

PSITTACOSIS CONTROL GUIDELINES for Local Health Departments

Background

Psittacosis is the term used for human infection with *Chlamydophila psittaci* (formerly *Chlamydia psittaci*). The disease is also referred to as avian chlamydiosis, ornithosis or parrot fever and is primarily a disease of birds that incidentally affects people. Previous illness does not confer immunity on either birds or humans. Although psittacine birds like parrots and parakeets are most often affected, poultry and other non-psittacine birds can also be infected. Some strains are more likely to cause disease in birds and humans and some are less pathogenic. For more complete and up to date information, please see the most recent edition of the "Compendium of Measures to Control *Chlamydophila psittaci* (formerly *Chlamydia psittaci*) Infection Among Humans (Psittacosis) and Pet Birds" from the National Association of State Public Health Veterinarians. It can be found at <http://vdhweb/epi/dzee/otherzoonosis/psittacosis.asp> or <http://www.nasphv.org/Documents/Psittacosis.pdf>.

Source of Human Disease

Humans become infected by inhaling the agent from aerosolized fresh feces, dusts from dried bird droppings, or nasal discharges of infected birds. Transmission from person to person has been suggested, but not proven. Because birds do not always show signs of illness when they are shedding organisms, it is possible to become infected from an apparently healthy bird. Shedding may be intermittent and is exacerbated by stress from such things as shipping, crowding, chilling, or breeding. Infected sick birds excrete high concentrations of *C. psittaci* organisms in their feces, and if not properly treated, constitute the greatest hazard to other birds and to their human contacts. Pet psittacine birds in aviaries, pet shops and homes are the most likely to infect humans. Ducks, geese, and pigeons are occasionally responsible for human disease. Large outbreaks of human disease have been associated with turkey processing plants. In 1984 an outbreak in a Virginia turkey processing plant resulted in 71 cases; usually less than 2 cases per year are reported in Virginia. Mammals can also occasionally transmit chlamydial species to humans.

Human Clinical Presentation and Treatment

The onset of disease usually follows an incubation period of 5-14 days, which can be longer. Severity ranges from inapparent to systemic illness with severe pneumonia. Symptoms typically include abrupt onset of fever, chills, headache, malaise and myalgia. A nonproductive cough usually develops and can be accompanied by breathing difficulty and chest tightness. A pulse-temperature dissociation (fever without elevated pulse), enlarged spleen, and nonspecific rash are sometimes observed. *C. psittaci* can affect organ systems other than the respiratory tract and result in different symptoms depending on the organ involved. Severe illness with respiratory failure, thrombocytopenia, hepatitis and fetal death has been reported among pregnant women.

Antibiotics of the tetracycline group, continued for 10-14 days after the temperature returns to normal, are the treatment of choice. Macrolides are probably the best alternative when tetracycline is contraindicated (children < 9 years and pregnant women).

Human Case Definitions

In 1997, CDC and the Council of State and Territorial Epidemiologists established surveillance case definitions for confirmed and probable psittacosis for epidemiologic purposes (4). These definitions should not be used as the sole criteria for establishing clinical diagnoses. For surveillance purposes, a patient is considered to have a confirmed case of psittacosis if clinical illness is compatible with psittacosis and the case is laboratory confirmed by one of three methods: a) *C. psittaci* is cultured from respiratory secretions; b) antibody against *C. psittaci* is increased by fourfold or greater (to a reciprocal titer of 32 between paired acute- and convalescent-phase serum specimens collected at least 2 weeks apart) as demonstrated by complement fixation (CF) or microimmunofluorescence (MIF); or c) immunoglobulin M antibody is detected against *C. psittaci* by MIF (to a reciprocal titer of 16).

A patient is considered to have a probable case of psittacosis if clinical illness is compatible with psittacosis and a) the patient is epidemiologically linked to a confirmed human case of psittacosis or b) a single antibody titer of 32, demonstrated by CF or MIF, is present in at least one serum specimen obtained after onset of symptoms. See (<http://www.cdc.gov/epo/dphsi/casedef/psittacosiscurrent.htm>) for current definitions.

