

Histoplasmosis

Case Definition

Confirmed Case

Clinical illness^[1] with laboratory confirmation of infection:

- Isolation of *Histoplasma capsulatum* from an appropriate clinical specimen (tissue biopsy, blood, urine, sputum or bronchoalveolar lavage fluid)

OR

- Detection of *H. capsulatum* antigen

OR

- Identification of a microorganism compatible with *Histoplasma capsulatum* in tissues

OR

- Seroconversion of both H and M immunodiffusion bands

OR

- Complement fixation (CF) antibodies to the mycelial and/or yeast-phase antigen at a titre of $\geq 1:32$

OR

- Seroconversion or significant (fourfold or greater) rise in CF titre between acute and convalescent sera.

Probable Case

Clinical illness^[1] with laboratory evidence of recent infection:

- Seroconversion of H immunodiffusion band

^[1] Clinical illness is characterized by influenza-like illness with two or more of the following symptoms; fever/chills, cough, chest pain, weakness or myalgia/arthralgia with accompanying epidemiological evidence. Clinical illness may also include symptoms of disseminated infection in liver, adrenal, gastrointestinal tract, or CNS with accompanying epidemiological evidence.(1)

Reporting Requirements

1. Physicians

Physicians shall notify the Medical Officer of Health (MOH) (or designate) of all confirmed cases in the prescribed form by mail, fax or electronic transfer within 48 hours (two days).

2. Laboratories

All laboratories, including regional laboratories and the Provincial Laboratory for Public Health (PLPH), shall report all positive laboratory results by mail, fax or electronic transfer within 48 hours (two days) to the:

- Chief Medical Officer of Health (CMOH) (or designate),
- MOH (or designate) and
- Attending/ordering physician.

3. Alberta Health Services

- The MOH (or designate) shall report in the prescribed form (as detailed in the Notice dated March 22, 2011) using the preliminary Notifiable Disease Report (NDR) of all confirmed cases to the CMOH (or designate) within two weeks of notification and the final NDR (amendment) within four weeks of notification.
- For out-of-zone reports, the MOH (or designate) first notified shall notify the MOH (or designate) where the client resides by mail, fax or electronic transfer and fax a copy of the positive laboratory report within 48 hours (two days).
- For out-of-province and out-of-country reports, the following information should be forwarded to the CMOH (or designate) by phone, fax or electronic transfer within 48 hours (two days) including:
 - name,
 - date of birth,
 - out-of-province health care number,
 - out-of-province address and phone number,
 - attending physician (locally and out-of-province) and
 - positive laboratory report (faxed).

Etiology

Histoplasma capsulatum is a dimorphic fungus that grows as a mould in the environment and as yeast in human and animal tissue.(1)

Clinical Presentation

Approximately 90% of histoplasmosis cases are either asymptomatic or result in mild influenza-like illness requiring no medical attention.(1) However, depending on the size of the inoculum, age and underlying conditions of the individual, presentation will vary. The symptoms of the infection appear within 5 to 17 days after exposure, with the average of about 10 days.(1;2)

There are five types of histoplasmosis: asymptomatic, acute disseminated, acute benign respiratory, chronic disseminated and chronic pulmonary.(2;3)

Types of Histoplasmosis	Onset of Symptoms	Clinical Presentation
Asymptomatic	Unknown	None - diagnosed by laboratory testing only.
Acute Respiratory	Onset is quick, usually within a few days of exposure. Length of illness is dependent upon age, pre-existing health status, and degree of exposure.	Illness ranges from mild to severe, with malaise, fever, chills, headache, cough, chest pain and in later stages, enlargement of the liver and spleen.
Acute Disseminated	Onset is quick, usually within a few days of exposure. Length of illness is dependent upon age, pre-existing health status, and degree of exposure.	Illness marked with fever, GI symptoms, evidence of bone marrow suppression, enlargement of liver and lymph node involvement. Later symptoms might include small scattered calcifications in the lungs, hilar lymph node, spleen and liver. Illness most common in infants, young children and immunosuppressed individuals (including AIDS cases). Usually fatal if not treated.
Chronic Disseminated	Of long duration (over 10–11 months)	Illness presents with low-grade intermittent fever, GI symptoms, bone marrow suppression, liver enlargement, mild hematological abnormalities. Other manifestations include pneumonia, endocarditis, meningitis, ulcers of the oral cavity and Addison's Disease. Usually fatal if not treated.
Chronic Pulmonary	Chronic (progresses over months to years)	Occurs in the presence of pre-existing pulmonary disease (e.g., emphysema). It clinically resembles tuberculosis and is more common in men over 40 years of age.

