than older birds. In turkeys, serovar D strains cause 50–80% morbidity and 10–30% mortality. In broiler turkeys, up to 80% of infections with this serovar may be fatal. Other serovars in turkeys usually result in 5–20% morbidity, with mortality under 50%. In ducks, morbidity may be up to 80% and mortality 0–40%. Concurrent infections or stress increase the severity of the disease.

Antibiotics are effective in treating the symptoms of chlamydiosis, but do not always eliminate infections in birds.

## Diagnosis

### Clinical

Chlamydiosis can be difficult to diagnose; however, it should be considered in a bird that is lethargic and has non-specific signs of illness. A high index of suspicion should be maintained in recently purchased pet birds.

### Differential diagnosis

In turkeys, the differential diagnosis includes *influenza*, aspergillosis, fowl cholera, and *Mycoplasma gallisepticum* infections. In cage birds, infections with herpesviruses, paramyxovirus, *influenza*, and the Enterobacteriaceae should be considered. Samples from all birds should be cultured for *Salmonella*, *Pasteurella*, *Mycoplasma*, and other bacteria and viruses.

### Laboratory tests

Chlamydiosis is usually diagnosed by isolating *C. psittaci* from affected birds. *C. psittaci* can be isolated in embryonated eggs, laboratory animals, or cell cultures of buffalo green monkey (BGM), African green monkey (Vero), McCoy, or L cells. The organisms can be identified by direct immunofluorescence or other staining techniques. A single negative culture may be misleading, as carrier birds may shed *C. psittaci* only intermittently. Treatment with antibiotics during the 2 to 3 weeks before testing may also lead to false negatives.

Chlamydiosis can also be diagnosed by demonstrating *C. psittaci* in tissues, feces, or exudates by histochemical or immunohistochemical staining. Antigen capture enzyme-linked immunosorbent assays (ELISAs) are also used, but may lack sensitivity or cross-react with other Gram negative bacteria. Polymerase chain reaction (PCR) and polymerase chain reaction/ restriction fragment length polymorphism (PCR-RFLP) assays have been described.

Serology is occasionally helpful. At least a four-fold rise in titer should be seen in paired samples. Complement fixation is the standard test. Other assays include ELISA,

latex agglutination (LA), elementary body agglutination (EBA), micro-immunofluorescence (MIFT), and agar gel immunodiffusion tests. The EBA test detects IgM only and can be used to diagnose current infections.

### Samples to collect

Chlamydiosis is a zoonotic disease; samples should be collected and handled with all appropriate precautions.

In live birds, pharyngeal and nasal swabs should be taken. Feces, cloacal swabs, conjunctival scrapings, and peritoneal exudate may also be submitted. Post-mortem samples from acute cases should include whole blood and samples of ocular exudates, nasal exudates, and the fibrinous or inflammatory exudates around organs. Tissue samples should also be collected from the lung, kidney, spleen, liver, and pericardium. If diarrhea is present, the colon contents or feces should be cultured. Samples for bacterial isolation must be collected aseptically and placed in sucrose/ phosphate/ glutamate (SPG) medium for transport. Serum may also be collected for serology. To prevent human infections, samples should be wrapped securely and shipped in conformation with all biohazard regulations.

### Recommended actions if chlamydiosis is suspected

#### Notification of authorities

Chlamydiosis is a reportable disease. State authorities should be consulted for more specific information. Federal: Area Veterinarians in Charge (AVICS) [http://www.aphis.usda.gov/vs/area\\_offices.htm](http://www.aphis.usda.gov/vs/area_offices.htm)

State vets: <http://www.aphis.usda.gov/vs/sregs/official.html>

### Quarantine and Disinfection

*C. psittaci* is a contagious disease; birds must be quarantined during treatment. While a bird is being treated, the premises should be cleaned and disinfected frequently to eliminate infectious dust. The circulation of feathers and dust should also be minimized. When handling infected birds or cleaning cages, handlers should wear protective clothing, gloves, a paper surgical cap, and a respirator with at least a N95 rating.

Dead birds should be immersed in disinfectant solutions to prevent infectious dust from spreading in the air. Carcasses must be wet with detergent and water or disinfectant during necropsy. Potentially infectious material, including carcasses, should be examined in a laminar flow hood or while wearing the proper protective equipment.

*C. psittaci* is susceptible to quaternary ammonium compounds, chlorophenols, iodophore disinfectants, formaldehyde, 80% isopropyl alcohol, or a 1:100 dilution of household bleach.

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## Public health

Human infections usually occur by inhalation and often develop after contact with pet birds or poultry. Human chlamydiosis varies from a mild, flu-like infection with a fever, shivering, headaches, anorexia, sore throat, and photophobia to a serious atypical pneumonia with a dry cough and dyspnea. More rarely, a severe systemic illness with endocarditis, myocarditis, and renal complications may develop. Encephalitis, meningitis, and myelitis have also been seen. Treated cases are rarely fatal.

## For More Information

World Organization for Animal Health (OIE)

<http://www.oie.int>

OIE Manual of Standards

[http://www.oie.int/eng/normes/mmanual/a\\_summry.htm](http://www.oie.int/eng/normes/mmanual/a_summry.htm)

OIE International Animal Health Code

[http://www.oie.int/eng/normes/mcode/A\\_summry.htm](http://www.oie.int/eng/normes/mcode/A_summry.htm)

MSDS – *Chlamydia psittaci* at Canadian Laboratory Centre for Disease Control

<http://www.hc-sc.gc.ca/pphb-dgsp/msds-ftss/msds31e.html>

“Material Safety Data Sheet –Chlamydia psittaci.” January 2001 *Canadian Laboratory Centre for Disease Control*. 1 November 2001 <<http://www.hc-sc.gc.ca/pphb-dgsp/msds-ftss/msds31e.html>>.

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