

Psittacosis

*Avian Chlamydiosis,
Ornithosis, Parrot Fever*

Last Updated: Jan. 2004

Etiology

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

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

Among birds, *C. psittaci* is transmitted frequently by 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.

Humans usually become infected after inhaling contaminated dust from feathers or bird droppings. Direct contact with infected birds and bites can also spread the disease. Person-to-person transmission is rare but can occur by aerosol or venereal spread.

Disinfection

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

Infections in Humans

Incubation Period

The incubation period in humans is 1 to 4 weeks; most infections become symptomatic after 10 days.

Clinical Signs

Psittacosis can be acute or insidious in onset. The disease varies from a mild, flu-like infection with a fever, chills, headaches, anorexia, malaise, sore throat and photophobia to a serious atypical pneumonia with dyspnea. There may be a dry cough, which sometimes becomes mucopurulent. In uncomplicated infections, the fever lasts for approximately 2 to 3 weeks then resolves. More rarely, a severe systemic illness with endocarditis, myocarditis and renal complications can develop. Hepatitis and neurologic complications including encephalitis, meningitis and myelitis have also been seen.

Communicability

Person-to-person transmission is rare; the agent is occasionally spread in aerosols during paroxysmal coughing. Venereal transmission has also been reported.

Diagnostic Tests

Psittacosis can be diagnosed by isolation of *C. psittaci* or by serology. *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. Iodine staining of inclusion bodies or immunofluorescence can differentiate *C. psittaci* from *C. trachomatis*. DNA restriction endonuclease analysis can also distinguish these two organisms in tissue samples. Serologic tests include complement fixation or immunofluorescent tests; individuals treated with antibiotics may not develop antibodies. A presumptive diagnosis is sometimes made, based on exposure to birds and clinical signs.



**Institute for International
Cooperation in Animal Biologics**
An OIE Collaborating Center
Iowa State University
College of Veterinary Medicine



IOWA STATE UNIVERSITY®

**Center for Food
Security and Public Health**
College of Veterinary Medicine
Iowa State University
Ames, Iowa 50011
Phone: (515) 294-7189
FAX: (515) 294-8259
E-mail: cfsph@iastate.edu
Web: <http://www.cfsph.iastate.edu>

Treatment and Vaccination

Antibiotics (tetracycline) combined with supportive care are effective. There is no vaccine.

Morbidity and Mortality

Currently, fewer than 50 confirmed cases are reported annually in the United States; additional undiagnosed or unreported cases are thought to occur. The disease may be mild or severe, depending on age and health of the individual and the extent of pneumonia; more serious disease is usually seen in the elderly and those who are debilitated. The mortality rate can be as high as 30% in severe infections left untreated; treated cases are rarely fatal. Convalescence may be slow after severe disease.

Infections in Animals

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.

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.

Communicability

Infected birds can shed *C. psittaci* for weeks to months. Shedding may be continuous or intermittent.

Diagnostic Tests

In live birds, avian chlamydiosis is usually diagnosed by isolating *C. psittaci* from pharyngeal or nasal swabs, feces, cloacal swabs, conjunctival scrapings or peritoneal exudate. At necropsy, the organism may be isolated from blood, ocular or nasal exudates, inflammatory exudates, or tissue sam-

ples from the lung, kidney, spleen, liver, and pericardium. If diarrhea is present, organisms may be found in the colonic contents or feces.

C. psittaci is 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.

Avian 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.

Treatment and Vaccination

Antibiotics are effective in treating the symptoms of avian chlamydiosis, but some birds may remain infected.

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.

Post-Mortem Lesions [Click to view images](#)

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 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.

Internet Resources

Centers for Disease Control and Prevention (CDC)

http://www.cdc.gov/ncidod/dbmd/diseaseinfo/psittacosis_t.htm

Material Safety Data Sheets–

Canadian Laboratory Center for Disease Control
<http://www.hc-sc.gc.ca/pphb-dgsp/msds-ftss/index.html#menu>

Medical Microbiology

<http://www.gsbs.utmb.edu/microbook>

Office International des Epizooties (OIE)

Manual of Standards for Diagnostic Tests and Vaccines

http://www.oie.int/eng/normes/mmanual/a_summry.htm

The Merck Manual

<http://www.merck.com/pubs/mmanual/>

The Merck Veterinary Manual

<http://www.merckvetmanual.com/mvm/index.jsp>

“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>>.

National Association of State Public Health Veterinarians. Compendium of Measures To Control *Chlamydia psittaci* (formerly *Chlamydia psittaci*) Infection Among Humans (Psittacosis) and Pet Birds, 2004. AVMA Online. <<http://www.avma.org>>.

“Psittacosis.” *Centers for Disease Control and Prevention (CDC)*, July 2002. 14 Nov 2002 <http://www.cdc.gov/ncidod/dbmd/diseaseinfo/psittacosis_t.htm>.

“Psittacosis.” In *The Merck Manual*, 17th ed. Edited by M.H. Beers and R. Berkow. Whitehouse Station, NJ: Merck and Co., 1999. 14 Nov 2002 <<http://www.merck.com/pubs/mmanual/section6/chapter73/73j.htm>>.

Vanrompay D., R. Ducatelle, and F. Haesebrouck. “*Chlamydia psittaci* infections: a review with emphasis on avian chlamydiosis.” *Veterinary Microbiology* 45, no. 2–3 (1995): 93–119.

References

“Avian Chlamydiosis.” In *Whiteman and Bickford’s Avian Disease Manual*, 4th ed. Edited by B.R. Charlton et al. Kennett Square, Pa: American Association of Avian Pathologists, 1996, pp. 68–71.

“Avian Chlamydiosis.” In *Manual of Standards for Diagnostic Tests and Vaccines*. Paris: Office International des Epizooties, 2000, pp. 679–90.

Becker, Y. “*Chlamydia*.” In *Medical Microbiology*. 4th ed. Edited by Samuel Baron. New York; Churchill Livingstone, 1996. 14 Nov 2002 <<http://www.gsbs.utmb.edu/microbook/ch039.htm>>.

“Chlamydiosis.” In *The Merck Veterinary Manual*, 8th ed. Edited by S.E. Aiello and A. Mays. Whitehouse Station, NJ: Merck and Co., 1998, pp. 1300–01.

“Chlamydiosis.” In *Poultry Diseases*, 4th ed. Edited by F.T.W. Jordan and M. Pattison. London: W.B. Saunders, 1996, pp. 94–99.

Gerlach, H. “*Chlamydia*.” In *Clinical Avian Medicine and Surgery*. Edited by G.J. Harrison and L. Harrison. Philadelphia: W.B. Saunders, 1986, pp. 457–63.

Johnston W.B., M. Eidson, K.A. Smith, and M.G. Stobierski. “Compendium of chlamydiosis (psittacosis) control, 1999.” Psittacosis Compendium Committee, National Association of State Public Health Veterinarians. *Journal of the American Veterinary Medical Association* 214, no. 5 (1999): 640–6.