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Useful Pet Information

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When Your Pet Experiences Digestive Upset

Most frequently, digestive upsets occur because a pet has eaten something that the digestive system cannot tolerate. Most of these digestive upsets are not severe and will be manifested by diarrhea and occasional vomiting.

The following simple approach is a home treatment for milder forms of digestive upset.

Rule #1: Rest the digestive system

- No food for 24 hours
- No liquids for 6-8 hours
- Liquids can be given in the form of water or Gatorade.
- When giving liquids, only give **small amounts** at a time. Large amounts may encourage further vomiting. One to two ounces given at frequent intervals (every 1-2 hours) is adequate. Sometimes it helps to freeze the liquids and allow the pet to lick them.

Rule #2: Provide for healing of the digestive system

- Feed easily digested foods for at least 3-5 days. Give 1-2 tablespoons per 30 pounds every 3-4 hours initially. Select any combination of foods from the following list:
- One part of boiled ground beef to 2-3 parts cooked long-grain rice

- Cottage cheese
- Boiled or baked potatoes
- Yogurt
- Strained baby foods
- Toast

More severe digestive upsets often need to be treated medically. Pets having watery diarrhea with or without blood should be examined. Also, pets with persistent vomiting need to be treated medically.

If you have any problems with the above home management of digestive disorders, please call the hospital.

Parasite Prevention

We recommend using flea, tick, and heartworm preventatives year-round to ensure full protection for your pet.

Parasites of Concern: Fleas, ticks (Lyme disease), heartworm, roundworms, hookworms, whipworms, tapeworms

Zoonotic Risks: Fleas, ticks (Lyme disease), roundworms, hookworms, tapeworms

RISK LEVEL	HIGH	MODERATE	LOW
	Hunting dogs, hiking dogs, dogs who live on farms or near the woods, frequent travel	Outdoors primarily in urban or suburban neighborhoods, occasionally boarded, visits dog parks	Indoor dogs, only goes outside briefly in low risk environments, very rarely has contact with animals that go outside Ticks of least concern
Recommended Parasite Prevention and Control Options Goal: Most appropriate protection for the animal with the fewest products	<i>Interceptor</i> (no flea coverage) or <i>Sentinel</i> (some flea coverage) AND <i>Preventic Collar</i> (ticks only) or <i>Frontline Plus</i> (fleas & ticks) OR <i>Heartgard</i> (no whipworm coverage) AND <i>Frontline Plus</i>	<i>Interceptor</i> or <i>Sentinel</i> AND <i>Frontline Plus</i> OR <i>Heartgard</i> (no whipworm coverage) AND <i>Frontline Plus</i>	<i>Interceptor</i> or <i>Sentinel</i> AND <i>Frontline Plus</i> OR <i>Heartgard</i> (no whipworm coverage) AND <i>Frontline Plus</i>

None of these combinations cover tapeworms. There are oral medications for intestinal parasites that may be appropriate for your pet. Please consult your veterinarian or the clinic staff with questions regarding appropriate coverage for your pet.

Other important measures:

- Routine fecal checks. The Companion Animal Parasite Council recommends fecal checks 2-4 times a year depending on lifestyle factors
- Clean up pet feces regularly
- Practice good personal hygiene.
- Minimize exposure to high traffic pet areas.

Dogs

Buy 6 get 1 free	Buy 12 get \$5.00 rebate	Buy 12 get \$5.00 rebate	Buy 12 get \$10.00 rebate
<i>FRONTLINE PLUS</i>	<i>INTERCEPTOR</i>	<i>HEARTGARD</i>	<i>SENTINEL</i>
- Ticks - Fleas - Flea Larvae	- Heartworm - Intestinal Parasites Roundworms Whipworms Hookworms	- Heartworm - Intestinal Parasites Roundworms Hookworms	- Fleas (larvae only) - Heartworm - Intestinal Parasites Roundworms Whipworms Hookworms
NOT FOR: - Heartworm - Intestinal Parasites	NOT FOR: - Fleas - Ticks	NOT FOR: - Fleas - Ticks - Whipworms	NOT FOR: - Ticks

