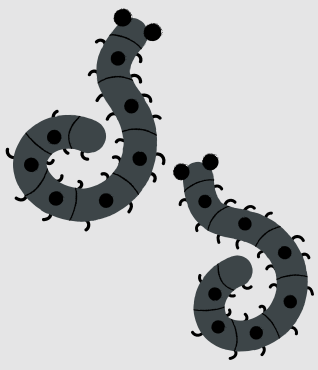
HOOKWORMS

Ancylostoma caninum, Ancylostoma braziliense, Unicinaria stenocephala

1 LIFE CYCLE



- Dogs can be infected by ingesting larva, migration of larvae through the skin, and/or by consuming infected prey.
- Adult worms attach to the mucosa of the small intestine, digesting tissue and sucking blood, causing bleeding ulcers.
- Larvae will migrate into tissues, enter a dormant phase and be activated to replace any dead adults in the small intestine.
- Hookworms only survive in the environment a few months; freezing kills the larvae.

2 IMPACT ON PREGNANCY AND NEONATES

- Dormant larvae in tissue are activated during pregnancy, migrate to mammary tissue and infect neonatal pups via ingestion of larvae while nursing.

3 PREVALENCE

- Hookworms are common in tropical and subtropical areas of the world including the southern parts of the US.
- In 2020, there were close to 225,000 positive cases in the US.
- Infection can occur in all dogs, even those on a monthly preventative.

4 SYMPTOMS

- Hookworms cause serious disease in puppies.
- Symptoms include failure to grow, poor coat, dehydration, pale gums, anemia, and dark, tarry diarrhea.
- Adult dogs are typically asymptomatic, but if they are stressed, undernourished, or immunocompromised they can develop anemia, anorexia, weakness and tarry diarrhea.
- Skin penetration of hookworms can cause red itchy skin (dermatitis) at the site of penetration, most commonly on the feet and between the toes.

5 DIAGNOSIS & PREVENTION

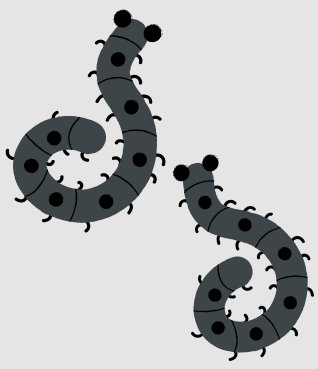
- Fecal flotation with centrifugation in combination with antigen tests is recommended 2-4 times in the pups first year and 1-2 times a year for adult dogs.
- It should be assumed that all puppies are infected so they should be treated accordingly.
- For adult dogs, infection can be prevented with a monthly broad-spectrum control product given year round or use of a broad spectrum antiparasitic drug (anthelmintic) 4 times a year.
- Many products are available to treat the adult stage of the parasite, but routine antiparasitic drugs (anthelmintics) DO NOT treat the dormant larval stage in tissues.
- Note: Dogs, Greyhounds especially, residing in the southeastern US have been found to have multi-drug resistant infections that are difficult to clear, requiring combination drug treatments for a year or longer.

https://capcvet.org/guidelines/hookworms/

WHIPWORMS

Trichuris vulpis

1 LIFE CYCLE



- Whipworms pass in stool in the form of eggs, which develop in 9-21 days depending on the environmental conditions.
- Some infective eggs can remain viable in the environment for years.
- Dogs are infected by ingesting eggs from the environment.
- The eggs hatch in the small intestines, the larvae develop for 2-10 days, move to the end of the small intestine or colon, and mature into adults.
- Adult worms feed off of blood, tissue, and mucous from the GI tract.

2 IMPACT ON PREGNANCY AND NEONATES

- Transmission to pups through placenta or milk does **not** occur. Dogs can only acquire whipworms from ingesting infective eggs from the environment.

3 PREVALENCE

- Whipworms are a common parasite worldwide.
- They are endemic in all US states, with the highest prevalence being in Midwest and Southeastern states.
- In 2020 close to 40,000 positive cases were diagnosed in the US.

4 SYMPTOMS

- Many cases are asymptomatic, but with an increasing number of worms, signs include diarrhea with blood and mucus.
- Severe infections can progress to weight loss, dehydration, and anemia.

