

## What Are Tapeworms?

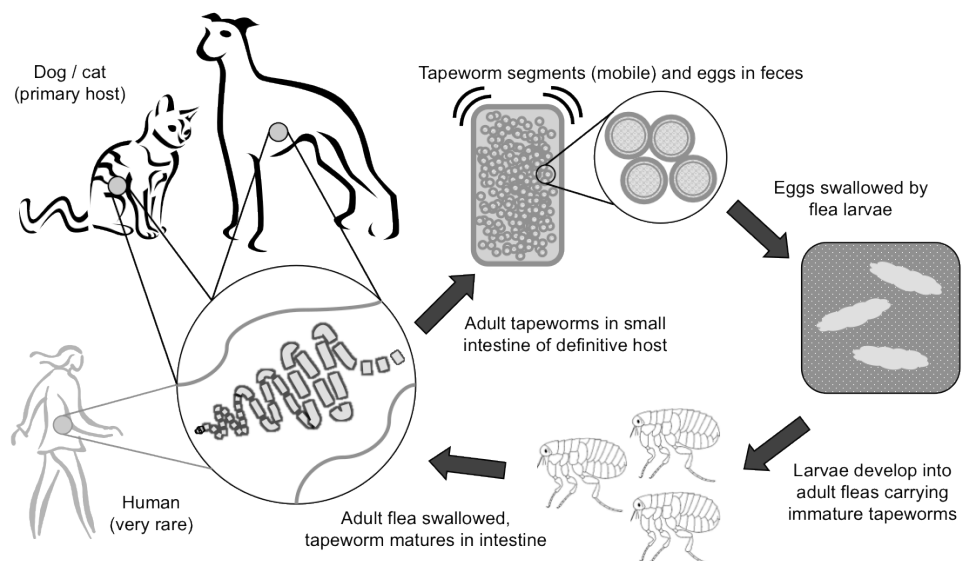
- Tapeworms are parasites that live in the small intestines of many different species of animals, including humans.
- Depending on the species, these tapeworms can vary greatly in length. For example, *Echinococcus multilocularis* is less than 1 cm long, whereas an adult *Taenia saginata* may be up to 10 metres long!
- Except for the head, a tapeworm's body is made up entirely of small segments, called **proglottids**, which break off from the end of the worm's tail as it grows and contain the parasite's eggs. Both intact proglottids (which can **move** by themselves!) and eggs may be passed in the feces.
- Of all the tapeworms in pets, *Echinococcus* spp. pose the greatest disease risk to people. An information sheet specifically about *Echinococcus* spp. can be found on the [Worms & Germs Resources – Pets](#) page.



## Different Tapeworms, Different Risks

There are three main groups of tapeworms, each containing one or more species, that are a concern for most domestic animals and humans. Each group poses a different level of risk to people, and may be spread between animals and people in a different way:

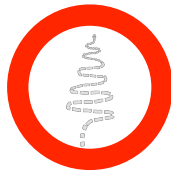
Figure 1: Life cycle of *Dipylidium caninum* tapeworms causing intestinal infection in dogs and cats



### *Dipylidium caninum*

- This is the **most common** type of tapeworm found in dogs and cats in North America, and can be found in pets worldwide.
- The eggs of *D. caninum* are passed in an animal's feces, but cannot infect people or animals at this stage. The eggs are eaten by flea larvae, and they develop into their infective form as the flea larvae mature into adult fleas. The tapeworm can then be transmitted to a new host by swallowing the entire flea.
- After an animal or a person swallows an infected flea, the tapeworm can then mature into an adult in the small intestine and begin shedding eggs, starting the cycle all over again.
  - ▶ **Human infection with *D. caninum* is rare**, but is most commonly reported in children. Most intestinal tapeworm infections in people are caused by human-adapted *Taenia* species that are not transmitted by pets.
- Infection with *D. caninum* usually does not make animals or people sick, but it can be uncomfortable because the **proglottids** shed by the worms (which are typically about the size of a grain of rice) can move by themselves, and may get stuck around the anus, causing itching. In dogs this can be a cause of "scooting" (when a dog drags its bum across the floor). The image to the right shows a close-up of a single proglottid, and each black dot is a "packet" of tapeworm eggs.
  - ▶ Occasionally infected dogs or cats may vomit part or all of a large tapeworm from the portion of the small intestine closest to the stomach.
  - ▶ Infections with a large number of worms can cause weight loss in pets.
  - ▶ Intestinal tapeworm infection of this kind in animals or people is easily treated with oral anti-parasitic drugs, but since fleas are also required for infection, **flea infestation always needs to be addressed** too.