Cats

Buy 6 get 1 free	Buy 6 get 1 free OR get 12 doses for the price of 10
<i>FRONTLINE PLUS</i>	<i>REVOLUTION</i>
- Fleas - Flea Larvae - Ticks	- Fleas - Heartworm - Intestinal Parasites Roundworms Hookworms
NOT FOR: - Heartworm - Intestinal Parasites - Ear Mites - Skin Mites	- Ear Mites NOT FOR: - Ticks - Skin mites

Intestinal Parasites

Roundworms (Ascarids): puppies and kittens are infected in utero; adult dogs and cats via ingesting eggs in feces or by eating a rodent. People can become infected by ingesting eggs, which develop into larvae that migrate through the liver, lungs, and eyes. Worms are white, round, and look like spaghetti. Puppies and kittens should be treated at 2 week intervals with Pyrantel and a fecal sample should be rechecked 4 weeks after the second dose is given. We like to see two negative fecal samples on puppies and kittens to be sure they are worm-free.

Hookworms: cause weight loss, bloody diarrhea, and anemia in severely infected animals by sucking blood. Dogs and cats are infected via ingesting larval stages or by larval stages penetrating through the skin or footpads or can be passed in utero. These worms are difficult to see without a microscope. People can become infected when the larval stages penetrate the skin and cause a skin condition known as cutaneous larval migrans or creeping eruption. Dogs and cats should be treated at 2 week intervals with Pyrantel and a fecal sample should be rechecked 4 weeks after the second dose is given.

Whipworms: cause weight loss and bloody diarrhea. Cats are rarely infected with whipworms. Dogs are infected by ingesting eggs in feces. These worms are difficult to see without a microscope. Dogs should be treated with Panacur 3 days in a row and a fecal sample rechecked in 3 weeks. Some dogs may need to be treated again 3 weeks after the 1st dose and again 3 months after the 1st dose. Whipworms do not infect people.

Giardia: protozoal infection that causes bloody diarrhea. Dogs and cats are infected by ingesting cysts passed in feces or present in puddles or ponds. Animals are treated with either Metronidazole or Panacur and a fecal should be rechecked on the last day of the medication. People can become infected with giardia by ingesting cysts.

Coccidia: protozoal infection that causes bloody diarrhea and is common in puppies and kittens. Infection occurs via ingestion of cysts in feces or via ingestion of a rodent. Treatment consists of Albon liquid for 8 days or Albon tablets for 8 days, depending upon the weight of the animal. Coccidia are species specific, thus the cats infected in the house cannot pass it to the dog in the house. A fecal sample should be rechecked on the last day of the medication. People cannot become infected with coccidia.

Tapeworms: usually do not cause any clinical signs, possibly diarrhea. Dogs and cats are infected by eating a flea or by ingesting a rodent. These worms are flat like noodles and occasionally animals will vomit or pass them in the feces. However, it is more common to see the dried segments, which look like grains of rice, on the hair around the anus. Infected animals are treated with Droncit once. It is very uncommon to see tapeworm eggs in a fecal sample, thus a fecal sample does not need to be checked to diagnose tapeworms.

Fleas

At Centre Animal Hospital we recommend using flea and tick preventatives year-round due to the mild winters we have been experiencing in our area. Using these products year-round is the only way to ensure full protection against harmful parasites.

The common flea is one of the major threats to the comfort, health and general welfare of your pet. Fleas feed on the blood of all animals. Most of their life cycle is spent off the animal. Since only the adult state of the flea's life cycle is found on the animal, it is safe to say that for every flea seen on the pet there are 10-100 fleas developing in the immediate environment.

