

Psittacosis (Ornithosis)

NSW Control Guideline for Public Health Units

Revision history

Version	Date	Revised by	Changes	Approval
1.0	01/07/2012	-	-	-
2.0	31/03/2016	Communicable Diseases Branch	Update for consistency with the Psittacosis Series of National Guidelines (SoNG) v1.0 (endorsed 22 Oct 2015, released 23 Feb 2016)	Approved 22/04/2016
3.0	27/06/2018	Communicable Diseases Branch	Update for consistency with new national case definition (endorsed by CDNA 21 February 2018, released 1 July 2018). Specifically adding other animals to epidemiological evidence. NSW differences to SoNG indicated by square brackets.	Approved 26/02/2019

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1. Summary

Public health priority

Sporadic cases: Routine. Action should be carried out as part of routine duties. Data entry should be completed within 5 working days.

Cluster / Outbreak: High. Act as soon as possible, generally within one working day. Data entry should be completed within 3 working days.

Case management

Appropriate antibiotics under direction of the treating doctor. Determine likely source of infection.

Contact management

Ask about unwell co-exposed co-workers, family, and friends to help identify cases that may be associated with an outbreak.

2. The disease

Infectious agent

Chlamydia psittaci (previously known as *Chlamydophila psittaci*) is a gram negative obligate intracellular bacterium.^{1, 2} *C. psittaci* is divided into eight serovars according to variation in the major outer membrane protein; serovar A to F, WC and M56. Subsequently, eight corresponding genotypes based on the sequencing of variable domains of the outer membrane protein A (ompA) gene were defined, with the later addition of genotype E/B. Each serovar/genotype is associated to a varying degree with a particular animal host; A to F with avian hosts, WC and M56 with mammalian hosts. Human infection has been associated with all avian host serovars.³

Reservoir

Birds are the major zoonotic reservoir of *C. psittaci* which has been documented in 467 species in 30 bird orders worldwide.⁴ In practice, most human infections are associated with pet or wild psittacine birds (such as lorikeets, budgerigars, cockatiels and cockatoos) and farmed birds such as poultry.³

[*C. psittaci* infections in other mammalian species have been less well-studied with prevalence rates potentially underestimated. *C. psittaci* has been detected in dogs, cats, pigs, cattle, buffalo, goats, sheep and horses⁵⁻⁹ in association with respiratory, intestinal and arthritic diseases, as well as reproductive loss. The strongest evidence for the potential of *C. psittaci* to cause infection and disease in a non-human mammalian host has recently emerged in horses.¹⁰ The results of this work revealed that *C. psittaci* infection was present in tissues associated with equine reproductive loss at a relatively high (20%) prevalence.¹¹ In 2017 symptomatic foals were diagnosed with *C. psittaci* in southern NSW.]

Mode of transmission

Bird-to-bird

The disease in birds is referred to as avian chlamydiosis (AC). *C. psittaci* is excreted in the faeces and nasal discharges of infected birds. The organism can remain infectious for months if protected by organic debris such as cage litter or faeces. Infected birds, including asymptomatic birds may shed the bacteria intermittently for several months. Bacterial shedding can be exacerbated by stressors such as transportation, overcrowding and reproductive activities. Birds do not develop protective immunity and so may become reinfected.¹²

Bird-to-person

Humans usually become infected after inhaling *C. psittaci* which has been aerosolised from dried faeces, feather dust, or respiratory secretions (e.g. sneezed droplets) of infected birds, including birds which are asymptomatic carriers. Other means of exposure include mouth-to-beak contact and possibly the handling of plumage and tissues of infected birds. Even brief exposures can lead to symptomatic infection.^{12,13}

Person-to-person

Person-to-person transmission is rare, but has been reported, and includes instances of potential nosocomial transmission.¹⁴⁻¹⁷

[Other animal to human]

While the zoonotic risks of avian chlamydiosis are well documented, much less is known about the zoonotic potential of *C. psittaci* in non-avian hosts. Transmission of *C. psittaci* (and other closely related chlamydial organisms) to humans from non-avian sources is likely under-recognised, but

has been documented in case studies of pregnant women exposed to abortion products from sheep (*C. abortus*, formerly *C. psittaci* serotype 1), slaughterhouse workers, cattle or sheep ranchers, and laboratory staff.¹⁸⁻²¹ There is also evidence from case reports of human infection following exposure to infected foals.^{10]}

Incubation period

Onset of illness follows an incubation period of 5-28 days,³ typically 10 days.⁵ Immunity following infection is incomplete and transitory, so patients can be reinfected.

Infectious period

Person-to-person transmission has been reported only rarely; hence the infectious period is unknown.