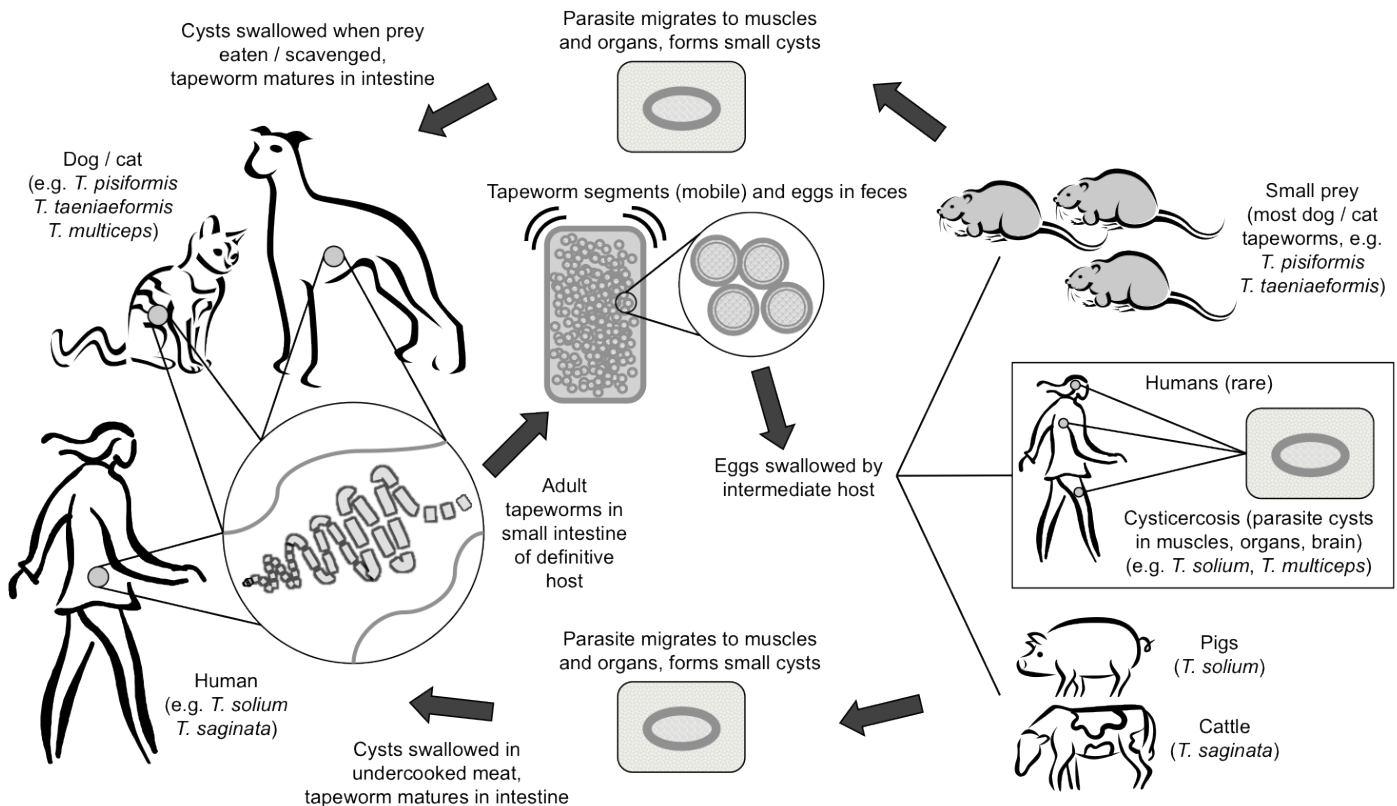




## *Taenia* spp.

- Human infections with certain tapeworm species in this group are a significant problem in some areas, but most of these species come from livestock - **those that infect pets rarely cause infection of any kind in people.**
- In general, *Taenia* species can cause two kinds of infection in humans:
  - Cysticercosis:** This condition occurs when a person swallows eggs from certain *Taenia* species, such as *T. solium*, which are shed in the feces of people with intestinal tapeworm infections.
    - Once swallowed, the eggs hatch and the larvae migrate through the body tissues, and eventually each one may form a small cyst. Most of the time these cysts cause few to no problems, unless there is a very large number of them, and/or if they form in a very sensitive area, such as the brain or eye.
    - This type of infection can be caused by a few *Taenia* species that infect pets (such as *T. multiceps*), but this is very rare, and mostly occurs in areas of Africa and South America.
  - Intestinal tapeworm infection (taeniasis):** This occurs when a person eats a tapeworm cyst (the parasite's intermediate stage) that has formed in the muscle or organs of certain animals, such as *T. saginata* in cattle or *T. solium* in pigs. *Taenia* species that infect pets do not cause intestinal infection in people.
    - The intermediate stage matures in the person's intestine to become an adult tapeworm, which then begins shedding eggs that can infect other people or animals, in some cases causing cysticercosis.
      - Eating raw or undercooked beef or pork is a very important risk factor for taeniasis in people. If meat is cooked properly, any tapeworm cysts that are present are killed and are no longer infectious.
      - In order for animals to become infected with the intermediate stage (cysticercosis) of a *Taenia* tapeworm that infects humans, they must have contact with feces from an infected person. Taeniasis is therefore more common in regions where cattle and pigs (e.g. animals that produce meat for human consumption) may have access to human sewage (i.e. where sanitation is poor).
- Similarly, pets can develop intestinal *Taenia* infections by eating small animals that have tapeworm cysts in their tissues, but these tapeworm species are mostly different from those that infect people. In North America, the most common species of tapeworms in pets are *T. pisiformis* in dogs and *T. taeniaeformis* in cats.
