COMMON SMALL ANIMAL PARASITES

Although safe and effective treatment and control methods exist for most internal and external parasites, many animals continue to suffer from preventable parasitic infections. Geographical location, lifestyle, housing conditions and species play a role in which parasites are likely to be a problem.

Internal and external parasites can cause great discomfort, transmit disease to animals and humans and significantly interfere with the relationship between people and animals. The presence of parasites on an animal can cause family and community members to distance themselves physically and emotionally from the animal. The 'mangy' dog will be perceived and treated differently than a dog who appears healthy. This perception may profoundly influence the level of care and attention an animal receives.

With proper testing and the administration of preventive medication and measures, most common parasites can be controlled effectively. Because of the impact on animal and human health, it is important that we encourage comprehensive parasite control as a priority in preventive health care.

Of course, recommendations for treatment and prevention are only effective if the client is able to comply. Knowledge of the available treatment options and awareness of the resources available to the client and the community are important in developing successful treatment recommendations.

The following is a brief overview of some of the most common parasites seen in our clinics.

INTERNAL PARASITES

Coccidia	
Agent:	*Isospora* species are most common and are species-specific (single cell protozoa)
Lifecycle	Oocysts produced through sexual reproduction are passed in feces of infected animals.
Effects:	Often subclinical. May cause diarrhea, weight loss, and dehydration. Young animals commonly affected. Stress and other diseases can precipitate. Death occurs rarely.
Diagnosis:	Identification of oocysts on fecal flotation
Treatment:	Sulfadimethoxine or trimethoprim-sulfa. Recent studies suggest ponazuril or toltrazuril are effective. Fluids and electrolytes for symptomatic therapy.
Prevention:	General husbandry, including removal of feces before oocysts become infective.
Transmission:	Excreted in feces. Transmission occurs directly via ingestion of infective oocysts or by ingestion of intermediate host (rodents). Resistant to many disinfectants. Oocysts require 8-36 hours to become infective so frequent litter box changes prevent spread.

Giardiasis	
Agent:	*Giardia lamblia* (flagellated protozoa)
Incubation:	8-10 days
Effects:	Most commonly dogs and cats will be asymptomatic and will spontaneously clear the infection. When clinical signs occur, acute mild diarrhea is most common. But severe diarrhea with dehydration or chronic small or large bowel diarrhea can be seen.
Diagnosis:	ELISA fecal antigen test most reliable. Identification of motile trophozoites on direct fecal smear or non-motile cysts on zinc sulfate fecal flotation with centrifugation.
Treatment:	Fenbendazole, metronidazole.
Prevention:	Good husbandry, prevent exposure to feces contaminated environments. A vaccine is available that may reduce severity of clinical signs and shedding of cysts.
Transmission:	Fecal-oral either directly or indirectly via e.g. fecal contaminated water or food. Cysts can exist for months in a moist/cool environment. Shedding may still occur even after disease is treated. Retest at the end of treatment and then again several weeks later.
Notes:	Zoonotic

Roundworms (Ascaridiasis)	
Agent:	*Toxacara canis* (dogs), *Toxacara cati* (cats), *Toxascaris leonina* (dogs and cats).
Lifecycle	Puppies are usually infected transplacentally before birth. Direct transmission requires ingestion of infective egg. Larva migrate to liver and lungs, are coughed up and swallowed, and mature in the small intestine. In older animals, larvae migrate to and become dormant in muscle and other tissue.
Effects:	Often asymptomatic. Young animals may show slow growth, poor hair coat, and be "pot bellied." Diarrhea may be present and worms can pass in feces or vomit. Migration can damage the lungs and lead to pneumonia. Death can occur in severe cases.
Diagnosis:	Fecal float to identify eggs. The vast majority of puppies and kittens are infected, and should be routinely treated, regardless of fecal results.
Treatment:	Pyrantel pamoate is the drug of choice in young puppies. All puppies & kittens should be treated every 2-3 weeks starting at 2-3 weeks of age until 12-16 weeks old.
Prevention:	Pregnant and nursing mothers should be treated to minimize transmission to offspring.
Transmission:	Fecal-oral, transplacental, transmammary most common. Eggs are extremely resistant. Frequent removal of feces before eggs become infective is recommended.
Notes:	Zoonotic-can cause visceral and ocular larval migrans in humans

