

# Psittacosis

<b>Signs and Symptoms</b>	<ul style="list-style-type: none"> <li>• Ranges from asymptomatic infections to severe pneumonia</li> <li>• Typically fever, chills, headache, muscle aches, and nonproductive cough</li> <li>• May have enlarged spleen or nonspecific rash; rarely endocarditis, myocarditis, hepatitis, or encephalitis</li> </ul>	
<b>Incubation</b>	Typically 5-14 days, range up to 4 weeks; 7-20 days in person-to-person transmission	
<b>Case classification</b>	<b>Clinical criteria:</b> fever, chills, headache, cough, and myalgia	
	<table border="1"> <tr> <td><b>Confirmed:</b> clinically consistent with either isolation of <i>Chlamydia psittaci</i> OR fourfold increase in titers</td> <td><b>Probable:</b> Clinically consistent with either single IgM <math>\geq</math> 32 OR PCR positive</td> </tr> </table>	<b>Confirmed:</b> clinically consistent with either isolation of <i>Chlamydia psittaci</i> OR fourfold increase in titers
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<b>Differential diagnosis</b>	Extensive; including allergic alveolitis, bacterial or viral pneumonia, legionellosis, influenza, mycoplasma pneumonia, Q fever, tuberculosis, tularemia, typhoid fever	
<b>Treatment</b>	Tetracyclines continued for at least 10-14 days after fever abates	
<b>Duration</b>	Variable	
<b>Exposure</b>	Inhaling aerosolized bird feces or respiratory fluids, direct oral contact with bird, or handling of an infected birds' plumage and tissues. Two person-to-person outbreaks have been reported involving severe respiratory disease.	
<b>Laboratory testing</b>	<p>Local Health Jurisdiction (LHJ) and Communicable Disease Epidemiology (CDE) can arrange testing at CDC</p> <ul style="list-style-type: none"> <li>• <b>Best specimens:</b> serum (acute and <math>\geq</math> 2 weeks later), NP and/or OP swabs, BAL or sputum</li> <li>• Keep specimens <b>cold</b>, store swabs in universal transport medium. Ship with Serology form: <a href="https://www.medialab.com/dv/dl.aspx?d=1615463&amp;dh=e4b87&amp;u=69790&amp;uh=0e2a1">https://www.medialab.com/dv/dl.aspx?d=1615463&amp;dh=e4b87&amp;u=69790&amp;uh=0e2a1</a></li> </ul>	
<b>Public health actions</b>	<p>LHJ can consult with CDE 877-539-4344 or 206-418-5500 for investigations or for testing</p> <ul style="list-style-type: none"> <li>• Identify potential exposures and those sharing the exposures</li> <li>• Identify potential outbreaks from common sources</li> <li>• Educate persons sharing exposure to monitor for symptoms of psittacosis</li> <li>• Recommend protective clothing when handling infected birds or cleaning their cages</li> <li>• For control measures in birds see: <a href="http://nasphv.org/documentsCompendiaPsittacosis.html">http://nasphv.org/documentsCompendiaPsittacosis.html</a></li> </ul> <p><i>Infection Control:</i> standard and droplet precautions, with addition of enhanced protection for severely ill patients with atypical pneumonia</p>	

# Psittacosis

## 1. DISEASE REPORTING

### A. Purpose of Reporting and Surveillance

1. To identify sources of transmission (e.g., a pet shop or poultry processing plant) and to prevent further transmission from such sources.
2. When the source is a risk for only a few individuals (e.g., a pet bird with avian chlamydiosis), to inform those individuals how they can reduce their risk of exposure.