  - Taenia* infections in dogs and cats are more common in warmer regions, and have been found in as much as 45%-76% of stray or feral animals, but the prevalence in household pets is usually much lower ( $\leq 4\%$ ).
  - The biggest problem with *Taenia* infections in pets is the parasite eggs appear identical to those of *Echinococcus* spp., which are a much greater concern for people.

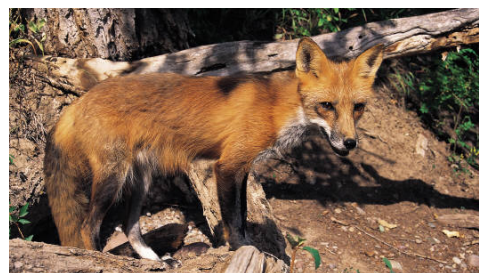
Figure 2: Life cycle of *Taenia* spp. tapeworms causing intestinal infection in domestic animals and cystic disease in people





## Echinococcus spp.

- These tapeworms are very small compared to *D. caninum* and *Taenia* spp., but they can cause some of the most severe disease in people. These parasites typically infect wildlife, but can also infect dogs (and very rarely cats), which can lead to a higher risk of human exposure. *Echinococcus* infection in people can result in the formation of slow-growing hydatid cysts (**cystic echinococcosis** (CE)) or alveolar hydatid cysts (**alveolar echinococcosis** (AE)).
- For more details about *Echinococcus*, please see the Worms & Germs *Echinococcus* information sheet.



## Table of tapeworm species that can be transmitted between humans and domestic animals:

Tapeworm group	Tapeworm species	Definitive host (intestinal worm)	Intermediate host (cyst stage)	Notes
<i>Dipylidium</i> spp.	<i>D. caninum</i>	Dogs Cats Humans (rare)	Fleas	Transmitted by swallowing infected adult flea
<i>Taenia</i> spp.*	<i>T. solium</i>	Humans	<b>Cysticercosis</b> Pigs Humans	Intestinal infection from eating undercooked pork, cysticercosis from contact with human sewage
	<i>T. saginata</i>	Humans	Cattle	Intestinal infection from eating undercooked beef
	<i>T. multiceps</i> <i>T. crassiceps</i> <i>T. serialis</i>	Dogs	Small prey Humans (rare)	RARE cause of cysticercosis
<i>Echinococcus</i> spp.	<i>E. granulosus</i>	Wild canids (especially foxes & wolves) Dogs	<b>Cystic echinococcosis</b> Humans Medium to large prey: Rabbits, sheep, moose	Eggs identical to <i>Taenia</i> spp.  Infection in humans is uncommon or rare in some areas, but can be extremely serious
	<i>E. multilocularis</i>	Wild canids (especially foxes) Dogs Cats	<b>Alveolar echinococcosis</b> Humans Small prey: Voles, mice, lemmings	