Flea Dermatitis

Severe dermatitis and itching may follow infestation by fleas. Most often fleas can be found around the animal's rump, tail, lower back and belly. The feces of the flea are seen as small black (pepper grain) specks. About 15% of dogs and cats will become sensitized after exposure and will develop an allergic reaction to the flea saliva. When these animals are infested with fleas, they bite and scratch almost constantly. It takes only one flea to set off the intense reaction in the allergic animal. Severe skin damage then follows: the coat becomes dull, dry and scaly and the skin becomes bruised and inflamed. There is often loss of hair as a result of the scratching and biting. Sores, often called hot spots, commonly develop as a result of this self-inflicted trauma.

Treatment of the Animal's Skin Disease

Injectable and oral anti-inflammatory medications are usually administered to the more severe cases in order to break the "itch-scratch" cycle. If secondary infection is present, antibiotics may be given. Topical medications are sometimes used in the more mild cases, but they have the disadvantage that the animal can usually lick the medication off before it can soothe the inflamed tissues.

***Frontline* Topical Solution**

Frontline is an effective and simple way to prevent and terminate flea and tick infestations on cats and dogs, and thereby in households. This once a month product is a topical liquid that is applied to one or more areas of skin behind the pet's neck and back. *Frontline* works by killing adult fleas and ticks very quickly after they come into contact with your pet. It attacks the flea nervous system, disabling fleas even before they can get a chance to bite. This feature makes *Frontline* the treatment of choice for pets with flea allergies, where not being bitten even once is crucial. Although deadly to fleas, *Frontline* is extremely safe for both you and your pet. It can even be used on puppies and kittens. It is also effective for dogs that swim or are bathed regularly using mild non-medicated grooming shampoos. *Frontline* is also effective in ridding your pet's living environment of developing fleas as research has shown that the tiny amounts of *Frontline* that comes off the pet in the shed hair and dander, will kill any developing flea larva in the pet's environment. Thus this product will prevent household infestation and help to treat already infested homes.

Use of *Sentinel* to Prevent Flea Infestation of Your Pet

Sentinel is an insect development inhibitor which is given to your pet orally, once a month, with a full meal. It prevents eggs laid by fleas feeding on your pet from developing, thereby breaking the flea life cycle. *Sentinel* is NOT an insecticide and is very safe for your pet. In fact, tests have shown that it has no adverse effects on health, growth, or reproduction. It is even safe for pregnant dogs and safe for puppies and kittens as young as six weeks. We highly recommend treating year round due to the mild winters we have been having in the area.

Please note: *Sentinel* will only prevent flea eggs from developing into new adult fleas. If an adult flea or fleas jump on your pet, this product will not kill them. Therefore, you may need to use an adulticide shampoo, spray, powder, or dip if your pet is being irritated by adult fleas. Any one of these products are safe to use with *Sentinel*.

Flea Shampoos

Shampoos are only effective in killing the fleas which happen to be feeding on the animal at the time of bathing. Once rinsed, there is no residual insecticidal effect.

Flea Collars

Flea collars are effective in the cat and also perform well in small, short-haired dogs.

Mists and Powders

These products can be effective, when properly applied. They are applied by brushing the hair forward (so that the hairs stand on end) and applying the product to the skin. You should start at the head of the animal and work towards the tail. After the insecticide is applied, the coat is brushed gently to spread the material onto the skin and hair.

A CAUTION for Cats and Young Animals

When treating cats, puppies or kittens, it is important to check the label to make sure that the product is safe to use on these animals. Bathing with a mild flea shampoo or a grooming shampoo will mechanically remove fleas from puppies and kittens. Treatment of the environment and the mother should prevent re-infestation.

Controlling Infestation in the Home and the Outside Environment

Professional Exterminator

Professional extermination is effective and thorough, but can be expensive. This may be the best route for individuals with very large homes.

