

Toxoplasmosis



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What is toxoplasmosis?

Toxoplasmosis is a disease caused by a microscopic protozoal parasite called *Toxoplasma gondii* (*T. gondii*). Many warm-blooded animals including most pets, livestock, birds, and people can become infected with *T. gondii*.

While nearly all warm-blooded animals can have *Toxoplasma* parasites in their meat, cats (all cat species, not only domestic cats) are the definitive host for *T. gondii*. This means that they are the only animals that pass oocysts (pronounced “oh-oh-sists”), the environmentally resistant stage of the parasite, in their feces (stool) to infect other animal species (including people).

Toxoplasma in cats

Cats are most commonly infected with *T. gondii* when they prey on infected mice, birds and other small animals. For indoor-only cats, the most likely source of infection is uncooked meat scraps or raw meat.



Infected animals develop cysts in their tissues that contain the parasite. When a cat eats meat or other tissues from infected animals and becomes infected with *T. gondii*, the parasite can live in the cat's tissues for the life of the cat. Almost one-third of cats in the U.S. have antibodies to *T. gondii* in their blood. When initially infected with *T. gondii*, a cat can shed (excrete) millions of oocysts in its feces (stool) each day for several days. People or other animals exposed to the infective oocysts are then infected with the *T. gondii* parasite. After the initial shedding period, most cats will not continue to pass oocysts in their feces. Cats that are shedding oocysts do not usually appear ill, and the oocysts are not visible to the naked eye.

Most infected adult cats appear healthy, with no visible signs of illness. However, some cats may develop pneumonia, liver damage and other health problems. Signs of illness in cats include lethargy, loss of appetite, coughing, difficulty breathing, diarrhea, jaundice, blindness, personality changes, eye problems and other neurologic problems. The reason why some cats get sick and others do not is unknown, but immunocompromised kittens and cats (e.g. those also infected with feline leukemia virus and/or feline immunodeficiency virus [FIV]) appear to have increased risk of illness. There is currently no vaccine available for *T. gondii*, but treatment can be effective if the disease is diagnosed early. A blood test for *T. gondii* antibodies can help in the diagnosis of toxoplasmosis in sick cats.

Toxoplasma in people

Although infection with the parasite is relatively common in people, actual disease is rare. The U.S. Centers for Disease Control and Prevention (CDC) estimate that almost one-quarter of the U.S. population 12 years and older have been infected with *T. gondii*; fortunately, a healthy immune system usually keeps the parasite in check and prevents illness. Signs of illness include mild flu-like symptoms such as fever, mild aches and pains, and enlarged lymph nodes for a short period of time, and treatment with antibiotics is generally not necessary. In immunocompromised people (e.g., HIV/AIDS positive, persons receiving cancer chemotherapy, etc.) the parasite causes more severe illness that requires treatment with antibiotics.

People can be infected with *Toxoplasma gondii* in a number of ways:

- Handling or consuming undercooked or raw meat, particularly pork, is the most common route of infection in North America. *T. gondii* tissue cysts may be found in meats from sheep, pigs, goats, and game. They are less frequently found in poultry and cattle. Locally produced cured, dried

or smoked meat can also pose an increased risk of infection.



- Consuming raw, unpasteurized milk (including goat's milk) and milk products.
- Handling or consuming unwashed fruit or vegetables that may have been contaminated with soil containing infective oocysts.
- The consumption of raw oysters, clams or mussels. *T. gondii* oocysts can survive for months in seawater.
- The ingestion of infectious oocysts from the environment. Activities such as gardening increase the risk of infection because of the direct contact with soil or water that may be contaminated with cat feces and infective oocysts. Because stray or feral cats may view a child's sandbox as a litter box, outdoor sandboxes pose a risk of *T. gondii* infection of children.
- Transmission directly to an unborn child from the mother when she becomes infected with *T. gondii* during pregnancy.

Toxoplasma gondii oocysts must spend at least 24 hours (and up to 5 days, depending on environmental conditions) in the environment to become infectious to other animals, including people. They are more likely to survive in warm, humid environments. Oocysts are very resistant and can live for months or even years in the environment.