\* There are several other species of *Taenia* species that can infect dogs and cats (e.g. *T. pisiformis*, *T. taeniaeformis*), but their intermediate hosts are all small prey species and they **do not infect humans**.

## How do I know if my pet has tapeworms?

- Tapeworm infection in adult animals rarely causes illness, even with large numbers of worms, but the motile proglottids may cause irritation around the anus, causing the animal to chew or rub the area or "scoot".
- Your veterinarian can perform a fecal "float" on your pet to look for eggs of tapeworms (and other parasites) in the feces. It is important to have this done regularly.
  - ▶ It is impossible to tell *Echinococcus* eggs from the eggs of *Taenia* tapeworms based on a fecal float. The intact proglottids (egg sacs) of *Echinococcus* are distinguishable from *Taenia*, but they are very small and extremely difficult to find.
  - ▶ Pets infected with *Echinococcus* may not pass tapeworm eggs in every fecal sample, so even if the fecal test is negative, it is still important to pick up after your pet and use good hygiene when handling your pet's feces, especially if you live in an area where *Echinococcus* is endemic.







## How are tapeworm infections treated?

In pets, intestinal tapeworm infections are easily treated using oral dewormers such as praziquantel. Nonetheless, if your pet needs to be treated for tapeworms, it is important to also take steps to prevent your pet from being reinfected afterwards (see below).

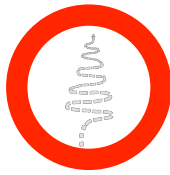
- ▶ Pets may shed very high numbers of parasite eggs for a few days after being treated, so be particularly diligent about removing pet feces promptly and hand washing.
- ▶ People with intestinal tapeworm infections are typically treated the same way as pets (using an oral dewormer).

## How can I prevent tapeworm infection in me, my pets & my family?

The two major components of preventing tapeworm infection in people are preventing intestinal infection in pets and preventing human exposure to the parasite eggs and cysts.

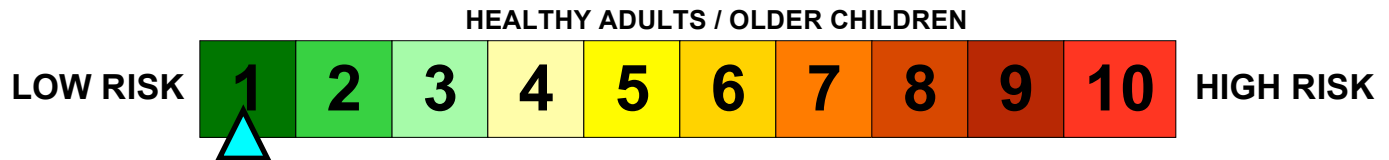
- ▶ **Have your veterinarian check your pet's feces** at least once a year to detect parasite eggs. In areas where *Echinococcus* has been recently reported, it's best to do this several times per year.
  - Because pets may not pass tapeworm eggs in every fecal sample, testing three fecal samples collected over the course of a week is recommended to decrease the likelihood of a false-negative test.
  - **Remember:** It is impossible to tell *Echinococcus* eggs (which are high risk for people) from the eggs of *Taenia* tapeworms, so it is best to err on the side of caution and always treat pets that are shedding tapeworm eggs, but regular deworming alone may not be effective if other precautions are not taken as well.
- ▶ **Flea control** is essential for preventing *D. caninum* infection in pets, because without adult fleas the parasite cannot be transmitted. Remember that pets can be exposed to fleas from other animals if they go outside, even if they don't become infested themselves.
- ▶ **Do not allow pets to hunt or scavenge** other animals. Keep cats indoors and prevent rodent infestations in the house. Keep dogs on a leash or at least in sight when outdoors. Do not allow hunting dogs to eat raw offal. Ensure all meat or other animal-based products are properly cooked before being fed to pets, especially if the animal source is from an area where *Echinococcus* is endemic.
  - Meat for human consumption should also always be thoroughly cooked to reduce the risk of transmission of a variety of parasites and bacteria, including tapeworms.
- ▶ **Pick up pet feces** promptly and **wash you hands** thoroughly afterwards.
- ▶ **If working with soil**, especially in an area where the soil may be contaminated by feces from foxes, feral dogs or similar animals, always wear gloves and wash hands thoroughly when done.