Human Diagnosis

Most diagnoses are established by using microimmunofluorescence (MIF) to test for antibodies to *C. psittaci* in paired sera. MIF is more sensitive and specific than the previously used complement fixation (CF) tests; however there is still some cross-reactivity with other chlamydia, such as *C. pneumoniae*, *C. trachomatis* and *C. felis*. Certain polymerase chain reaction (PCR) assays can be used to distinguish *C. psittaci* infection from infection with other chlamydial species. Acute-phase serum specimens should be obtained as soon as possible after onset of symptoms, and convalescent-phase serum specimens should be obtained 2 weeks after the first specimen. Because antibiotic treatment can delay or diminish the antibody response, a third serum sample might help confirm the diagnosis. All sera should be tested simultaneously at the same laboratory. The infectious agent can also be isolated from the patient's sputum, pleural fluid, or clotted blood during acute illness and before treatment with antimicrobial agents; however, culture of *C. psittaci* is performed by few laboratories because of technical difficulty and safety concerns.

Information about laboratory testing is available at the Virginia state public health laboratory, the Division of Consolidated Laboratory Services (DCLS). Only a few commercial laboratories have the capability to differentiate chlamydial species. A list of laboratories which accept human specimens to confirm *C. psittaci* infection is provided in the compendium referenced in the opening paragraph of this document. In outbreak situations, it may be possible to make special arrangements for testing at the Centers for Disease Control via consultation with the Virginia Department of Health and DCLS.

Avian Transmission, Clinical Presentation and Treatment

Transmission between birds occurs most frequently by inhalation or ingestion of nasal secretions or feces. The signs of chlamydiosis in birds vary with the species of bird, the virulence of the strain of *Chlamydia*, stresses on the bird and the route of exposure. There are no pathognomonic signs or lesions. It is a systemic disease with signs that include lethargy, ruffled feathers, anorexia, and a serous or purulent ocular and/or nasal discharge. If diarrhea occurs, the urates are often stained green to yellow-green. If death does not occur, the signs may subside after a prolonged period of weakness and debilitation. Rarely, the first sign of illness is sudden death.

If at all possible, treatment should be supervised by a licensed veterinarian who is experienced in avian medicine. See Appendix B of Compendium referenced in first paragraph for treatment options.

Avian Case Definitions

A confirmed case of avian chlamydiosis is defined on the basis of at least one of the following laboratory results: a) isolation of *C. psittaci* from a clinical specimen, b) identification of chlamydial antigen by immunofluorescence (fluorescent antibody [FA]) of the bird's tissues, c) a greater than fourfold change in serologic titer in two specimens from the bird obtained at least 2 weeks apart and assayed simultaneously at the same laboratory, or d) identification of *Chlamydiaceae* within macrophages in smears stained with Gimenez or Macchiavellos stain or sections of the bird's tissues.

A probable case of avian chlamydiosis is defined as compatible illness and at least one of the following laboratory results: a) a single high serologic titer in one or more specimens obtained after the onset of signs or b) the presence of *Chlamydiaceae* antigen (identified by enzyme-linked immunosorbent assay [ELISA], PCR, or FA) in feces, a cloacal swab, or respiratory or ocular exudates.

A suspected case of avian chlamydiosis is defined as a) compatible illness that is epidemiologically linked to another case in a human or bird but that is not laboratory confirmed, b) a subclinical infection with a single high serologic titer or detection of chlamydial antigen, c) compatible illness with positive results from a nonstandardized test or a new investigational test, or d) compatible illness that is responsive to appropriate therapy.

Avian diagnosis

Diagnosis of avian chlamydiosis can be difficult, especially in the absence of clinical signs. A single testing method might not be adequate. Therefore, use of a combination of culture, antibody- and antigen-detection methods is recommended, particularly when only one bird is tested. See Appendix A of the Compendium referenced in the first paragraph for details on the various testing procedures and a list of the laboratories that perform such testing.

The Animal Health Laboratory of the Virginia Department of Agriculture and Consumer Services performs an PCR test on cloacal swabs. They will also perform post mortems and evaluate tissue specimens by PCR and histopathology using special stains.

