In most practices, veterinary technicians and veterinary assistants evaluate fecal samples daily. There are common parasites that we see such as roundworms, hookworms, coccidia and occasionally whipworms but what fecal parasites could you be missing? Are you using the right technique to find the fecal parasites? Can knowing the history or physical exam findings assist you in better fecal sample evaluation? How do you treat the parasites that are found? Can any of these parasites affect you?

The most important thing to remember when evaluating fecal samples for parasites is to protect yourself. You should wear gloves when prepping fecal samples for evaluation and no food or drinks should be in the area. You need to wash your hands after prepping and reading the samples as well. Common items for fecal evaluation include a timer, clean slides, cover slips, microscope, and depending on type of flotation technique used either a fecalyzer kit or centrifuge and test tubes, and finally the appropriate flotation solution. The wet lab will discuss in detail the different flotation solutions and their use for the best recovery of fecal parasites. We will also discuss different techniques and their advantages and disadvantages. The best flotation solution will be noted when appropriate under the individual parasites as they are discussed.

History, signalment and physical exam can help suggest which fecal parasites may be present. If an adult dog has roundworms in the fecal sample then more history and testing may be necessary. Most dogs develop immunity to roundworms by 6 months. If you find 1 coccidia in a fecal from a healthy dog, it is likely due to the dog eating rabbit feces not a true infection that needs treatment. A fecal sample from a dog with diarrhea that hunts and spends lots of time outside should be evaluated closely for *Giardia*. These are just a few examples of how history and signalment can help you evaluate sample better.

**Toxocara canis** and **Toxocara cati** (roundworms)

**Clinical signs:** pot belly appearance, unthrifty, intermittent diarrhea, live worms in stool or vomit, occasionally anemic. In severe infections can see intestinal obstruction and even pneumonia especially in very young puppies.

**Transmission:** transplacental- most important, transmammary, ingestion from ground or feces

**Detection:** fecal float

**Treatment:** Important to treat pregnant dogs and when the dam is lactating. Fenbendazole (Panacur), pyrantel pamoate (Strongid or Nemex), milbemycin oxime (Interceptor) piperazine. Puppies should be treated at 2, 4, 6, 8, 10, and 12 weeks.

**Zoonotic:** Yes. Visceral larval migrans or ocular larval migrans can occur. Ocular larval migrans can cause blindness. Visceral larval migrans can be found in the lungs, liver, kidneys, and
brain. Typically infection comes from soil contaminated with infective eggs. This is why routine treatment is so important.

Ancylostoma caninum and Uncinaria stenocephala (hookworms)

**Clinical signs:** anemia is the primary sign, depression, diarrhea, pale to white mucous membranes
**Transmission:** transmammary, ingestion of infective larvae, skin penetration
**Detection:** fecal float
**Treatment:** Ivermectin, milbemycin oxime, pyrantel pamoate, fenbendazole
**Zoonotic:** Yes. Disease is called “Creeping Eruptions” (cutaneous larval migrans). Rarely Ancyclostoma caninum can cause eosinophilic enteritis.

Trichuris vulpis (whipworms)

**Clinical signs:** weight loss, unthriftiness, profuse diarrhea with heavy infection
**Transmission:** ingestion of eggs
**Detection:** centrifugal fecal float will help with recovery
**Treatment:** fenbendazole, milbemycin oxime, febantel (Drontal Plus), and moxidectin (Advantage multi). It takes 3 months to mature so it is important to deworm every 3 months or even better is to use a monthly heartworm preventive with whip worm control.
**Zoonotic:** no

Cystoisopora spp. (coccidia) (Formerly known at Isopora)

**Clinical signs:** bloody diarrhea, weight loss, dehydration
**Transmission:** ingestion of sporulated oocysts or transport hosts (rodents etc). Species specific
**Detection:** fecal float
**Treatment:** sulfadimethoxine (Albon). Thorough cleaning of the environment since kennels are the most common source of infection
**Zoonotic:** no