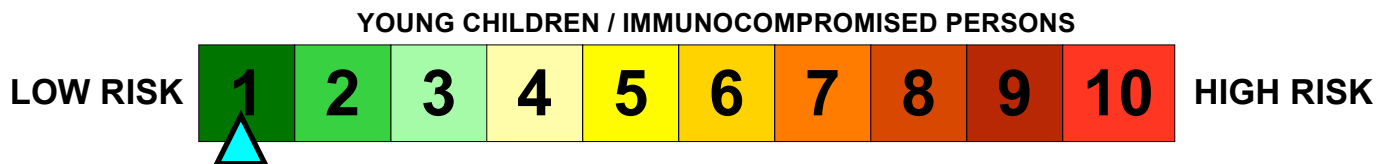


## What is the risk?

For **healthy adults and older children**, the risk of infection with tapeworms of any kind from most pets is very low, but the risk is higher for individuals who live in *Echinococcus*-endemic areas, whose work or recreational activities involve direct contact with soil, and whose pets are allowed to roam, hunt and eat raw tissues from wild animals. In general, for those who live in non-endemic regions and do not have these risk factors, the risk of tapeworm infection from pets is:



It is unknown if **people who are immunocompromised** (e.g. HIV/AIDS patients, transplant recipients, cancer patients) are more susceptible to infection with tapeworms, but such individuals are more likely to develop secondary complications because their immune systems in general cannot fight infections as efficiently. **Young children** may be more likely to swallow parasite eggs if they have contact with contaminated soil while playing. Nonetheless, for these groups, living in non-endemic regions, the risk of tapeworm infection from pets is:

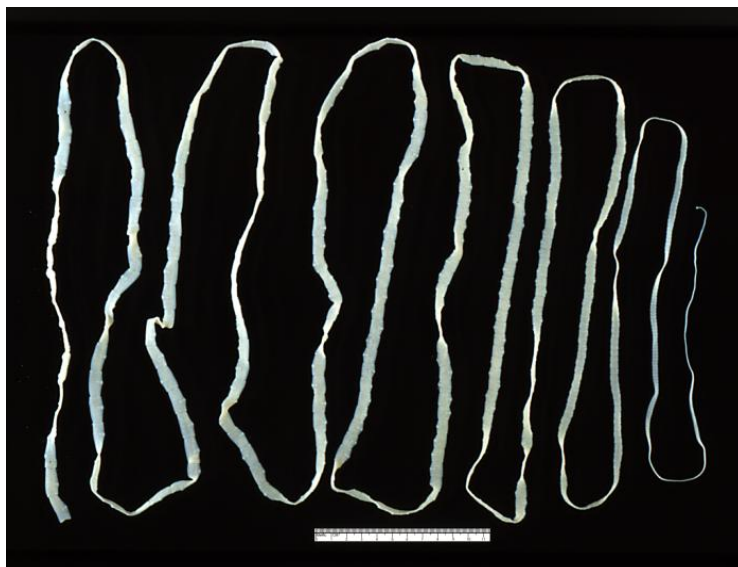


### Additional Information:

Centers for Disease Control and Prevention (CDC) webpages:

- *Dipylidium caninum* (<http://www.cdc.gov/parasites/dipylidium/>)
- *Taenia* spp. and cysticercosis (<http://www.cdc.gov/parasites/taeniasis/>)
- *Echinococcus* spp. (<http://www.cdc.gov/parasites/echinococcosis/>)

Below: An adult *Taenia saginata* tapeworm. The adults live in the small intestine of humans and can reach several metres in length, but this species is not transmitted by dogs and cats. *Taenia* species that infect dogs are a rare cause of cysticercosis in humans.



CDC Public Health Image Library ([phil.cdc.gov](http://phil.cdc.gov))