Home Owner Applied Insecticide Foggers and Premise Sprays

When properly used, foggers and premise sprays can be very effective in controlling flea infestations. We recommend the *Mycodex Environmental Control* aerosol room fogger. This fogger will treat up to 6000 cubic feet of unobstructed room space. It contains both short acting adult flea killing insecticides and *Ovikill 2*, an insect growth regulator that will kill flea eggs and flea larva for up to 7 months after a single application.

Life Cycle of the Flea

Eggs	®	Larvae	®	Pupae	®	Adults
			1			2

1. Insect growth regulator blocks development of eggs and larvae
2. Quick acting insecticide kills the adult

It should be noted that the pupa is encased within a cocoon which protects it from various chemicals which are used to treat the home. For this reason, it is very important, even after killing frosts, that the pets continue to be treated for a **minimum of one month** after treating the house.

Recommended Method for Using the *Mycodex* Fogger

- A. Read instructions on the product carefully. Be sure that all pets (especially birds and fish) are removed from the area before treatment. Dogs and cats should be treated with an appropriate adulticide flea product if they are infested.
- B. Vacuum thoroughly before treatment. Mothballs in the vacuum bag will kill the fleas.
- C. Launder your pet's bedding prior to treatment.
- D. Spray the fogger according to directions on the label. Concentrate on areas where your pet(s) frequent and remember to spray poorly exposed areas such as under furniture.
- E. Leave the house or treated rooms for the required time and then ventilate as directed.

It is very important to use an adequate number of foggers. One fogger will treat 6000 cubic feet of unobstructed space. In homes with many small rooms we recommend one fogger for every 2 adjoining rooms to which the pet has access.

Yard and Environment Treatment

We recommend treating the yard environment in heavily infested areas every 2 to 3 weeks. *Carbaryl (Sevin)* or *Diazinon* are effective and can be applied with a garden hose type sprayer.

Canine Lyme Disease

Lyme Disease has been recognized in humans since 1975 when it was associated with an outbreak of arthritis in children in Lyme, Connecticut. The disease was first reported in dogs in 1984 and the reported annual incidence has been rising rapidly in recent years. In the state of Pennsylvania there are three areas that are heavily infested with the ticks that carry Lyme disease: 1) the southeastern portion of Pennsylvania; 2) the north central counties of Elk, northern Clearfield, and Cameron; and 3) Presque Isle in Erie County. Centre, Mifflin and Huntingdon counties are believed to have a lower population of ticks and thus a lower risk of acquiring Lyme disease. The purpose of this handout is to try to

summarize the most recent information about Lyme disease in dogs. Armed with this information, pet owners can then make better educated decisions about prevention and treatment of this disease in their animals.

The Organism

The causative agent of Lyme disease, *Borrelia burgdorferi*, is a host-associated spirochete, with alternate arthropod (ticks) and vertebrate hosts. They do not live in water or soil and are not transmitted by aerosols or fecal contamination.

The Vectors

Deer ticks, hard-shelled ticks of the genus *Ixodes*, transmit the bacteria by attaching and feeding on various hosts. Other blood-sucking insects including other types of ticks, biting flies and some species of mosquitoes may be involved, but the evidence indicates they are of minor importance as vectors.

Ixodes ticks require three hosts and four different developmental steps to complete their 2-year life cycle. Each female tick lays up to 2000 eggs in the spring which hatch into tiny larvae. The primary host of the larvae in the northeastern U.S. is the white footed mouse, which serve as a reservoir for the disease and can be infected for their lifetime without developing disease. After feeding on the mice the larvae drop off and enter a resting phase through the next winter. The larvae molt into still very small nymphs the following spring. The nymphs attach to a new host, again, most commonly, the white-footed mouse or any of a wide range of animals including dogs and humans. Transmission of the organism to the host occurs during the nymph's 4 day feeding period. Infection of the host takes place only after 2 days of feeding as it takes this long for the organism to multiply and move from the tick's mid-gut to its salivary glands and then into the new host via secretions. In the fall of the second year the nymphs molt to the adult stage. This stage is the most important source of infection for dogs. As long as the temperature stays above 35 degrees, adult ticks can be found on shrubs where they gain access to white tailed deer and other large animals. Adult ticks feed for 5 to 7 days, again several days of feeding are usually required to transmit the organism to the new host. **Thus, early tick detection and detachment of ticks is an important factor in disease prevention.** After engorgement the adult female ticks drop off and reside under fallen leaves for the winter. The following spring they lay their eggs and start a new cycle.

