# Congenital Toxoplasmosis

## Revision Dates

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| Case Definition | August 2011 |
| Reporting Requirements | December 2018 |
| Remainder of the Guideline (i.e., Etiology to References sections inclusive) | June 2005 |



## Case Definition

### Confirmed Case

Clinical illness[A] in a child with laboratory evidence of *Toxoplasma gondii* infection born to a mother with documented seroconversion during pregnancy (post-conceptually)

**OR**

Laboratory confirmation of infection in the neonate with or without clinical illness[A]:

- Detection of IgA and/or IgM antibodies to *T. gondii* from a single peripheral blood specimen from the neonate

**OR**

- Demonstration of rising *T. gondii* IgG titres in sequential sera from the neonate

**OR**

- Detection of *T. gondii* nucleic acid (e.g., PCR) in amniotic fluid, placental tissue, fetal or neonatal tissue, blood or CSF

**OR**

- Isolation of *T. gondii* from blood or body fluid of the neonate by mouse inoculation

**OR**

- Microscopic demonstration of *T. gondii* in an appropriate neonatal clinical specimen.

**The following probable case definition is provided as a guideline to assist with case finding and public health management, and should not be reported to AHW.*

### Probable Case*

- Clinical illness[A] in a child with laboratory evidence of *T. gondii* infection born to a seropositive mother

**OR**

- Clinical illness[A] in a neonate[B] born to a female with reactivated toxoplasma infection (rare).

[A] Fetal infection early in pregnancy may manifest as fetal death, chorioretinitis, brain damage with intracerebral calcifications, hydrocephaly, microcephaly, fever, jaundice, rash, hepatosplenomegaly or convulsions. Fetal infection later in pregnancy results in mild or subclinical disease with delayed manifestations (recurrent or chronic chorioretinitis, developmental delay, hearing loss or blindness).
[B] A neonate is defined as a newborn up to and including 28 days of age.

## Reporting Requirements

1. **Physicians, Health Practitioners and Others**
   Physicians, health practitioners and others shall notify the Medical Officer of Health (MOH) (or designate) of the zone, of all confirmed cases in the prescribed form by mail, fax or electronic transfer within 48 hours (two business days).

2. **Laboratories**
   All laboratories shall report all positive laboratory results by mail, fax or electronic transfer within 48 hours (two business days) to the:
   - Chief Medical Officer of Health (CMOH) (or designate), and
   - MOH (or designate) of the zone.

3. **Alberta Health Services and First Nations Inuit Health Branch**
   - The MOH (or designate) of the zone where the case currently resides shall forward the Perinatally Acquired Notifiable Disease Enhanced Report form for all confirmed cases to the CMOH (or designate) within four weeks of notification.
   - 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 business days):
     - name,
     - date of birth,
     - out-of-province health care number,
     - out-of-province address and phone number,
     - positive laboratory report, and
     - other relevant clinical / epidemiological information.

## Etiology (1,2)

*Toxoplasma gondii* is one of the most common protozoan parasites in the world. It is related to the parasites Plasmodium and Cryptosporidium among others. *T. gondii* comes in three forms: the cysts in tissues of infected individuals; the oocysts in the intestine of members of the cat family; and the tachyzoite which is the invasive form responsible for acute disease (toxoplasmosis). Tissue cysts can survive for weeks at room temperature in body fluids. The oocysts can survive for up to one year in water or moist soil. Tachyzoites can survive in body fluids up to one day and in whole blood for up to 50 days at four degrees Celsius.

*T. gondii* is an obligate intracellular parasite. It is only able to reproduce inside of cells. Both the sexual (enteroepithilia) and asexual (extraintestinal) reproductive cycles occur in felines. Other species only undergo extraintestinal infection.

## Clinical Presentation (1,2)

Congenital toxoplasmosis results from an infection with *T. gondii* in a pregnant woman. Asymptomatic infections in the mother are common and 70–90% of infants born with congenital infection are asymptomatic at birth. Visual impairment, learning disabilities, and mental retardation generally become apparent several months to years later.

The clinical presentation in the newborns may vary with the trimester in which the mother acquires the infection. Toxoplasmosis infection acquired in the first and second trimesters of pregnancy generally show a more severe degree of illness in the newborn although transplacental infection is least likely during the first trimester. Early infection has been associated with death of the fetus, spontaneous abortion, and prematurity. Signs of congenital infection include chorioretinitis (35% of chorioretinitis cases in US and Europe), strabismus, blindness, epilepsy (or seizures at birth), psychomotor or mental retardation, anemia, jaundice, rash, thrombocytopenia (petechiae), encephalitis, pneumonitis, microcephaly, intracranial calcification, hydrocephalus, diarrhea, hypothermia, and nonspecific illness. When the infection is acquired in the third trimester, newborns tend to have a subclinical infection.

## Diagnosis

The diagnosis of congenital toxoplasmosis is usually based on clinical signs and supportive serological results. The presence of specific IgM and/or rising IgG titres in sequential sera of infants is conclusive evidence of congenital infection. Transplacentally transmitted IgG antibody is often undetectable by 6-12 months of age. In newborns, the isolation of *T. gondii* from the placental or fetal tissue, the umbilical cord, body fluid or infant blood is diagnostic. Alternatively peripheral blood, white blood cells, CSF, urine, and amniotic fluid should be assayed by PCR. Prenatal diagnosis may be based on ultrasound and/or PCR testing of amniotic fluid.