### B. Legal Reporting Requirements

1. Health care providers and Health care facilities: notifiable to **local health jurisdiction** within 24 hours
2. Laboratories: notifiable to **local health jurisdiction** within 24 hours; submission on request – specimen associated with positive result, excluding IgG, within 2 business days.
3. Veterinarians: Suspected human cases notifiable within 24 hours to the local health jurisdiction; avian chlamydiosis cases notifiable to Washington State Department of Agriculture <https://app.leg.wa.gov/WAC/default.aspx?cite=16-70>
4. Local health jurisdictions: notifiable to Department of Health (DOH) Communicable Disease Epidemiology (CDE) within 7 days of case investigation completion or summary information required within 21 days

### C. Local Health Jurisdiction Investigation Responsibilities

1. Facilitate the transport of specimens to Washington State Public Health Laboratories (PHL) for confirmatory testing.
2. Identify source of infection in humans and birds
3. Identify potentially exposed persons and educate them about signs and symptoms of disease to facilitate early diagnosis.
4. Report all *probable* and *confirmed* cases to CDE (see definitions below). Complete the psittacosis report form <https://www.doh.wa.gov/Portals/1/Documents/5100/210-042-ReportForm-Psitt.pdf> and enter the data in the Washington Disease Reporting System (WDRS.)

## 2. THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

*Chlamydia* (formerly called *Chlamydophila*) *psittaci* is an obligate intracellular bacterium.

### B. Description of Illness

Psittacosis (also known in humans as ornithosis and parrot fever) usually presents as an acute febrile respiratory illness. However, the severity of the disease ranges from asymptomatic infections to severe pneumonia. Symptoms commonly include fever, chills, headache, muscle aches, and nonproductive cough that can be associated with shortness of

breath and chest pain. An enlarged spleen and nonspecific rash can also occur. Rarely, *C. psittaci* can affect organ systems other than the respiratory tract and result in complications such as endocarditis, myocarditis, hepatitis, and encephalitis. Death from psittacosis is rare.

### C. Psittacosis in Washington State

Department of Health receives 0 to 4 reports of psittacosis per year. In the United State, illness is commonly associated with indoor exposure to pet birds and less commonly farm or wild birds. Risk groups include bird owners, pet shop employees, poultry farmers, veterinarians, and workers in abattoirs and processing plants. Outbreaks of psittacosis in poultry processing plants have been reported in the United States.

### D. Reservoirs

The primary reservoir is psittacine birds (parrot family) such as parakeets, parrots, lovebirds and macaws but chlamydial organisms have been isolated from more than 400 species of birds including poultry, pigeons, canaries, finches, and sea birds. Birds that appear to be healthy can be carriers and shed the infectious agent intermittently for weeks to months, particularly when subjected to the stress of crowding or shipping. Co-infection in birds with *C. psittaci* and an avian adenovirus may increase risk of shedding.

### E. Modes of Transmission

Bird-to-human transmission occurs when a person inhales *C. psittaci* organisms that have been aerosolized from dried feces or respiratory tract secretions of infected birds, or from handling their plumage and tissues. Person-to-person transmission (associated with paroxysmal coughing and severe disease) has been described in two outbreaks, one in Scotland in 2012, and one in Sweden in 2013. Both index patients in these outbreaks were hospitalized with severe disease. Healthcare workers and close contacts of the index patients represented the majority of these rare secondary cases.

### F. Incubation Period

The incubation period is generally 5 to 14 days but can be as long as 4 weeks. In the documented human-to-human cases, incubation ranged from 7 to 20 days.

### G. Period of Communicability

Asymptomatic birds can be carriers for life, resulting in intermittent shedding of the organism. Shedding may be precipitated by any stress exerted on the bird (e.g., transport, change of feed, a new cage mate, temperature changes). Such stress can also lead to the onset of overt disease (avian chlamydiosis) in the bird.

It is unclear how long the period of communicability for person-to-person transmission is, due to few documented cases.

### H. Treatment

Tetracyclines are the drugs of choice for adults. Remission of symptoms usually is evident within 48 to 72 hours. However, relapse can occur, and treatment must continue for at least 10 to 14 days after fever abates.

### 3. CASE DEFINITIONS

#### A. Clinical Description

Psittacosis is an illness characterized by fever, chills, headache, myalgia, and a non-productive cough with pneumonia often evident on chest x-ray. An enlarged spleen and nonspecific rash can also occur. Severe pneumonia requiring intensive-care support, endocarditis, hepatitis, and neurologic complications occasionally occur.