Diagnosis(3)

Literature reviews support different diagnostic assessments and treatments unique to each clinical presentation of histoplasmosis. Detection of the *H. capsulatum* organism can be achieved through culture, EIA and/or antigen assay, tissue biopsy or urine testing. Each of these methods of testing has increased reliability in specific clinical presentations, and will not always result in a positive diagnosis if used outside the clinical guidelines. Historically, a histoplasmin skin test was used for diagnosis. This test has since been discontinued as it only indicates past exposure, and therefore is not valuable for diagnosis of current illness.

Epidemiology (1-3)

Reservoir

Histoplasma capsulatum is primarily found in soil with a high organic content, in undisturbed bird droppings (particularly chicken, starling, blackbird and pigeon roosts) and in bat caves. Birds carry the fungus in their GI tract and on their feathers but are not infected with it because of their high body temperature. Bats, having a lower body temperature, can be infected with the fungus and will shed it through their GI tract.

Transmission

Inhalation of the airborne microconidia (spores) into the lungs is the documented mode of transmission. This can occur when the contaminated soil is disturbed by excavation or construction.(1) Additionally, individuals who engage in cave spelunking, gardeners and horticulturists (those using poultry manure as fertilizer), or in outdoor construction or rehabilitation of buildings that have been inhabited by birds or bats, are at increased risk of infection.

Incubation Period

Symptoms usually appear within three to 17 days after exposure; the average is 10 days.(3) This may be shorter if the exposure is greater.

Period of Communicability

Not known.

Host Susceptibility

Susceptibility is universal however, the severity of illness depends on the age of the individual, underlying health conditions and degree of exposure. Older adults, children under the age of two, and individuals who are immunocompromised are more likely to develop disseminated disease.

Occurrence

General(3)

Histoplasmosis occurs in wide areas of the Americas, eastern Asia, Africa and Australia. It is rare in Europe. Rates increase in children zero to fifteen years of age, the chronic pulmonary form more prevalent in males. Histoplasmosis can also occur in animals (e.g., dogs, cats, cattle, horses and foxes) with a clinical picture similar to that of humans.

Canada

In Canada, acute histoplasmosis occurs mainly in the eastern provinces, primarily along the St. Lawrence River(4) with some evidence of infection in the Atlantic provinces and northern territories.(5) Until 2003, it was thought that there were no locally-acquired infections reported in the Western provinces.(5)

Alberta

Histoplasma capsulatum became newly reportable in 2011. A cluster of locally acquired cases of histoplasmosis (4;5) prompted consideration and inclusion for reporting in Alberta.

Key Investigation

- Determine history of relevant exposure, including soils with high organic content, indoor environments contaminated with bird/bat droppings, caves, outdoor construction and rehabilitation of buildings inhabited by birds/bats.

Single Case/Household Cluster(6)

- Confirm diagnosis and ensure appropriate clinical specimen(s) have been collected. Tests requiring culturing of *H. capsulatum* may take up to six weeks to yield growth.

Control

Management of a Case

- Supportive treatment as necessary.

Treatment of a Case

- Treatment with appropriate non-steroidal anti-inflammatory medication and/or oral antifungal medication.
- Supportive therapy as indicated, especially in cases with immunosuppression or disseminated illness present.

Management of Contacts

- None

Preventative Measures

- Education and use of protective respirators, gloves and coveralls when in known risk areas.(2)

References

- (1) Deepe GS J. *Histoplasma capsulatum*. In: Mandell GL, Bennett JE, Dolin R, editors. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 7th ed. Philadelphia, PA: Churchill Livingstone Elsevier; 2009. p. 3305-18.
- (2) Histoplasmosis. Canadian Centre for Occupational Health and Safety 2005 August 18 Available from: URL: <http://www.ccohs.ca/oshanswers/diseases/histopla.html>
- (3) Heymann DL (ed.). *Control of Communicable Diseases Manual*. 19th Ed ed. Washington, DC: American Public Health Association; 2008.
- (4) Locally Acquired Histoplasmosis Cluster, Alberta, 2003. *Can Commun Dis Rep* 2005 December 1531(24):255-258. Available from: URL: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/05vol31/dr3124b-eng.php>
- (5) Anderson H, Honish L, Taylor G, Johnson M, Tovstiuk C, Fanning A, et al. Histoplasmosis cluster, golf course, Canada. *Emerg Infect Dis* 2006 Jan;12(1):163-5.
- (6) Kauffman CA. Histoplasmosis: a clinical and laboratory update. *Clin Microbiol Rev* 2007 Jan;20(1):115-32.