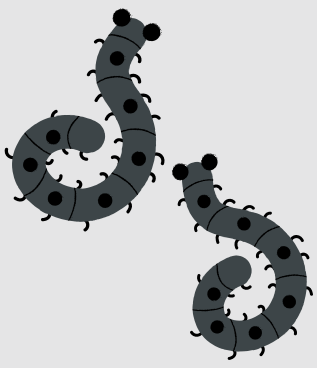
5 DIAGNOSIS & PREVENTION

- Fecal flotation with centrifugation in combination with antigen tests is recommended 2-4 times in the pups first year and then 1-2 times a year for adult dogs.
- It's important to note that eggs are not often found in feces until pups are 3-6 months old, due to the long period of time it takes for worms to mature.
- For adult dogs, infection can be prevented with a monthly broad-spectrum control product given year round or use of a broad spectrum antiparasitic drug (anthelmintic) 4 times a year.

https://capcvet.org/guidelines/trichuris-vulpis/

TAPEWORMS

Cestode parasites; many species each with unique lifecycles and hosts



1 LIFE CYCLE

- Tapeworms develop in multiple stages with specific hosts for each stage.
- Infected dogs shed eggs in their feces.
- Dogs become infected when they ingest fleas, lice or prey, including fish, that contain larvae in their tissue.

2 IMPACT ON PREGNANCY AND NEONATES

- Transmission to pups through placenta or milk does **not** occur.

3 PREVALENCE

- Many different species of tapeworms are found throughout North America.
- Prevalence in pets is partially dependent on lifestyle and the amount of prey the dog consumes.

4 SYMPTOMS

- Irritation of the perianal area after passing eggs in stool.
- While rare, the impaction of a large number of tapeworms in the small intestine may require surgical removal.
- Other common symptoms include diarrhea, weight loss, and vomiting.
- Bleeding and organ failure can occur if larvae form cysts in the dog's organs.

5 DIAGNOSIS & PREVENTION

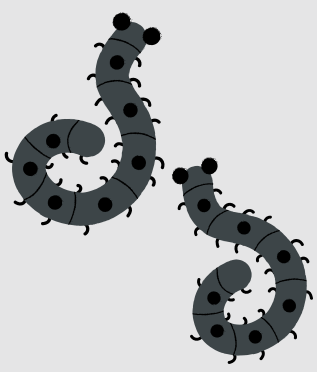
- Fecal flotation tests can identify eggs, or segments of the tapeworm can be seen in feces.
- Prevent dogs from eating prey, as well as raw or undercooked fish.

https://capcvet.org/guidelines/dipylidium-caninum/

COCCIDIA

Cystoisospora, also referred to as Isospora, spp include C. canis, C. ohioensis, C. neorivolta, C. burrows

single cell parasite



1 LIFE CYCLE

- 5 stage life cycle with dogs infected by ingesting infective eggs from the environment, or ingesting rats and mice infected with the zoite stage.

2 IMPACT ON PREGNANCY AND NEONATES

- Transmission to pups through placenta or milk does **not** occur.

3 PREVALENCE

- Common in dogs with research indicating coccidia is present in 3-38% of dogs
- Puppies are at greater risk than adults.

4 SYMPTOMS

- Symptoms include diarrhea, weight loss, and dehydration.
- In severe cases, symptoms include anorexia, vomiting, and depression.
- Asymptomatic dogs may still shed eggs.
- There is an increased risk associated with concurrent infections, immunosuppression, and environmental stressors such as transportation or rehoming.

5 DIAGNOSIS & PREVENTION

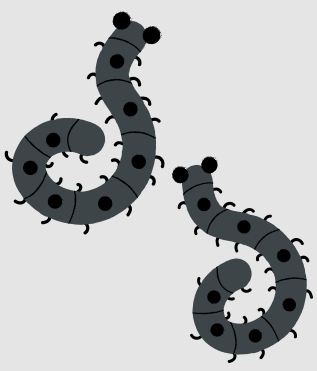
- Fecal flotation with centrifugation.
- Infective oocytes are resistant to most disinfectants and can persist in the environment for months.
- Preventing environmental contamination through routine sanitation and daily removal of feces will help decrease the spread.
- Decrease risk by pressure washing kennels and treating all animals in contact with infected individuals.

https://capcvet.org/guidelines/coccidia/

GIARDIA

Giardia duodenalis

simple, one-celled microorganism



1 LIFE CYCLE

- The number of giardia strains is unknown.
- The cystic stage can survive in the environment for several months, and especially favors wet or damp conditions.
- Transmission occurs from ingestion of cysts from contaminated objects, water, or food, as well as self-grooming.
- Trophozoites, the mobile stage, attach to the lining of the small intestine, causing damage that leads to maldigestion, malabsorption, and diarrhea.