#### B. Laboratory Criteria for Diagnosis

1. Isolation of *Chlamydia psittaci* from respiratory secretions (e.g., sputum, pleural fluid, or tissue) or blood, or
2. Fourfold or greater increase in antibody (immunoglobulin G [IgG]) against *C. psittaci* by complement fixation (CF) or microimmunofluorescence (MIF) between paired acute- and convalescent-phase serum specimens obtained at least 2-4 weeks apart, or
3. Supportive serology (e.g. *C. psittaci* antibody titer [immunoglobulin M (IgM)] of greater than or equal to 32 in at least one serum specimen obtained after onset of symptoms), or
4. Detection of *C. psittaci* DNA in a respiratory specimen (e.g. sputum, pleural fluid or tissue) via amplification of a specific target by polymerase chain reaction (PCR) assay

#### C. Case Classification (2010)

*Probable:* An illness characterized by fever, chills, headache, cough, and myalgia that has either:

- Supportive serology (e.g. *C. psittaci* antibody titer [immunoglobulin M, (IgM)] of greater than or equal to 32 in at least one serum specimen obtained after onset of symptoms), OR
- Detection of *C. psittaci* DNA in a respiratory specimen (e.g. sputum, pleural fluid or tissue) via amplification of a specific target by polymerase chain reaction (PCR) assay.

*Confirmed:* An illness characterized by fever, chills, headache, cough and myalgia, and laboratory confirmed by either:

- Isolation of *Chlamydia psittaci* from respiratory specimens (e.g., sputum, pleural fluid, or tissue), or blood, OR
- Fourfold or greater increase in antibody (immunoglobulin G [IgG]) against *C. psittaci* by complement fixation (CF) or microimmunofluorescence (MIF) between paired acute- and convalescent-phase serum specimens obtained at least 2-4 weeks apart.

#### D. Comment

Although MIF has shown greater specificity than CF to *C. psittaci*, positive serologic findings by both techniques may occur as a result of infection with species in the genus *Chlamydia* and should be interpreted with caution. To increase the reliability of test

results, acute- and convalescent-phase serum specimens should be analyzed at the same time in the same laboratory.

## 4. DIAGNOSIS AND LABORATORY SERVICES

### A. Laboratory Diagnosis

Psittacosis is most commonly diagnosed by serologic testing. Antibodies to *Chlamydia psittaci* can be detected using microimmunofluorescence (MIF), complement fixation (CF), and immunofluorescent antibody tests (IFA). MIF is the most sensitive and specific of these tests, however, there is still some cross-reactivity with other chlamydial species, such as *Chlamydia pneumoniae*, *C. trachomatis* and *C. felis*. Thus, all tests are imperfect.

*C. psittaci* can also be isolated from sputum, pleural fluid, and clotted blood, but culture is rarely done due to technical difficulties and safety concerns in the laboratory.

Polymerase chain reaction (PCR) assays can detect *C. psittaci* nucleic acid in clinical specimens and also distinguish *C. psittaci* from other chlamydial species.

**Confirmatory laboratory testing should be performed by a reference laboratory such as the Centers for Disease Control and Prevention (CDC).**

### B. Tests Available at Washington State Public Health Laboratories (PHL)

PHL does not perform testing for psittacosis but will forward specimens to the CDC. Contact Communicable Disease Epidemiology (CDE) for approval prior to submitting specimens.

Note that PHL require all clinical specimens have two patient identifiers, a name **and** a second identifier (e.g., date of birth) both on the specimen label and on the submission form. Due to laboratory accreditation standards, specimens will be rejected for testing if not properly identified. Also include specimen source and collection date.

### C. Specimen Collection

Serum: Collect acute serum at the first clinical encounter and convalescent serum at least 2 weeks after the first specimen. A third serum sample collected 4 to 6 weeks after the acute sample might be necessary to confirm the diagnosis since treatment with antibiotics can delay or diminish the antibody response. For best results, acute and convalescent sera should be tested simultaneously at the same laboratory.