SUGGESTED PROTOCOL FOR CASE INVESTIGATION

Introduction

An investigation may be initiated by a report of an infected bird or an infected person. Most investigations in Virginia have resulted from a private veterinarian or the Department of Agriculture and Consumer Services reporting a confirmed bird. Occasionally, we hear about a human case first. Some physicians will request that a bird be tested to confirm the diagnosis in a human patient. The appropriate approach is to test the human for the disease, not the bird. A positive or negative finding in a bird does not determine the diagnosis in the person. A clinically ill bird that may have exposed a person who has symptoms compatible with psittacosis should be examined by a veterinarian experienced in treating birds. A newly purchased psittacine bird is more likely to be responsible for human disease than a non-psittacine or one that has been a pet for a prolonged time.

The most common situation involves a pet shop that has infected birds on the premises or has sold an infected bird. At the present time there are no regulations (other than local ordinances) that address pet shops. The only authority that the Department of Health has is the broad mandate to protect the public's health. Our role is to identify any possible human cases and to educate the owners and employees about the disease and ways to minimize the risk to themselves and to customers. Recommendations on treatment of the birds should come from a private veterinarian experienced in treating birds using protocols based on the Compendium referenced in the first paragraph. Quarantine of the facility or an order not to sell any birds might be necessary if human illness has resulted from exposure to the birds (indicating a virulent strain of *C. psittaci*), the facility is poorly designed and lacks adequate hygiene, and/or there are many sick birds.

Inspectors or veterinarians from the Virginia Department of Agriculture and Consumer Services may be available to visit the facility, but the health department always needs to be part of the team to evaluate human health.

Pet Shop Site Visit

Employees:

- Interview about compatible illness, usual duties, how birds are maintained and how cleaning is done.
- Refer anyone with compatible symptoms to their own physician; remind them to tell physician about exposure to birds.
- Provide handout (see attached suggestion) with basic information, symptoms to look for, protective methods, name and phone number of contact at local health department.

Birds:

- Establish whether records exist to trace birds (source and sales).
- Observe for crowding of birds, color and consistency of stools, nasal discharge, level of activity, ruffled feathers.

- Evaluate design and placement of cages for risk of aerosolization of feces and discharges to customers and staff.
- Obtain name, address, and phone number of attending veterinarian.

Recommendations: (you will have to tailor these to the specific situation you are investigating and rely on the Compendium for more up to date details)

- Redesign cages so customers are not exposed to aerosol and cleaning can be done with a minimum of exposure. Cages with grates in bottom that allow feces to drop through for efficient cleaning are preferred.
- Limit number of people who clean cages.
- People doing cleaning should wear protective clothing, gloves, a disposable surgical cap, and an appropriately fitted respirator with N95 or higher rating when cleaning cages or handling infected birds. Surgical masks might not be effective in preventing transmission of *C. psittaci*. These items should not be removed from the room unless properly bagged for disposal.
- Cages should be cleaned frequently so feces don't have time to dry and become airborne. Feather and dust circulation should be kept to a minimum. Do not use a vacuum cleaner.
- If feces are dry, dampen with disinfectant or water prior to cleaning. Waste should be adequately contained and disposed of to avoid spillage and contamination.
- All surfaces should be cleaned thoroughly before disinfection. *C. psittaci* is susceptible to most disinfectants and detergents as well as heat; however, it is resistant to acid and alkali. A 1:1,000 dilution of quaternary ammonium compounds (e.g., Roccal[®] or Zephiran[®]) is effective, as is 70% isopropyl alcohol, 1% Lysol[®], 1:100 dilution of household bleach (i.e., 2.5 tablespoons per gallon), or chlorophenols. Many disinfectants are respiratory irritants and should be used in a well-ventilated area. Avoid mixing disinfectants with any other product.
- Sick birds should be isolated and not sold until treated appropriately.
- New birds should be free of psittacosis, as shown by testing or documentation of appropriate treatment.

Please notify the Division of Zoonotic and Environmental Epidemiology at 804-864-8141 if you become aware of any human or avian cases of psittacosis. We can advise you on management of the investigation and report avian cases to the Virginia Department of Agriculture and Consumer Services (VDACS). In addition, some testing and investigation may be available through VDACS or the United States Department of Agriculture, especially if birds were imported illegally or brought into the state while known to be sick.