2 IMPACT ON PREGNANCY AND NEONATES

- Transmission to pups through placenta or milk does not occur.

3 PREVALENCE

- Giardia is the most common intestinal parasite in dogs with over 560,000 reported cases in 2020, but regional differences exist with the Western and Northwestern parts of the US at greater risk.
- Dogs living in facilities with high population densities such as shelters, breeder facilities, and kennels, are more likely to be infected.
- Dogs that visit dog parks are also more commonly infected.

4 SYMPTOMS

- Watery diarrhea is common, with other signs including weight loss and chronic-intermittent diarrhea.
- Giardia may be severe or fatal if untreated in dogs with immature or compromised immune systems.
- Puppies are most likely to exhibit symptoms, while many healthy adult dogs are asymptomatic.

5 DIAGNOSIS & PREVENTION

- Giardia is difficult to diagnose and may require repeated testing over several days using multiple techniques including fecal flotation, direct smear, and an ELISA assay optimized for use in dogs.
- Clean feces from the dog's area daily.
- Thoroughly clean and dry bedding materials, crates, and kennels.
- Prevent reinfection through self-grooming by bathing dogs while treating them.
- Hard surfaces can be disinfected (diluted chlorine bleach or Lysol) or steam-cleaned.
- Grass, soil, and standing water can be difficult to decontaminate.

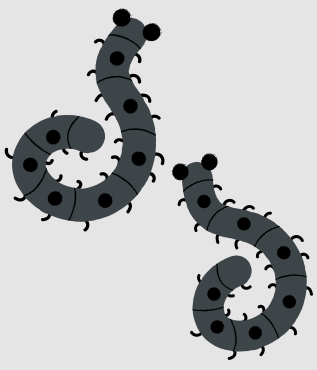
https://capcvet.org/guidelines/giardia/

ASCARIDS

Toxocara canis, Toxascaris leonina

commonly known as roundworms

1 LIFE CYCLE



- Dogs can become infected by ingesting larvated eggs, or by ingesting infected prey.
- Once ingested, larvated eggs migrate to the liver, lungs, into the airways, and are coughed up and swallowed to enter the intestinal tract and develop in the small intestine.
- If a dog ingests larvae in prey or meat, they go straight into the intestines to develop.

2 IMPACT ON PREGNANCY AND NEONATES

- Enclosed cysts, reactivated during pregnancy, travel through the umbilical vein to the fetal puppies, where they will remain in their liver and lungs until birth. After birth, they will continue to migrate across their airways.
- Larvae can also be transmitted to nursing puppies through milk.

3 PREVALENCE

- Common worldwide, including every state in the US, with over 130,000 positive cases reported in 2020.
- Dogs that live outside or consume infected prey including rabbits or birds, are at increased risk.
- Re-infection can occur even with monthly preventative care.
- Studies show virtually all puppies are born infected.

4 SYMPTOMS

- Symptoms are most severe in young pups, but are rarely a problem in dogs over a year old.
- Infected pups may fail to thrive or gain weight, have a pot-bellied appearance, or have a poor coat. Severe infection in pups may be fatal.
- At 4-6 months, untreated infection may result in vomiting a large number of worms.

5 DIAGNOSIS & PREVENTION

- Fecal flotation test is recommended 2-4 times in the pups first year and 1-2 times a year for adult dogs; antigen tests are also available.
- Starting puppies on antiparasitic drugs (anthelmintics) every 2 weeks beginning at 2 weeks of age until 4-8 weeks old, then start on monthly, broad-spectrum parasite control.
- For adult dogs, infection can be prevented with a monthly broad-spectrum control product given year round.
- Ascarid eggs are difficult to remove from the environment, so the best way to prevent them is by controlling the infection in dogs.

https://capcvet.org/guidelines/ascarid/