Acute and convalescent sera should be refrigerated and transported cold. Specimens should be submitted with a completed DOH PHL Serology form available at:

<https://www.medialab.com/dv/dl.aspx?d=1615463&dh=e4b87&u=69790&uh=0e2a1>

Culture or PCR: Respiratory swabs (NP and/or OP) or specimens (e.g. sputum, pleural fluid, or tissue) or whole blood specimens can be submitted upon consultation with CDE. Specimens should be collected prior to starting antibiotics.

## 5. ROUTINE CASE INVESTIGATION

### A. Evaluate the Diagnosis

Review the clinical presentation and laboratory results. **Confirmatory laboratory testing should be performed by a reference laboratory such as Centers for Disease**

**Control and Prevention (CDC).** Facilitate submission of laboratory specimens to Washington State Public Health Laboratories for confirmation at CDC.

### **B. Identify Source of Infection**

Review clinical presentation and history to determine appropriate potential exposures. Investigate possible exposures during the period 5 days to 4 weeks (particularly 5–14 days) before onset, including a history of:

1. Contact with captive or wild birds, and their feces, feathers, or tissues
2. Visit to a facility keeping birds in captivity (e.g., pet shop, laboratory, farm) (even without direct bird contact), and
3. Work in a laboratory or healthcare setting.

### **C. Infection Control Recommendations/Case Management**

Standard infection-control practices and droplet transmission precautions are generally sufficient for the medical management of humans with psittacosis. However, enhanced protection may be needed when caring for severely ill patients with atypical pneumonia, for example, using airway protection with facemasks and treating the cases in isolation in order to prevent nosocomial transmission from patients hospitalized with psittacosis. Staff treating a severely ill psittacosis patient should be informed of the symptoms so they can self-monitor.

Work and child care restrictions are not needed.

### **D. Identify Potentially Exposed Persons**

Identify and contact persons who might have been exposed to the sources of infection, and educate them about the signs and symptoms of psittacosis (see Section 6A). Additionally, for severe or hospitalized cases, notify any healthcare workers who treated the patient, as well as close contacts of the patient who might have been exposed. Any persons who are ill or become ill should seek medical attention and inform their healthcare provider of possible exposure to facilitate proper diagnosis and therapy.

### **E. Environmental Evaluation**

Notify local environmental health program of human cases. An investigation into the source of the bird infection, and resulting action (culling, quarantine, and/or treatment) is required. This response should be in accordance with the “Compendium of Measures To Control *Chlamydia psittaci* Infection Among Humans (Psittacosis) and Pet Birds (Avian Chlamydiosis), 2017” found at:

<http://www.nasphv.org/Documents/PsittacosisCompendium.pdf>, see section 6 for additional details. Ensure that vendors of psittacines birds comply with [WAC 246-100-201](#) (“Psittacosis—Measures to prevent human disease”).

Notify Washington Department of Agriculture for avian cases.

## **6. MANAGING SPECIAL SITUATIONS**

### **A. *C. psittaci* infection in birds (Avian Chlamydiosis)**

- Avian chlamydiosis in birds is reportable to the Washington State Department of