Prevalence of Infection

The proportion of dogs that develop disease in an endemic area is relatively small. In hyperendemic areas, where more than 75% of the dogs are exposed to infected ticks, and where 50% or more of clinically normal dogs will have positive serologic titres (detectable antibodies in their blood), only about 5% of the exposed dogs actually develop signs that *may* be attributable to Lyme disease. Infection risks are greatest at times when tick activity is the highest (spring and early summer for nymphs, fall for adults).

Clinical Signs in Dogs

The onset of clinical manifestations of disease, particularly lameness, did not appear in experimental dogs subjected to tick-induced infection for 2 to 5 months after exposure, indicating a long latent period. The skin rash (ECM - erythema chronica migrans) seen as the first stage of human Lyme disease is rarely seen in dogs.

There are several distinct syndromes of musculoskeletal disease seen in dogs. In the first syndrome, affected dogs have a sudden onset of lameness, lethargy, loss of appetite, with or without fever. Swelling of one or more joints is common. The carpus (wrist) or tarsus (hock) are the most commonly affected joints, and pain on manipulation can be severe. Many dogs also have swollen regional lymph nodes.

The second, less common, musculoskeletal syndrome involves sudden onset of severe pain which is not localized to the joints. Loss of appetite and severe physical depression are present, fever is high (104-105.5 F), a total reluctance to move is demonstrated and manipulation of the head and neck produces pain. These animals may also have swollen lymph nodes. These signs are similar to those seen in humans with Lyme meningitis (infection of the spinal canal and central nervous system).

A third group of dogs has a less acute history including some of the following signs: intermittent nonspecific lameness, normal to slightly increased temperature, slight decrease in appetite and slight lethargy. Physical exam usually reveals no localized limb/joint pain or abnormality. This last group is usually diagnosed as having Lyme disease on the basis of exclusion of other causes of disease, history of possible tick exposure, positive serology (antibodies to the organism in the blood) and response to antibiotic therapy alone.

In dogs, second-stage signs of carditis (heart involvement), nephritis (kidney involvement) and neuroborreliosis (nervous system involvement) are far less common than the musculoskeletal syndromes described above. We have seen several cases of serious kidney damage caused by Lyme disease in Labrador and Golden Retrievers. The severely debilitating chronic arthritis syndrome seen in humans is extremely rare in dogs regardless of how long they have been in high incidence areas or how long they have been infected.

Interestingly, in Beagle dogs experimentally infected by placing many infected ticks on them (15-100 ticks), the resulting arthritis, lethargy and loss of appetite lasted about 4 days, and resolved completely without antibiotics! One or two episodes of recurrent lameness occurred in some dogs at intervals of several weeks or months with apparent full recovery after each episode without antibiotic therapy. Thus it appears the disease is self-limiting without therapy in many dogs.

Diagnosis

Four diagnostic criteria should be considered as important factors to establish a diagnosis of Lyme disease in dogs. These include: (1) history of exposure to *Ixodes* ticks in an endemic area, (2) typical clinical signs, (3) a positive serology, (4) and a prompt response to antibiotic therapy.

Diagnosis Tests

Following experimental exposure to infected ticks, antibodies begin to appear in dogs within 4 to 6 weeks. The level of antibodies increases for several weeks to high levels and remains constant for at least 18 months. It must be pointed out that a positive serologic test alone, without any other signs of disease, in a Lyme endemic area is **NOT** sufficient for a diagnosis of Lyme disease. Vaccination of dogs elicits antibodies that react in the Lyme antibody tests run at most laboratories. Therefore routine serology in vaccinated dogs is not useful. Recently a new test using Western Blot technology, has been developed that can differentiate between antibodies generated in a tick-induced infection, versus antibodies that develop following vaccination. It can also tell when a dog has experienced both an infection and vaccination.