Hookworms	
Agent:	*Ancyclostoma spp*. *Ancyclostoma caninum* is the most likely to cause disease.
Lifecycle:	Usually transmitted to the young through mother's milk or through eating larva. Larva can also invade directly through the skin. Prenatal infection is not common. Skin invaders migrate to the lungs, are coughed up and swallowed, and develop in the small intestine. Worms remove a plug of tissue from the intestinal wall to feed on blood. In older animals, larvae migrate to muscle and become dormant.
Effects:	Animals are most commonly asymptomatic. Can cause black, tarry diarrhea and severe blood loss which can be fatal in puppies.
Diagnosis:	Fecal flotation to identify eggs.
Treatment:	Pyrantel pamoate is the drug of choice. Fenbendazole and milbemycin also effective. All puppies should be treated every 2 weeks starting at 2 weeks of age until 12 wks old.
Prevention:	Pregnant and nursing bitches should be treated to minimize transmission to offspring.
Transmission:	Fecal-oral, transmammary (dogs), percutaneous, ingestion of animals who have ingested hookworm eggs. Eggs become infective 2-8 days after they are shed and are less resistant than those of roundworms.
Notes:	Zoonotic- can cause cutaneous larval migrans in humans

Whipworms	
Agent:	*Trichuris vulpis*
Incubation:	Pre-patent period (time from infection to shedding) = 3 months
Lifecycle:	Larvae develop in the small intestine and the adults live in the cecum.
Effects:	Frequently asymptomatic. Weight loss and diarrhea (with fresh blood) are major signs. Anemia may develop. Rarely seen in cats.
Diagnosis:	Fecal flotation for identification of eggs.
Treatment:	Fenbendazole, milbemycin. Ivermectin is unapproved but effective. Due to long period of maturation, deworming should be repeated three times at monthly intervals.
Prevention:	Eggs are very resistant, especially in soil. Reduce exposure by prompt removal of feces. Eggs become infective one month after they are shed
Transmission:	Fecal-oral is only route of transmission.

Tapeworms	
Agent:	(*Dipylidium caninum (90%); Taenia taeniae)*
Effects:	Serious disease is rare. Mild diarrhea and unthrifty appearance are typical signs.
Treatment:	Praziquantel is drug of choice.
Prevention:	Effective flea control and preventing ingestion of rodents is the best preventative.
Transmission:	Eggs are passed separately or in segments and eaten by a flea, mouse, or other animal. Ingestion of intermediate host is the only way a dog or cat becomes infected. Flea-borne *Dipylidium* accounts for most infestations in dogs and cats.

Heartworm	
Agent:	*Dirofilaria immitis*
Incubation:	Pre-patent period (time from infection until positive test possible): 6-7 months.
Lifecycle:	Microfilariae are released into the infected animal's blood stream by adult female worms living in the heart, lungs and associated blood vessels. Mosquitoes ingest larvae when feeding. Over a 2 week period, the larva becomes infective and migrates to the insect's mouth parts where they are passed to another dog during the next feeding. The larva migrates to the right ventricle of the heart by 2-4 months post-infection. The worm then takes 2-3 months to reach maturity and produce offspring.
Effects:	Exercise intolerance, coughing, dyspnea, and slow chronic weight loss. Heart and lung damage result from obstruction of blood flow by the bodies of living and dead worms.
Diagnosis:	Serum antigen test, identification of microfilaria.
Treatment:	Injectable arsenic compounds kill adult worms slowly (melarsamine). Concurrent steroids and antibiotics help prevent complications. Strict cage rest is critical to prevent pulmonary thromboembolism from dying worms.
Prevention:	Ivermectin or milbemycin given monthly are the most commonly used preventatives. Animals > 6 months of age should be heartworm tested before preventative is given.
Transmission:	Must be transmitted by mosquito. No direct transmission.
Notes:	Though more common in dogs, cats can also be infected with heartworm.

