



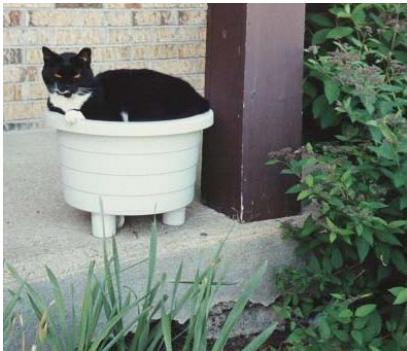
## General Information

- *Toxoplasma gondii* is a protozoal parasite capable of infecting any warm-blooded animal, including humans.
- Cats are the only species which can shed one of the infective stages of the parasite (oocysts) in their stool. In all other animals (and humans) the parasite forms microscopic cysts in the tissues which can only infect another animal or person if the tissue (such as muscle) is ingested.
- In all species, *Toxoplasma* infection usually causes no illness, but sometimes it causes mild signs like fever and swollen lymph nodes. In immunocompromised (e.g. HIV/AIDS, cancer or transplant patients) or pregnant animals and people, the infection may be more serious.
- There are three important ways of transmitting *Toxoplasma*:
  - ▶ Eating undercooked meat containing *Toxoplasma* tissue cysts.
  - ▶ Ingesting *Toxoplasma* oocysts from cat feces, either directly or in contaminated food, water or soil.
  - ▶ If a woman or female animal is infected for the first time while pregnant, the parasite may also infect the fetus.
- The risk of contracting *Toxoplasma* infection (toxoplasmosis) from cleaning the litter box of a house cat is very small, especially if a few simple precautions such as appropriate hand washing are observed.



## How Common Is *Toxoplasma*?

- *Toxoplasma* is one of the most widespread zoonotic infections in the world.
- It has been estimated that 225 000 cases of clinical toxoplasmosis (i.e. with signs of sickness) occur annually in the USA, and that 50% of these are due to transmission from contaminated food or infected meat.
- In North America, about 1/4 of the population has probably been exposed to *Toxoplasma*. Most people don't even know they've been exposed and will never be sick from the disease. Cultural habits affecting how food is handled and cooked, how cats are handled, and personal hygiene can significantly affect the risk of exposure.
- Between 40 to 400 children born in Canada each year are infected with *Toxoplasma* before birth.
- The prevalence of oocyst shedding in cats is very low (0-1%), even though at least 15-40% of cats have been infected with *Toxoplasma* at some point. This means very few cats at any one time are actually able to pass their infection on to people. Infection is more common in pets that go outside, hunt, or are fed raw meat.



## How Is *Toxoplasma* Spread?

- The risk of transmission of *Toxoplasma* from a household cat is small, and can be easily controlled by good hygiene when handling litter and stool.
- Contamination of water sources and soil with the stool of wild or domestic cats is more difficult to control, and can lead to infection due to ingestion of oocysts on unwashed, uncooked vegetables or in contaminated water. Insects may also transfer infectious *Toxoplasma* oocysts from cat feces to food, water, or utensils.
- Contact with contaminated soil or sand, such as in a garden or a sandbox, may also be associated with *Toxoplasma* infection.
- Eating undercooked meat, especially from free-range pigs, sheep, goats or wild game, is one of the most common ways of contracting *Toxoplasma*.

## What Does *Toxoplasma* Do?

- If a **person or another animal** (other than a cat) eats *Toxoplasma* oocysts or tissue cysts, the parasite takes the form of tachyzoites. Tachyzoites can travel through the tissues anywhere in the body, multiplying as they go. Eventually the tachyzoites slow down and stop multiplying, and form cysts within the remains of the last cell they invaded, often a muscle cell. The cysts persist for the life of the person or animal, and usually don't cause any problems. However, if the body's immune system is weakened, the organisms in the cysts may reactivate and start multiplying and spreading again. Usually the damage done by the spreading tachyzoites doesn't cause any problems, but if they get out of control the effects can be much worse. The organs most commonly damaged are the lungs, liver, brain and eyes, but any organ can be affected.
- If a **cat** eats either oocysts or tissue cysts, the parasite does two things – some of the organisms multiply in the intestine to form more oocysts, which are passed in the cat's stool. This process only happens in cats. The parasite can also form tachyzoites, which migrate through the cat's body to form more tissue cysts, just like in people and other animals.