Changes in antibody titres were evaluated in a group of dogs treated for acute limb/joint Lyme disease to see if there was any value in reassessing to evaluate therapeutic success. **Antibody titres were found to have no correlation with clinical condition.** With successful therapy some dogs had decreasing titres, some had increasing titres and some stayed the same!

Treatment

Antibiotics are the treatment of choice for Lyme disease in dogs. Doxycycline appears to be the drug of choice at 22 mg/lb twice a day for 21 days. Other antibiotics that appear to be effective include Amoxicillin at 10 mg/lb twice a day for 21-28 days or tetracycline at 10 mg/lb three times a day for 21-28 days. Response to antibiotics is rapid in almost all cases. In animals that show no improvement in 3 to 4 days on antibiotics alone, other diagnoses should be considered. Analgesic/non-steroidal anti-inflammatory medication may be used, but their effect will obscure the response to antibiotic therapy. **Steroids should not be used.** Tetracycline should not be given to young dogs as it may cause damage and discoloration to their permanent teeth. Dogs with recurrent episodes normally respond well to the same antibiotic doses used to treat the primary episode.

Risks to Humans With Infected Dogs

The risk to humans in contact with infected dogs is extremely small. It is also unlikely that dogs would transport ticks into the house that could then fall off and become attached to humans. This is because *Ixodes* ticks are thermotropic (seek heat) and once on the dogs hair will quickly go to the skin and start embedding. Once a tick starts feeding on the dog, it will feed until full. None of the 3 life stages of the tick are intermittent feeders.

Prevention

Tick engorgement on dogs may be prevented by controlling the tick population around the home and the use of tick repellents when going into high risk areas. Daily grooming and removal of adult ticks before engorgement will prevent transmission of the organism, but this is difficult due to the small size of even the larger adult ticks. Cutting brush and mowing grass in animal areas will make the environment less hospitable for ticks and the small mammals which are the reservoir for the bacteria. At **Centre Animal Hospital** we recommend the use of the several products for tick control. We have found the **PREVENTIC** collar to be highly effective for all types of ticks. Please do not leave these collars on dogs that are housed in groups where one dog is likely to chew off and ingest the collar, as toxicity could result. We also highly recommend a topically applied product called **Frontline Plus**. It is applied

every 30 days and will prevent both flea and tick problems. The insect repellent diethyltoluamide (DEET) will repel ticks, but is rapidly absorbed through the skin and in combination with certain insecticides has been associated with severe toxicity including death (i.e. Hartz Blockade). DEET products are effective when applied to clothing to prevent tick infestation on humans. We recommend using a flea/tick preventative year-round due to the mild winters we have been experiencing in our area.

Vaccination

Lyme vaccination is elective, but we recommend vaccination for dogs who are at risk. Dogs could be at risk if:

- Deer and mice, which are reservoirs for the disease, live in or around your neighborhood.
- Your yard is near a wooded area or tall brush where ticks breed .
- You take your dog camping, hiking, hunting or fishing.

Many of our patients, including those who live in town, are at risk. About 22% of the animals we test are positive for exposure to Lyme bacteria. Talk with your doctor about whether or not the Lyme vaccine is appropriate for your dog.

Heartworm Disease

At Centre Animal Hospital we recommend using heartworm preventatives year-round due to the mild winters we have been experiencing in our area. Using these products year-round is the only way to ensure full protection against harmful parasites.

Heartworm disease is a life-threatening condition. See below for more information on the disease in both dogs and cats.