EXTERNAL PARASITES

Fleas	
Agent:	*Ctenocephalides felis, C. canis*
Lifecycle:	Fleas feed on host, mate, and then the females lay hundreds of eggs which drop off and pupate. Adult fleas emerge from the cocoons to restart the cycle. Entire lifecycle takes 3 weeks in a favorable environment. Can go 2 months without feeding, and can reproduce explosively.
Effects:	Itching. Heavy infestations may result in anemia. Most serious result is when animals develop allergic reactions to flea saliva and self-mutilate due to the intense itching.
Treatment:	Applying a suitable insecticide to both the animal and the environment is the most common control method. Imidacloprid (Advantage ®) and fipronil (Frontline®) are very safe and effective, but may not be available to all clients. Pyrethrins are safest effective OTC products available. Flea collars are not generally effective. Clients should be cautioned not to use canine labeled products to treat cats.
Notes:	Fleas also transmit *Dipylidium canimun,* the tapeworm.

Ticks	
Agent:	*(Dermacentor spp.; Rhipicephalus)*
Lifecycle:	Ticks are blood feeders. After mating, the adult females engorge from feeding and drop off to lay their eggs in the environment. The small six-legged seed ticks attach to a host, feed, grow, and drop off to molt. They repeat this 1 to 3 times depending on the tick species before finally breeding. Life cycle is completed in a couple of months.
Effects:	Anemia from the feeding of many ticks is possible. Tick paralysis can result from an animal's reaction to a feeding tick. Transmit a number of rickettsial and bacterial agents which can cause serious disease in both animals and humans.
Treatment:	The ear canal and shoulders are typical sites of feeding. Ticks should be removed with a forceps to prevent breaking off the mouth parts in the skin and causing infection.
Prevention:	Both the environment and animal must be treated to achieve effective control.
Notes:	Ticks can transmit several serious zoonotic disease (RMSF, Lyme disease, etc)

Sarcoptic Mange	
Agent:	*Sarcoptes scabei* (burrowing mite)
Incubation:	Dogs may show signs within a few days of infection
Lifecycle:	Spread through direct contact. Eggs are laid in skin tunnels as the female burrows. The entire life cycle of 17 to 21 days is spent on the host.
Effects:	Intense itching with self-mutilation and secondary bacterial infection is common. Dry. thick, wrinkled areas with possible crusts on the head, under the chest, and around the tail head. If untreated, animals may become debilitated and can die.
Diagnosis:	Via skin scraping and microscopic identification, but false negatives are common. Diagnosis may be made on clinical signs.
Treatment:	Lime sulfur dips, rotenone, and amitraz have all been used. In the clinic setting, the typical treatment (for all but collie-breeds) is ivermectin. Live mites may remain after resolution of pruritus – continue treatment at least 4-6 weeks
Prevention:	Prevent contact with infected animals.
Transmission:	Direct contact, fomite transmission. Mites live off host up to 6 days at room temperature, longer (up to 21 days) in moist cool environment. All dogs in prolonged direct contact (house or kennel mates) with affected dog should be treated.
Notes:	May transiently infect cats and humans

Demodectic Mange	
Agent:	*Demodex canis D. cat*
Lifecycle:	Life cycle of egg to mite requires 20 to 35 days.
Effects:	Localized form is most common with small, discrete areas of hair loss on face and front legs. About 90 percent of these cases resolve spontaneously. In generalized demodecosis the skin becomes reddened, oozes serum, and is complicated by bacterial infection. These may be very difficult to cure.
Treatment:	Amitraz is considered drug of choice for generalized infection. Oral ivermectin (administered daily for several weeks) is also effective.
Prevention:	General nutrition and immune support (sterilization, parasite control, etc)
Transmission:	Lives in hair follicles and is found on many healthy animals. Direct contact transfers wandering mites to a susceptible host, usually received when nursing from the dam. Hereditary predisposition and other immunosuppressing factors play a role.
Notes:	Disease is not contagious to other animals and is not zoonotic.

Earmites	
Agent:	*Otodectes cynotis*
Incubation:	Adults live in the ear canal and pierce the skin to suck lymph fluid. Eggs are laid there and the life cycle repeats every 2 weeks.
Effects:	Irritation and crusts appear in the ears. Head-shaking and scratching can result in self-inflicted wounds. Secondary bacterial infections and abscesses are common.
Treatment:	Topical oils and/or insecticides are applied to the ear canal. Treatment is repeated and continued for 7 to 9 days to break the life cycle. Ivermectin administered orally or topically is also effective (may need to repeat in 2 weeks).
Transmission:	Direct contact with infested animals. Cat to dog and vice versa spread is common.