It has been suggested that handling cats poses a risk of infection, but this activity is unlikely to pose a risk of *T. gondii* infection for humans. Since most healthy cats groom themselves frequently, and it takes a minimum of 24 hours before the oocysts in the feces are infectious, it is unlikely that feces would remain on their fur long enough for any oocysts to become infectious.

Pregnant women and immunocompromised people are at higher risk for toxoplasmosis. Usually, people that develop toxoplasmosis after infection with human immunodeficiency virus (HIV) were exposed to the *T. gondii* parasite earlier in life, and the immunosuppression caused by the HIV infection allowed the parasite to reactivate and grow unchecked. Toxoplasmosis in these patients can result in severe neurologic disease, convulsions, paralysis, coma, and death despite appropriate treatment.

Women exposed to *T. gondii* during pregnancy can pass the infection to the fetus, resulting in congenital infection of the infant. If the mother is infected with *T. gondii* during the first trimester, the infection can cause severe disease resulting in fetal death, eye disease or nervous system disease. Infections acquired later in pregnancy are less severe. Although the majority of infected infants show no symptoms at birth, many are likely to develop signs of infection later in life. Children congenitally infected with *T. gondii* may suffer from loss of vision, mental developmental disability, loss of hearing, and, in severe cases, death. Women can be tested for *T. gondii* antibodies in their blood, which indicate infection. Women infected prior to pregnancy will have protection against the parasite, and are not at risk of passing the infection to their unborn child.



However, immunocompromised and pregnant individuals can certainly have pets in their lives and benefit from animal companionship. Immunocompromised or pregnant cat owners should not feel pressured to relinquish their pets. Common sense measures that can prevent infection are listed below. If you are pregnant or immunocompromised, discuss your concerns with your physician and veterinarian.

How can exposure to *T. gondii* be prevented?

General precautions:

- Wash your hands with soap and water immediately after working with soil or after handling raw or undercooked meat, vegetables, or unpasteurized dairy products.
- Avoid consuming raw milk or other unpasteurized dairy products.
- Wash fruits and vegetables thoroughly before eating, especially those grown in backyard gardens.
- Boil water from ponds and streams when camping/hiking.
- When cooking, avoid tasting meat before it is fully cooked.
- Cook meat to appropriate temperatures to destroy the oocysts. For the appropriate temperatures, go to www.cdc.gov/toxoplasmosis/prevent.
- Thoroughly wash and disinfect cutting boards, knives, sinks and counters immediately after cutting meats.
- Cover all outside sand boxes when not in use to prevent cats from using them as litter boxes.



For cat owners:

- Remember that you are more likely to be infected with *T. gondii* from undercooked meat or the environment than from your cat, and take the precautions listed above to protect yourself.
 - Dispose of used litter safely, preferably in a sealed plastic bag
- Keep your cat indoors - do not allow your cat(s) to hunt rodents and birds.
- Avoid raw foods. Only feed your cats cooked meat or processed food.
- Change the cat litter daily before *T. gondii* oocysts “ripen” and become infectious.
 - Dispose of used litter safely, preferably in a sealed plastic bag
- If your cat has long hair on its rear end that tends to collect fecal material, carefully trim the hair or have your cat professionally groomed to keep the area clean. Similarly, if your cat is too overweight, ill or arthritic to adequately groom itself, you may need to groom the cat (wash your hands afterward) or have it professionally groomed.

If you are pregnant or immunocompromised, follow these additional precautions:

- If possible, do not handle stray cats or adopt new cats during your pregnancy or illness. If a new cat comes into your family during this time, have it thoroughly examined by a veterinarian immediately to ensure it is healthy and to answer any questions you may have.
- Take extra precautions (hand washing, etc.) to avoid contact with cat feces.
- If you own a cat, avoid changing the litter box if possible (e.g., ask your spouse, roommate, etc. to change the litter box) or change it daily (to avoid contact with oocysts after they have had sufficient time to become infectious), use rubber gloves when doing so, and wash your hands thoroughly afterwards.

For additional information on toxoplasmosis in people, visit
www.cdc.gov/parasites/toxoplasmosis



American Veterinary Medical Association
1931 North Meacham Road, Suite 100
Schaumburg, Illinois 60173 - 4360
Phone: 847.925.8070 • Fax: 847.925.1329
www.avma.org • AVMAinfo@avma.org