- Agriculture (WSDA). WSDA will notify DOH of any positive laboratory results for *C. psittaci*.
- Birds should be classified as a confirmed or suspected case of avian chlamydiosis, using the case definition in the compendium: <http://www.nasphv.org/Documents/PsittacosisCompendium.pdf>.
  - An investigation should be initiated if a bird is identified with confirmed or suspected avian chlamydiosis and the bird was procured from a bird vendor within 60 days of illness onset.
  - Public health investigators should work with an avian veterinarian and WSDA to identify sick and exposed birds, and from this, determine human exposures. Exposed persons should be instructed to monitor themselves for symptoms of psittacosis. If symptoms occur, obtain NP and OP swabs for PCR testing prior to administration of antibiotics.
  - In conjunction with WSDA, actions need to be taken to prevent further spread from the infected bird, including culling or quarantine, treatment, and environmental disinfection.
  - If the confirmed or suspected bird originated from a facility with bird movement (e.g. vendor school, or boarding facility), environmental specimens should be collected to assess environmental contamination. This will inform risk assessments for exposed people and in developing a plan for remediation (see Section 7.).
    - Swabs of the environment should be collected (dry swabs for PCR testing, or swabs in Stuart’s media for culture) and shipped to the University of Georgia Infectious Diseases Laboratory for testing: <http://vet.uga.edu/idl/>. Results of environmental testing can assist,
  - Environmental remediation generally involves cleaning the facility, quarantine of birds, improving record-keeping, and staff training and education, all in coordination with the facility’s veterinarian.
  - Detailed instructions for follow-up can be found in the current “Compendium of Measures to Control *Chlamydia psittaci* Infection among Humans (Psittacosis) and Pet Birds (Avian Chlamydiosis), 2017” available at <http://www.nasphv.org/Documents/PsittacosisCompendium.pdf>.
  - For additional regulations regarding the prevention of psittacosis see WAC 246-100-201: Birds—Measures to Prevent Psittacosis available at <https://app.leg.wa.gov/WAC/default.aspx?cite=246-100-201>.

## 7. ROUTINE PREVENTION

### A. Vaccine Recommendations

There is no vaccine for psittacosis.

### B. Prevention Recommendations

The following recommendations are taken from “Compendium of Measures to Control *Chlamydia psittaci* Infection among Humans (Psittacosis) and Pet Birds (Avian



Chlamydiosis), 2017” available at <http://www.nasphv.org/Documents/PsittacosisCompendium.pdf> and [WAC 246-100-201](http://www.wa.gov/wa-law-books/wa-law-books.html) (“Psittacosis—Measures to prevent human disease”).

1. **Educate persons at risk.** Inform all persons in contact with birds or bird-contaminated materials about potential health risks. Written information about psittacosis and avian chlamydiosis must be provided to all buyers and recipients of psittacines birds. Bird caretakers with respiratory or influenza-like symptoms should seek medical attention and inform their health care provider about bird contact.
2. **Protect persons at risk.** When handling infected birds or cleaning their cages, caretakers should wear protective clothing, such as a smock or coveralls, gloves, eyewear, designated footwear or shoe covers, and a disposable surgical cap. A disposable particulate respirator (such as an N95) should be worn. Minimize the circulation of feathers and dust by wet mopping the floor frequently with disinfectants and preventing air currents and drafts within the area. Reduce contamination from dust by spraying the floor with a disinfectant or water before sweeping it. A vacuum cleaner or pressure washer may aerosolize infectious particles and should be used with caution. Frequently remove waste material from the cage (after moistening the material), and burn or double-bag the waste for disposal. There is no documented transmission of *C. psittaci* via ventilation systems from pet bird aviaries or pet stores to humans, nor are there any studies specific for *C. psittaci* viability in these systems. Use of a high efficiency particulate air (HEPA) filter on air system return may be an option to reduce particulate matter in the air. In addition, necropsies of potentially infected birds should be performed in a biological safety cabinet. The carcass should be moistened with detergent and water to prevent aerosolization of infectious particles during the procedure.
3. **Maintain accurate records of all bird-related transactions for at least one year to aid in identifying sources of infected birds and potentially exposed persons.** Records should include the date of purchase, species of birds purchased, individual bird identification, source of birds, certificate of veterinary inspection (if applicable), and any identified illnesses or deaths among birds. In addition, the seller should record the name, address, a customer and individual bird identification (e.g., band or microchip number).
4. **Certificate of veterinary inspection (CVI).** Psittacine birds transiting into and out of Washington State should be accompanied by a certificate of veterinary inspection and individually identified (e.g., leg banding); as regulated by WSDA.
5. **Avoid purchasing or selling birds that have signs consistent with avian chlamydiosis.** Signs are non-specific and may include lethargy, ocular or nasal discharge, diarrhea, ruffled feathers, or low body weight.
6. **Veterinary oversight.** Facilities with psittacine birds should work with an accredited veterinarian to provide regular health checks and biosecurity assessments.
7. **Avoid mixing birds from multiple sources.** To prevent epizootics (*i.e.*, disease outbreak in animals) and potential pathogen transmission to humans, additional control and prevention methods (*e.g.*, health screening, extended quarantine, and *C. psittaci* testing) are especially important when birds from multiple sources are co-mingled.