## Epidemiology

### Reservoir

The definitive hosts are cats and other felines that acquire disease mainly from eating infected mammals or birds. The parasite is harboured in the intestinal tract where the sexual stage of the life cycle occurs resulting in the excretion of oocysts in feces for approximately 10-20 days. The intermediate hosts include sheep, goats, rodents, swine, cattle, chicken, and birds. These intermediate hosts may carry the infective stage of *T. gondii* in tissue (muscle and brain).

### Transmission (3)

Congenital infection occurs through vertical transmission (transplacentally) when a pregnant woman has a primary infection (tachyzoites in the bloodstream). In most cases, congenital transmission occurs as a result of a primary maternal infection during pregnancy rather than



 

reactivation. Women who were first exposed to *T. gondii* and develop infection more than six months before becoming pregnant are not likely to pass the infection to their newborns. The presence of cats is of primary importance for transmission.

**Incubation Period**
The incubation period for a congenitally acquired infection is not known.

**Period of Communicability**
The infection is not transmitted person to person except in utero.

**Host Susceptibility**
Susceptibility is general. Fetuses are at high risk. Development of antibodies following infection confers immunity.

## Occurrence

### General (4)

Worldwide in mammals and birds. The annual incidence of toxoplasmosis has been estimated to range from 1–5% resulting in approximately 500 million infected individuals worldwide. A serosurvey performed in the US from 1988 to 1994 demonstrated that 23% of 17,658 persons tested were seropositive. Of the almost 6,000 women of childbearing age (12-49 years), 14% were seropositive. The frequency of congenital toxoplasmosis in the United States is estimated to be one in 1,000 to one in 10,000 live births.

In certain areas of Western Europe and Africa the seropositivity of pregnant women is reportedly greater than 50%. In untreated infections acquired in the first trimester, the incidence of fetal infection is 10–25% of newborns, in the second trimester, 30–54% and the third trimester, 60–65%. Treatment of the mother during pregnancy reduces the incidence of congenital infection by about 50%.

### Canada

No specific information is available. Congenital toxoplasmosis is not a disease under national surveillance.

### Alberta (5)

Congenital toxoplasmosis is rare in Alberta. From 1986 to 2003, seven cases of congenital toxoplasmosis were reported. One case was reported in 1986, one in 1988, one in 1996, three in 1998 and one in 2003. The outcomes are not known.

## Key Investigation

### Single Case/Household Cluster

- Identify possible risks and potential source of exposure for mother during pregnancy.
  - Contact with cats (domestic and stray) and their feces.
  - Cleaning cat litter boxes.
  - Occupational risks e.g., handling raw meat.
  - Ingestion of raw or undercooked meat, or unpasteurized dairy products.
  - Determine HIV or immunocompromised status. HIV-infected or immunocompromised woman have an increased likelihood of reactivation.
- Determination of antibody titres in mother.

## Control

### Management of a Case

- The mother may receive treatment to prevent transmission of infection to the fetus if the infection is discovered during pregnancy.

### Treatment of a Case

- Treatment is not routinely indicated for a healthy immunocompetent host. An exception is an initial infection during pregnancy. Treatment of an acute infection during pregnancy has been associated with an approximate 50% reduction in fetal infection.
- Spiramycin is used to prevent placental infection.
- Pyrimethamine and sulfadiazine would be considered if there is indication that fetal infection has occurred. However, pyrimethamine should not be given during the first 16 weeks of pregnancy. Sulfadiazine may be administered alone in this circumstance.
- Infants whose mothers had a primary infection during pregnancy should be treated with a combination of pyrimethamine-sulfadiazine-folinic acid during their first year of life.
- There are no clear guidelines for managing infants born to HIV-infected mothers who are *Toxoplasma* seropositive. A physician specializing in HIV should be consulted.

### Management of Contacts

- No specific action is taken as infection is not passed person to person except in utero.

### Preventive Measures (6)

- Test pregnant women for infection if medically indicated to reduce the risk of transmission.
- Pregnant women should receive *T. gondii* antibody-negative blood components if transfusions are required (4).
- Pregnant women should be educated to:
  - avoid ingesting raw or undercooked meat products (especially pork, lamb or venison),
  - avoid handling raw meat (especially pork, lamb, or venison) or use good handwashing techniques following this potential exposure,
  - peel or thoroughly wash fruits and vegetables before eating,
  - wash cutting boards, dishes, counters, utensils, and hands with hot soapy water after contact with raw meat, poultry, seafood or unwashed fruits or vegetables and
  - avoid activities that potentially expose them to cat feces. This includes changing of cat litter, gardening, etc. Wear gloves or wash hands thoroughly if these activities are unavoidable. (Daily changing of cat litter reduces the chance of infection, as the oocysts are typically not infective for one to two days after passage.)

## References

(1) Public Health Agency of Canada. *Infectious substances: Toxoplasma gondii.* Office of Laboratory Security. Material Safety Data Sheet. April 2001. http://www.phac-aspc.gc.ca/msds-ftss/msds148e.html

(2) *Toxoplasma gondii*. Palo Alto Medical Foundation Research Institute. Department of Immunology and Infectious Diseases. 2002

(3) *Toxoplasmosis*. MedicineNet.com. April 2002. http://www.medicinenet.com/Toxoplasmosis/page2.htm

(4) Public Health Agency of Canada. *Toxoplasmosis.* Transfusion Transmitted Injuries Section. September 2003. http://www.phac-aspc.gc.ca/hcai-iamss/tti-it/ttdi_e.html#tox

(5) Alberta Health and Wellness, Disease Control and Prevention. *Communicable Disease Reporting System.* March 2003.

(6) Centers for Disease Control and Prevention. *Preventing congenital toxoplasmosis*. MMWR 2002;49(RR02):57-75.



 