Clinical presentation and outcome

Psittacosis can result in a range of clinical manifestations from asymptomatic infection through mild flu-like illness to systemic illness with severe atypical pneumonia. Persons with symptomatic infection typically have abrupt onset of headache, fever, chills, malaise, and myalgia. They also usually develop a non-productive cough that can be accompanied by breathing difficulty and chest tightness.^{3, 5} A pulse-temperature dissociation (fever without elevated pulse), enlarged spleen, and rash are sometimes observed and are suggestive of psittacosis in-patients with community-acquired pneumonia.

C. psittaci can affect other organ systems and result in endocarditis, myocarditis, hepatitis, arthritis, keratoconjunctivitis, and encephalitis. Severe illness is rare in pregnant women, but can result in respiratory failure, thrombocytopenia, hepatitis, and foetal death.³

Persons at increased risk of disease

Persons at higher risk include bird owners, pet shop employees, and persons whose occupation places them at risk for exposure (e.g. employees in poultry slaughtering and processing plants, veterinarians, veterinary technicians, laboratory workers, taxidermists, workers in avian quarantine stations, farmers, wildlife rehabilitators, and zoo workers).¹² Lawn mowing without a grass catcher and gardening have also been associated with disease transmission.⁶ [Limited evidence has suggested people who come into close contact with aborted material from horses, or unwell foals, may also be at risk.^{10]}

Any age group can be affected, although children rarely present with clinically significant illness.³ Immunocompromised people do not appear to be at increased risk of contracting the disease.¹²

Disease occurrence and public health significance

Between 2001 and 2014 there were 1,687 notifications of psittacosis reported in Australia, with an average rate of 0.5 cases per 100,000 population. Rates peaked in 2003 and 2004 at 1.1 cases per 100,000 population for both years and were lowest in 2013 and 2014 at 0.1 cases per 100,000 population.¹³ Rates in NSW and Victoria are generally higher than other states. Males are more commonly affected than females, which may represent higher occupational exposure or testing bias. Notifications are highest in people aged 40 years or older. This may reflect more severe disease in older age groups rather than a difference in incidence.

Psittacosis is endemic in some areas of Australia⁸, and outbreaks have been reported.^{6,9,22} Cases may report only indirect contact with birds (i.e. seeing birds and their excreta in the local environment).^{3, 6, 22}

3. Routine prevention activities

There is no vaccine available to protect against psittacosis. Prevention activities are focused largely on education of high risk groups such as staff of pet shops and poultry processing plants, as well as bird owners and/or breeders, trappers, veterinarians, zoo workers and taxidermists.

Pet shops and bird suppliers should contact [the NSW Department of Primary Industries (DPI)] for advice on quarantining new birds, management of infected birds, general hygiene and housing requirements for pet birds (see also [Appendix 2: Avian chlamydiosis factsheet for bird carers and suppliers](#)).

The psittacosis factsheet provides advice to the public about reducing the risk of household exposure to infected pet birds (see [Appendix 1: Psittacosis \(Ornithosis\) Factsheet](#)).

This advice includes:

- Wearing gloves, dust masks or P2 respirators and using a disinfectant (see [Section 12: Special situations](#)) when cleaning areas where birds have had frequent contact, such as cages and bird feeders
- Using a grass catcher on lawnmowers whilst mowing lawns and wearing dust masks or P2 respirators and eye protection
- Avoiding feeding and handling wild birds
- Seeking advice and treatment from a veterinarian as soon as pet birds develop signs of respiratory illness.

4. Surveillance objectives

- To rapidly identify and control the source of infection.
- To monitor the epidemiology of psittacosis in Australia to better inform prevention strategies.

5. Data management

Within 5 working days of notification enter confirmed and probable cases onto the notifiable diseases database. In the event of a re-infection, enter as a new case, as above.

6. Communications

- [Public Health Units should liaise with the Communicable Diseases Branch (CDB)] about human cases to facilitate investigation of possible pet shop, wild bird, poultry or other bird sources. [CDB will request support though DPI for an inspection (see [Section 12: Special situations](#)).]
- Suspected clusters or outbreaks (2 or more cases epidemiologically linked) in humans, linked to pet shops or bird breeders, should be reported to CDB with the patient's age, sex, date of onset, laboratory status, possible sources of infection, other people thought to be at risk, and follow up action taken
- [NSW DPI] should report suspected clusters or outbreaks of avian chlamydiosis to CDB, if there is associated human illness.
- De-identified cases and suspected outbreaks associated with commercial poultry farms and processing plants should be reported to [NSW DPI].
- During a recognised outbreak in an endemic area, CDB should provide advice to the public regarding protective practices.

7. Case definition

Reporting

Both confirmed cases and probable cases should be notified.

Confirmed case

A confirmed case requires laboratory definitive evidence AND clinical evidence.