8. **Quarantine newly acquired birds and isolate ill or exposed birds.** Quarantine and isolation should include housing in a separate air space from other birds and non-caretakers. Isolate birds, including those that have been to shows, exhibitions, fairs, and other events, for at least 30 days and test before introducing them to a group. Rooms and cages where infected birds were housed should be cleaned and disinfected thoroughly after removal of infected birds. When the cage is being cleaned, transfer the bird to a clean cage. Thoroughly scrub the soiled cage with a detergent to remove all fecal debris, rinse the cage, disinfect it (most disinfectants require 5-10 minutes of contact time) and rinse the cage again to remove the disinfectant. Discard all items that cannot be adequately disinfected (e.g., wooden perches, ropes, nest material, substrate/litter).
9. **Test birds on consignment before they are to be sold or boarded (unless boarded in a separate airspace from other birds).**
10. **Screen birds with frequent public contact (e.g., bird encounters, long term care facilities, schools) routinely for anti-chlamydial antibodies and DNA or bacterial protein.** Such testing may be used to reduce potential human exposure from birds.
11. **Practice preventive husbandry.** Position cages to prevent the transfer of fecal matter, feathers, food, and other materials from one cage to another. Do not stack cages, and be sure to use solid-sided cages or barriers if cages are adjoining. Use litter that will not produce dust (e.g., newspapers). Clean all cages, food bowls, and water bowls daily. Soiled bowls should be emptied, cleaned with soap and water, rinsed, placed in a disinfectant solution, and rinsed again before reuse. Between occupancies by different birds, cages should be thoroughly scrubbed with soap and water, disinfected, and rinsed in clean running water. Exhaust ventilation should be sufficient to prevent accumulation of aerosols and prevent cross contamination of rooms.
12. **Use disinfection measures.** All surfaces should be thoroughly cleaned of organic debris before disinfection. *Chlamydia psittaci* is susceptible to most disinfectants and detergents as well as heat; however, it is resistant to acid and alkali. Examples of effective disinfectants include 1:1,000 dilution of quaternary ammonium compounds (e.g., Roccal or Zephiran); 1% Lysol; or freshly prepared 1:32 dilution of household bleach (i.e., ½ cup bleach per gallon of water).

*Note:* For additional regulations to prevent psittacosis see WAC 246-100-201: Birds—Measures to Prevent Psittacosis available at <https://app.leg.wa.gov/WAC/default.aspx?cite=246-100-201>.

## ACKNOWLEDGEMENTS

This document is a revision of the Washington State Guidelines for Notifiable Condition Reporting and Surveillance published in 2002 which were originally based on the Control of Communicable Diseases Manual (CCDM), 17<sup>th</sup> Edition; James Chin, Ed. APHA 2000. We would like to acknowledge the Oregon Department of Human Services for developing the format and select content of this document.

## UPDATES

January 2010: Updated case definition

January 2011: The Legal Reporting Requirements section has been revised to reflect the 2011 Notifiable Conditions Rule revision. Section 4 was updated to reflect current lab submission requirements and forms.

December 2013: Combined Controlling Further Spread into Section 5; updated to 2010 psittacosis compendium.

December 2014: Included additional information on documented human-to-human transmission in sections 2E-G and 5C-D. Updated information from the NASPHV Compendium on Psittacosis in Section 7.

February 2017: Front page added; general updates

January 2018: Section 6 updated to include additional information for managing avian chlamydiosis positive results in birds; Section 7 updated in accordance with the 2017 NASPHV Compendium.

December 2022: For 2023 WAC revision combined provider and facility reporting requirement, updated laboratory submission (Section 1B)

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