Canine Heartworm Disease

Life Cycle

Canine heartworm disease is caused by long, slender, 10-14 inch spaghetti-like worms that are most frequently found in the right side of the heart and adjacent lung arteries. Heartworms can live for several years in a dog's body. The female worms are capable of producing millions of larvae called microfilaria, which circulate in the infected dog's bloodstream.

The life cycle of the heartworm cannot be completed without an intermediate host, the mosquito. A mosquito can bite an infected dog and ingest some microfilaria along with the blood. These ingested microfilaria incubate and undergo changes within the mosquito's body for 10-30 days and then enter its saliva. When the mosquito subsequently bites a dog, these infective larvae are deposited into the dog's skin. The larvae develop for 3-4 months in the dog's body and eventually migrate to the right side of the heart and adjacent large blood vessels. In another two months the larvae have developed into mature heartworms and being to reproduce. The entire cycle can now repeat itself. Heartworm disease cannot be transmitted to another dog by an exchange of blood; a mosquito must be involved as an intermediate host of the parasite.

Symptoms

The signs of heartworm disease will vary depending on the severity and duration of the infestation. In the early stages, no clinical signs of the disease will be evident. However, as the condition progresses, signs of cardiac failure will gradually become apparent. Animals in the more severe stages will usually exhibit signs of coughing, weakness, listlessness, and lack of stamina.

Diagnosis

A heartworm blood test is one of the most effective ways to detect the presence of heartworms. We test a small blood sample, taken from a dog's leg vein, using a heartworm antigen test. This test will show a positive result if microscopic particles (antigens) shed by the heartworms are present in the blood sample. These antigens are not detectable in blood until 5-7 months post-infection. If the test were to show a positive result, additional tests will be recommended. These tests will include chest x-rays, liver and kidney function tests, and possibly an electrocardiogram. These tests are necessary to determine the degree of advancement of the disease and will aid in recommending the best form of therapy.

The American Heartworm Association recommends annual testing for all dogs. It is also recommended to test before changing preventative products. Testing is recommended to ensure product efficacy (though failures are extremely rare, they do occur) and to detect infections that may have occurred due to missed doses. It is very important to make sure the medication was effective in preventing the disease before clinical signs become apparent. The heartworm blood test also enables us to screen your pet for exposure to Lyme disease.

Treatment

Treatment can be attempted in dogs which are found to be otherwise in good health. Depending on the extent of the disease in the patient, several protocols for treatment can be considered. Most commonly, treatment will involve multiple injections of an arsenic derivative which will destroy the adult worms over time. Ivermectin will be administered to kill the microfilaria. Strict confinement is required during two months of the course of treatment. Many animals will become ill during the treatment. Often they become lethargic, lose their appetite, and may develop some coughing. Some deaths during therapy have been reported in the veterinary literature.

Monthly treatment with Heartgard Plus (ivermectin) will result in a slow kill (up to two years) of adult heartworms. However, this treatment carries with it significant risks for the animal's health and is not currently recommended except in extenuating circumstances.

Prevention

Due to the potentially toxic nature of the drugs used to treat heartworm disease, the high expense of treatment, and the severity of the disease, we encourage you to take proactive measures to prevent the condition. Considering the life cycle of the parasite, two means of prevention are available:

1. Controlling the mosquito population and limiting mosquito exposure.
2. Preventing the larvae from reaching adulthood.

Controlling mosquito populations is important for both human and animal health. However, it is rarely 100% effective. Protection is most practically achieved through the use of monthly preventative

medications which kill the infective larvae after a mosquito has deposited them into the skin. The most popular types of preventative medication are administered once a month year round. These products are also effective in controlling the most common intestinal parasites of dogs: hookworms and roundworms. These parasites are also infective to people, particularly children and elderly. In the past we have recommended seasonal use of preventative but due to the mild nature of recent winters, and the public health benefits of controlling intestinal parasites, we now recommend year-round administration of preventative medication starting in puppyhood. This is particularly important for clients who take their dogs to the southern states during the winter months.