Laboratory definitive evidence:

1. A seroconversion or fourfold or greater rise in either immunoglobulin G (IgG) antibody by microimmunofluorescence (MIF) or complement fixation (CF) antibody against *Chlamydia psittaci* – between acute and convalescent sera (collected at least two weeks later) tested in parallel^A
OR
2. Detection of *C. psittaci* by nucleic acid testing or
3. Isolation of *C. psittaci* by culture.

Clinical evidence:

1. (Pneumonia
OR
2. AT LEAST TWO of the following: fever, headache, myalgia, rigors, dry cough or dyspnoea.)
AND
3. Not explained by an alternative diagnosis

Probable case

A probable case requires laboratory suggestive evidence AND clinical evidence AND epidemiological evidence.

Laboratory suggestive evidence:

- Detection of IgM or a single high IgG antibody titre^B to *C. psittaci* by MIF
OR
- A single high *C. psittaci* CF antibody titre^B.

Clinical evidence:

As with confirmed case.

Epidemiological evidence:

Direct or indirect exposure to birds or bird products, or contact with a confirmed human or animal case.

- A.** *C. psittaci* MIF antibody is more specific than CF antibody. However, positive serologic findings by both MIF and CF may occur as a result of infection with other *Chlamydia* species and should be interpreted with caution. This is most likely to occur with primary *Chlamydia pneumoniae* infection from 5-15 years of age. *Chlamydia* spp. infection in those < 5 years of age may not produce a MIF or CF serological response.
- B.** MIF IgG antibody can persist for years whereas CF antibody diminishes over months following *Chlamydia* spp. Infection.

The most recent Australian national notifiable diseases case definition for psittacosis can be found at the Department of Health website: (www.health.gov.au/casedefinitions).

8. Laboratory testing

Testing guidelines

- The clinical presentation of psittacosis can be similar to other respiratory pathogens and laboratory suggestive or confirmatory testing is required as part of the case definition.
- NAT testing of respiratory specimens is the preferred diagnostic method.²³ Appropriate respiratory specimens include nasopharyngeal swabs, sputum specimens, and bronchoalveolar lavage specimens. *C. psittaci* is a biosafety risk group 3 organism and culture is not usually performed due to the inherent technical difficulties and biosafety concerns.
- If culture is attempted, this should be performed in an appropriate physical containment level 3 (PC3) facility.²⁴
- Appropriate antibiotic treatment can delay or diminish the antibody response so a third serum specimen up to 8 weeks after the initial may be required to confirm diagnosis.

9. Case management

Response times

Investigation

Within 3 working days of laboratory notification, determine whether case is probable or confirmed and begin follow-up investigation. Notify CDB when an outbreak is identified.

Response procedure

Case investigation

The response to a notification will normally be carried out in collaboration with the case's health carers. Regardless of who does the follow-up, for confirmed cases, PHU staff should ensure that action has been taken to:

- Confirm the onset date and symptoms of the illness
- Confirm results of relevant pathology tests, or recommend that tests be done
- Find out if the case or relevant care-giver has been told what the diagnosis is and seek the doctor's permission to contact the case or relevant care-giver (where possible) before beginning the interview
- Interview case or relevant care-giver and obtain history, including possible exposures (i.e. occupational, recreational and travel).

Exposure Investigation

A history of exposure to birds, bird products or excreta from 4 days up to 4 weeks before onset of symptoms should be sought.

Pay particular attention to pet bird contact/ownership, occupations that would bring the case into contact with birds, or recreational activities including gardening that would result in these exposures. Ask about unwell, co-exposed co-workers, family, and friends to help identify cases that may be associated with a common exposure or an outbreak.

[Where appropriate ask about exposure to sick foals or contact with aborted material from horses.]

Case treatment

This is the responsibility of the treating doctor. For the current recommended treatment, refer to the *Therapeutic Guidelines*.²⁵

Education

The case or relevant care-giver should be informed about nature of infection and mode of transmission. The psittacosis and avian chlamydiosis factsheet should be provided, where relevant.

Isolation and restriction

Standard infection control procedures are sufficient.

Active case finding

Refer to section 12. Special situations.

10. Environmental evaluation

Birds that are suspected sources of human infection should be referred to a veterinarian for evaluation, testing and treatment by the owner. All birds with confirmed or probable avian chlamydiosis should be evaluated and managed by a veterinarian. To prevent reinfection, contaminated aviaries should be thoroughly cleaned and sanitised using routine protective measures (see section 12. Special situations). If the source of infection is a pet bird, obtain the history of ownership, date and place of acquisition, and bird's health history.

Sampling environmental surfaces in any setting is rarely warranted for single cases. Further advice can be obtained through [NSW DPI], which can assist in identifying local avian veterinary expertise.

[If other animals are suspected to be the source of a human infection the PHU should notify CDB. A discussion concerning next steps may occur with DPI and other experts from the appropriate field.]

11. Contact management

Ask about unwell co-exposed co-workers, family, and friends to help identify cases that may be associated with an outbreak.