## Important Facts About *Toxoplasma* Infection

- Once an animal or a person is infected with *Toxoplasma*, they are usually immune to reinfection for the rest of their lives, unless their immune system becomes weakened.
- Once a cat is infected with *Toxoplasma*, it will usually start shedding oocysts in its stool in 3-10 days and then stop in less than 3 weeks. Although it is possible for the cat to shed oocysts again if it is re-exposed to the parasite, this is thought to be uncommon and it will shed far fewer oocysts than the first time.
- If a previously infected cat develops a disease or is given drugs that inhibit the immune system, it may start to shed oocysts in its stool again. However, overall very few cats are shedding oocysts at any one time.
- Pregnant women (and animals) will only pass the infection on to their babies if they are infected for the first time while they are pregnant. If they were infected before they became pregnant, their immune system will protect their babies (and themselves) if they are exposed to the parasite again.

## How Do I Know If My Pet Or I Have *Toxoplasma*?

- Usually you don't ever know that you or your pet has been infected by *Toxoplasma*.
- Occasionally the infection (in a person or a pet) may cause mild fever, lethargy and swollen lymph nodes.
  - If the immune system cannot control the spread of the tachyzoites, they can damage the liver, lungs, eyes, brain, muscle and other organs. The person or animal will be very sick, but could have many different signs, which may appear slowly or very suddenly. Your doctor or your pet's veterinarian will have to run several tests to determine if the sickness is being caused by *Toxoplasma* and not by another infection or disease.
    - Worldwide, infection of the brain (*Toxoplasma* encephalitis) develops at some time in approximately 40% of people who have HIV/AIDS. This condition is very hard to treat in these patients, so they are often treated preventatively with antibiotics.
  - If an animal is infected when it is pregnant, its young may be born dead or very sick, and die soon after.
- If a woman is infected when she is pregnant, the baby may die before or soon after being born, develop mental problems, or the baby may be normal and not show any signs of infection until the person is an adult. Eye problems are very common in these delayed-onset cases.



## Should I Test My Cat For *Toxoplasma*?

There is very little value in testing your cat for *Toxoplasma*, because:

- Although 15-40% of cats have been exposed to *Toxoplasma*, less than 1% of all cats are shedding oocysts at any one time, and even some of these may be shedding so few oocysts that they can't be detected in the stool. Young cats and kittens are more likely to be shedding than older cats which are already immune, but they may still be hard to catch during their short shedding period.
- If a blood test shows your cat has been exposed to *Toxoplasma* (i.e. seropositive), it is probably already immune and no longer shedding oocysts. However, it could potentially shed small numbers of oocysts if it is re-exposed.
- If a blood test shows your cat has not been exposed to *Toxoplasma* (i.e. seronegative), then it is also likely not shedding oocysts. However, if it is exposed, it will likely shed a large number of oocysts for a short time.



**Try to minimize your cat's exposure to *Toxoplasma* by keeping it indoors and not feeding it raw meat.**

## Should I Be Tested For *Toxoplasma*?

Testing healthy pregnant women for *Toxoplasma* is not generally recommended in the USA and Canada, as it is in some European countries such as Belgium and France, because the risk of exposure to *Toxoplasma* is comparatively low. If you are concerned, or if you have traveled to another country where *Toxoplasma* is more common, talk to your doctor about whether or not you should be tested.

## How Is Toxoplasmosis Treated?

- Toxoplasmosis only needs to be treated (with antibiotics) if the person or animal is pregnant or really sick. However, if a person or animal develops a disease or needs to be treated with drugs that will severely inhibit the immune system, they may need to be treated preventatively, because if *Toxoplasma* is already present in their body in cysts, it may be reactivated and cause a lot of damage to their vital organs.
- In the exceptional case that a cat is found to be shedding oocysts, treatment is not necessary. However, if the cat lives with a high-risk individual, it should be removed from the premises temporarily and may be treated to help it stop shedding oocysts sooner. There is no vaccine available for *Toxoplasma* in cats, dogs or people.