Toxoplasma gondii

**Clinical signs:** clinical signs are rare. But can include fever, anorexia, cough, diarrhea, neurologic signs including seizures or difficulty walking, retinal changes.
**Transmission:** ingestion of contaminated feces, eating a paratenic host (rodent etc) or congenital infection
**Detection:** Fecal float, though more likely via serology
**Treatment:** Clindamycin, pyrimethamine or trimethoprim and sulfadiazine (SMZ-TMP)
**Zoonotic:** Yes. However, undercooked lamb and gardening are most common sources of infection for pregnant women, not cleaning the litter box. Pregnant women should avoid cleaning litter boxes if possible or should wear disposable gloves and clean the litter box every day.
Giardia spp

**Clinical signs:** Diarrhea, dehydration, weight loss with chronic infections due to malabsorption  
**Transmission:** fecal oral route, direct lifecycle  
**Detection:** direct smear for trophozoites, zinc sulfate centrifugation float for cysts, a drop of Lugol’s iodine may help with visualization, IDEXX snap tests.  
**Treatment:** Fenbendazole, metronidazole  
**Zoonotic:** possible. Recent research shows it is possible but not common

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**Basic Tapeworm life cycle**

Adult worms in the GI tract of definitive host → → eggs get defecated out into the environment in the segments → → intermediate host ingests the tapeworm egg → → development occurs in intermediate host → → intermediate host is ingested by definitive host or ingested with grass → → adult worms in GI tract of definitive host

With tapeworms it is very important to know which species of tapeworms are present not for treatment but to discuss how to prevent the tapeworms from returning with the pet owners.

**Taenia taeniaeformis and Taenia pisiformis (tapeworms)**

**Clinical signs:** none, anal pruritis, typically owners see segments on stool  
**Transmission:** ingestion of rodents  
**Detection:** fecal sample may show eggs, typically a squash prep of a rehydrated segment, or visualization of a rehydrated segment  
**Treatment:** praziquantel (Droncit and Drontal) and epsiprantel (Cestex), stop rodent ingestion  
**Zoonotic:** no – not the dog and cat species of Taenia

**Dipylidium caninum**

**Clinical signs:** none, owners complain of rice like worm on the feces or rectum  
**Transmission:** ingesting fleas  
**Detection:** rehydration of segments, eggs in feces rarely  
**Treatment:** Praziquantel and epsiprantel, treat the fleas  
**Zoonotic:** yes. Typically children, little damage to humans

**Echinococcus granulosus and Echinococcus multilocularis**

**Clinical signs:** none  
**Transmission:** Dog is definitive host which means that dogs shedding the eggs in their feces will infect the intermediate host which is what causes disease
Detection: fecal- eggs can not be distinguished from Taenia eggs,
Treatment: Praziquantel and epsiprantel
Zoonotic: Yes. Causes hydatid disease which causes large cysts to form in the lungs and even brain, can be fatal. Rare in North America

Cryptosporidium spp

Clinical signs: abdominal pain, general discomfort, diarrhea
Transmission: ingestion of infective oocysts
Detection: difficult to see on fecal slides, concentrated sucrose may help with identification. Can also try stains such as methylene blue, Giemsa stain, acid fast stain, Fecal assays
Treatment: none
Zoonotic: Yes. In immunocompromised people can be serious. Typically it causes self limiting diarrhea and flu-like symptoms.

HELPFUL WEBSITES
1. www.capcvet.org
2. www.cdc.gov/healthypets
3. www.cdc.gov/healthypets/resources
4. King County PH dept www.kingcounty.gov/healthservices/health/ehs/zoonotics
5. www.wormsandgermsblog.com
6. For client handouts- www.veterinarypartner.com
7. www.vspn.org
8. www.vin.com - ask your veterinarian to help collect handouts
9. Search for intestinal parasites and use any sites that are associated with a vet school or medical school
10. Ask your drug representatives about handouts
11. Veterinary schools
12. www.avma.org and your local and state associations
13. State veterinarian and Health department websites

References/Suggested Reading