

Neglected Parasitic Infections in the United States

Toxoplasmosis

Toxoplasmosis is a preventable disease caused by the parasite *Toxoplasma gondii*. An infected individual can experience fever, malaise, and swollen lymph nodes, but can also show no signs or symptoms. A small number of infected persons may experience eye disease, and infection during pregnancy can lead to miscarriage or severe disease in the newborn, including developmental delays, blindness, and epilepsy. Once infected with *T. gondii*, people are generally infected for life. As a result, infected individuals with weakened immune systems—such as in the case of advanced HIV disease, during cancer treatment, or after organ transplant—can experience disease reactivation, which can result in severe illness or even death. In persons with advanced HIV disease, inflammation of the brain (encephalitis) due to toxoplasmosis is common unless long-term preventive medication is taken. Researchers have also found an association of *T. gondii* infection with the risk for mental illness, though this requires further study.

Although *T. gondii* can infect most warm-blooded animals, cats are the only host that shed an environmentally resistant form of the organism (oocyst) in their feces. Once a person or another warm-blooded animal ingests the parasite, it becomes infectious and travels through the wall of the intestine. Then the parasite is carried by blood to other tissues including the muscles and central nervous system.

Humans can be infected several ways, including:

- Eating raw or undercooked meat containing the parasite in tissue cysts (usually pork, lamb, goat, or wild game meat, although beef and field-raised chickens have been implicated in studies).
- Ingesting food, soil, or water contaminated by cat feces (for example, from eating unwashed fruits and vegetables, gardening, or cleaning a cat's litter box).
- When a pregnant woman is newly infected during or just prior to her pregnancy and transmits the infection to her child.
- When a previously uninfected person receives an organ transplant or blood transfusion from an infected donor.

Who is most at risk for *Toxoplasma gondii* infection and toxoplasmosis?

The *T. gondii* parasite is present throughout the United States and the world; individuals are at higher risk for infection if they eat undercooked meat, drink untreated water, or are exposed to contaminated cat feces or soil. People at most risk of serious complications from toxoplasmosis are pregnant women (who can transmit the parasite to their child) and those with severely weakened immune systems.



Why be concerned about toxoplasmosis in the United States?

- Toxoplasmosis is a leading cause of foodborne illness-related death and hospitalization in the U.S.—causing an estimated 327 deaths and 4,428 hospitalizations each year.
- The *T. gondii* parasite infects over 1 million persons each year in the United States. An estimated 4,800 individuals each year develop symptomatic eye disease from *T. gondii* infection leading to vision loss.
- There are approximately 400–4,000 cases of congenital (mother-to-child) toxoplasmosis each year.
- Individuals whose immune systems are severely compromised can develop encephalitis, or have further spread of disease, which can be fatal.

What is CDC doing to address toxoplasmosis?

- Assessing physician knowledge and practices regarding congenital toxoplasmosis (mother-to-child transmission) and ocular toxoplasmosis (infection in the eye) by collaborating with professional organizations (for example, the American College of Obstetricians and Gynecologists).
- Educating health care professionals and the public about prevention of toxoplasmosis through the Web, response to telephone inquiries, and publications in targeted journals.
- Identifying the rates of *T. gondii* infection in the United States by analyzing samples and information collected through the National Health and Nutrition Examination Study (NHANES).
- Tracking toxoplasmosis-related hospitalizations in the United States to identify trends in severe disease.
- Collaborating with the U. S. Department of Agriculture to determine the risk of *T. gondii* infection from undercooked meat ingestion.
- Identifying further risk factors for *T. gondii* infection in the United States, including those for severe and fatal toxoplasmosis in immunosuppressed persons.

What more needs to be done?

- Develop a cost-effective *T. gondii* vaccine for cats to prevent shedding of the organism in feces.
- Determine the number of children infected by mother-to-child transmission nationally to guide screening and treatment strategies for congenital toxoplasmosis.
- Improve diagnostic tests for toxoplasmosis, including polymerase chain reaction (PCR)—a technology used for amplifying DNA to better detect and study infectious diseases—and improve tests to help determine the time of infection in pregnancy.
- Evaluate the efficacy of treatments to prevent or treat eye disease, infection in pregnant women, and infection in immunosuppressed persons.
- Improve ways to prevent *T. gondii* contamination of meat, especially field-raised meat.
- Further assess the impact of toxoplasmosis on health, including mental health.
- Improve preventive health education for the public.



For more information on Neglected Parasitic Infections, please visit www.cdc.gov/parasites/npi.html