## How Do I Stop My Cat From Giving Me *Toxoplasma*?

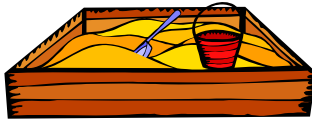
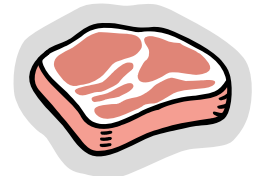


Given the emotional benefits associated with owning a cat, and the minimal risk of contracting *Toxoplasma* infection from a house cat if proper hygiene is practiced, **pregnant or immunocompromised people do NOT need to give up their cats**, but they should avoid contact with cat litter and litter boxes if at all possible, by having someone else clean their cat's litter box for them.

- Because cats are usually meticulous groomers, it is unlikely that oocysts will be found on their fur, so regular handling of your cat is not a significant risk.
  - Oocysts in cat stool actually take 24 hours or more to develop into their infective state. Removing the stool from your cat's litter box every day therefore reduces exposure to infective *Toxoplasma* oocysts.
  - Once the oocysts become infective, they are very resistant to disinfectants, but can still be killed by soaking and cleaning the litter box and other objects in scalding or boiling water.
- Always wash your hands thoroughly after contact with cat stool, cat litter or the cat litter box.
  - Keeping your cat indoors and controlling rodents in the house will decrease the risk of your cat being exposed to *Toxoplasma* through hunting rodents and birds, and therefore also the risk that it will shed oocysts in its stool. Don't feed your cat raw or undercooked meat for the same reason.

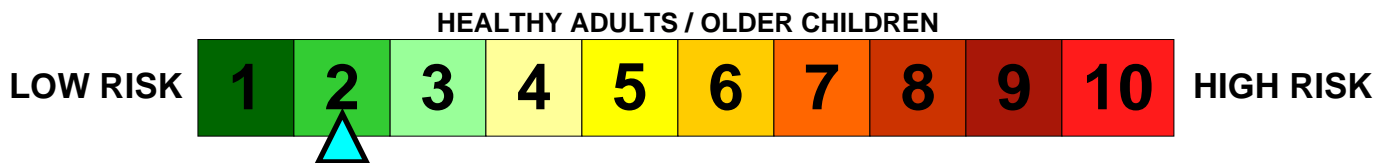
## What Else Can I Do To Prevent Toxoplasmosis?

- Cook all meat, especially pork, lamb, mutton and wild game, to an internal temperature of 67°C/153°F or higher.
- Peel or thoroughly wash all fruit and vegetables before eating them
- Clean all surfaces and objects that come in contact with raw meat or unwashed fruit and vegetables with scalding or boiling hot water.



- Wild or domestic cats may use gardens, flower pots, and sandboxes as litter boxes. Always wash your hands thoroughly after working in the garden or with soil/dirt. Keep sandboxes covered to prevent cats and other animals from contaminating them with stool. Ensure children do not eat sand and that they wash their hands well after playing in the sandbox.

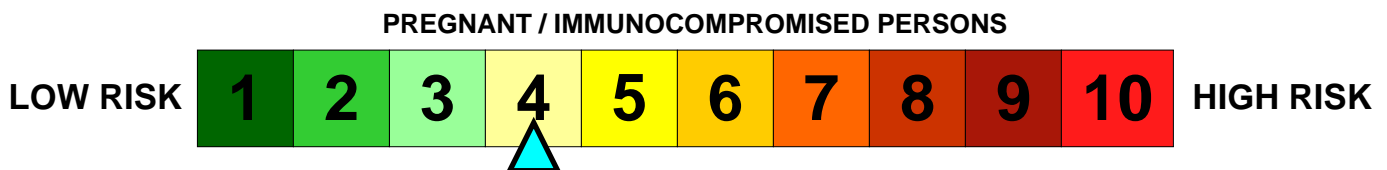
The zoonotic risk to **healthy adults** and **older children** (over 5 years) posed by *Toxoplasma* in household cats is:



**Pregnant women** and **immunocompromised individuals** must be particularly diligent in following all of the guidelines outlined above, because infection with *Toxoplasma* is often much more serious in these individuals.

- They should **avoid contact with cat stool, litter**, garden soil and sand that may be contaminated with cat stool.
- If it cannot be avoided, they should wear gloves and wash their hands immediately when the task is finished.
- They should also avoid contact with kittens and young cats, as these animals are more likely to shed oocysts in their stool.

For these groups, the zoonotic risk posed by *Toxoplasma* in household cats is:



## Additional Information

Centers for Disease Control and Prevention (CDC) Toxoplasmosis homepage: <http://www.cdc.gov/toxoplasmosis/>