12. Special situations

Human cases linked to pet stores, bird dealers/breeders or commercial poultry premises

Where a bird with probable or confirmed avian chlamydiosis (AC) linked to a human case has been acquired from a pet store, dealer or breeder within 60 days of the onset of signs of illness, an investigation should be undertaken to ensure that there is no ongoing risk associated with the source of the bird.

Special control measures may be necessary at pet stores that have been linked to case or cases of human psittacosis, or where there has been a recognised avian outbreak. [A joint inspection between a PHU Environmental Health Officer and DPI should be conducted. The PHU should contact CDB who will liaise with DPI to identify an appropriate DPI officer. Contact CDB to request a pet store inspection] (see [Appendix 3: Psittacosis Environmental Health Investigation Questionnaire](#)).

Control measures typically include the isolation and management of sick birds. There is no public health or animal health requirement to destroy infected birds; however in many cases the owner may elect to euthanize the birds. Cleaning/disinfection of cages and other surfaces are required (see below). These measures should be undertaken on advice from and under supervision of a

veterinarian. Where a pet store (include pet store bird suppliers) has been linked to human disease, the suppliers should be notified by telephone and by letter (see [Appendix 6: Psittacosis: model letter to bird suppliers and pet shops](#)). Also provide the [Psittacosis \(Ornithosis\) Factsheet](#) and [Avian chlamydia factsheet for bird carers and suppliers](#).

Environmental decontamination

Where infected birds are identified or suspected, the following guidelines should be followed by bird keepers:

- Personal protective equipment (PPE):
 - Wash hands with soap and running water for 10 seconds before and after handling pet birds. Wearing gloves and a properly fitted P2 respirator (obtainable from pharmacies and hardware stores) are recommended when cleaning areas where sick birds have been contained, or where wild birds have been roosting. Cover cuts and abrasions before gloving. Always handle healthy birds before handling isolated or sick birds.
 - Instructions on how to properly fit a P2 respirator are available from:
<http://www.health.nsw.gov.au/Infectious/factsheets/Pages/q-fever-p2-mask.aspx> or
http://www.health.qld.gov.au/chrisp/resources/Fit_Check.ppt
- Disinfection:
 - *C. psittaci* is susceptible to most disinfectants and detergents as well as heat; however, it is resistant to acid and alkali. Appropriate disinfectants include quaternary ammonium disinfectants such as benzalkonium chloride, 3% hydrogen peroxide, alcoholic iodine solutions and 70% ethanol.⁵ Hospital grade disinfectants based on sodium hypochlorite are also suitable. A 1:100 (500ppm of chlorine) dilution should be prepared immediately before use, and discarded at the end of each disinfection session. Many disinfectants are respiratory irritants and should be used in a well-ventilated area. Avoid mixing disinfectants with any other product.
 - Rooms and cages where infected birds were housed should be cleaned immediately and disinfected thoroughly. When the cage is being cleaned, transfer the bird to a clean cage. Thoroughly wash and scour the soiled cage with a detergent to remove all faecal debris, rinse the cage, disinfect it (allowing at least 5 minutes of contact with the disinfectant), and re-rinse the cage to remove the disinfectant. Discard all items that cannot be adequately disinfected (e.g., wooden perches, ropes, nest material, and litter).
 - Minimise the circulation of feathers and dust by wet-mopping the floor frequently with disinfectant 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. Do not use a vacuum cleaner, as it can aerosolise infectious particles. Frequently remove waste material from the cage (after moistening the material), and burn or double-bag the waste for disposal.

[Unexplained human respiratory illness cluster with sick animals

In 2014 and 2017, unexplained human respiratory illness clusters were associated with infected horses in southern NSW. In 2014, respiratory illness in five staff and students of a veterinary school was linked to exposure to aborted material from a horse¹⁰, while in 2017, illness in eleven staff and students of a veterinary school were investigated and linked to exposure to infected foals which had required very close care.

If a cluster is suspected, the PHU should notify CDB. An expert group will be formed to provide guidance on human and animal testing and control measures.]

13. Jurisdiction specific issues

- Avian chlamydiosis is notifiable to the DPI in NSW.
- Links to State and Territory Public Health Legislation, the Quarantine Act and the National Health Security Act 2007 are available from:
<http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-state-legislation-links.htm>

14. References and additional sources of information

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15. Appendices

[Appendix 1: Psittacosis \(Ornithosis\) Factsheet](#)

[Appendix 2: Avian chlamydiosis factsheet for bird carers and suppliers](#)

[Appendix 3: Psittacosis Environmental Health Investigation Questionnaire](#)

[Appendix 4: PHU Psittacosis Checklist](#)

[Appendix 5: Psittacosis Disease Investigation Form](#)

[Appendix 6: Psittacosis: model letter to bird suppliers and pet shops](#)