You may be familiar with Interceptor and Heartgard Plus preventative. We have also added Sentinel to our inventory. Having a broad selection enables us to tailor a complete parasite control program to each animal's needs. Please discuss a plan for your pet with your veterinarian. All of the preventative medications listed above are usually well tolerated by dogs except in animals which are already infested with heartworms. Infected dogs can have a serious reaction to the medication. For this reason, it is very important to perform a heartworm antigen test prior to starting preventative in animals over seven months of age.

Feline Heartworm Disease

Feline heartworm disease is caused by the same parasite that is responsible for canine heartworm disease, *Dirofilaria immitis*. A cat must be bitten by a mosquito carrying the infective larval stage of the worm in order to become infected. Unlike dogs, however, cats are more resistant to heartworm infection. Once infected, the life cycle is similar to that in the dog with a few exceptions cats tend to have fewer adult worms (usually only one or two) and the worms have a much shorter lifespan in cats as compared to dogs.

The symptoms of heartworm disease in cats are also very different from those seen in dogs. Some cats may show vague signs like lethargy, chronic vomiting, chronic episodes of coughing, weight loss, or anorexia. Some cats may have acute episodes of collapse or respiratory distress and can even suddenly die.

Because the signs of feline heartworm disease are so vague and nonspecific, it is much more difficult to diagnose the disease in cats. A new heartworm test has recently been developed to help diagnose feline heartworm disease. It is a blood test that tests for antibodies to the adult heartworms. Other methods of diagnosis include x-rays and echocardiogram (ultrasound of the heart).

Treatment of infected cats is very risky and may be hazardous to the cat's health. Since infected cats usually only carry one or two heartworms, treatment is usually just supportive care using medications to alleviate the symptoms until the worms die on their own. Even with supportive care however, heartworm infected cats may still die.

Dogs are the main source of heartworms. Indoor cats are at less risk of being bitten by an infected mosquito than cats that go outdoors. There is a monthly heartworm preventative available for cats, but since cats are more resistant to infection than dogs, and heartworm disease is not very common in our area, we are not routinely recommending the preventive for cats.

Products

Below is a list of the flea, tick, and heartworm preventatives offered at Centre Animal Hospital. We recommend using flea, tick, and heartworm preventatives year-round to ensure full protection for you pet.

Frontline
Heartgard
Interceptor
Sentinel
Revolution
Preventic Collar

Puppy Care

Core Vaccinations

A series of three "Distemper Group" vaccines (DHPP) is recommended for all puppies. This vaccination helps to prevent distemper virus, parvo virus, parainfluenza, and canine hepatitis. These vaccinations are given typically at 2, 3, and 4 months of age. This vaccine is repeated annually.

An intranasal vaccine against Kennel Cough (Bordatella/Parainfluenza) is recommended at either the 3 or 4-month visit. This vaccine is repeated annually.

A Rabies vaccine is given at 4 months of age. This vaccination is repeated in one year and then every 3 years after.

Additional Vaccinations

A Leptospira vaccine can be added to the Distemper Group of vaccines for dogs that hunt, live on a farm, or have other risk factors for Leptospira.

A Lyme disease vaccination is available. Because Lyme disease is transmitted by deer ticks, our first recommendation is to prevent ticks from spreading Lyme's to your dog by applying flea and tick prevention on the skin monthly. We are recommending the use of flea and tick prevention year-round.

Spaying and Neutering

If you are not planning to breed your dog, an ovariohysterectomy (spay) is recommended at about 6 months of age. Neutering of males is also recommended at approximately 6 months of age.

Permanent Identification/Lifetime Licensing

At the time your puppy is under anesthesia for the spay or neuter procedure, it is a good time to have some form of permanent identification placed on your pet. Nationally, fewer than half of lost dogs in animal shelters are ever reunited with their families. Collars and identification tags with names and phone numbers are a good first step, but collars can be lost or fall off.

A tattoo or microchip can be used to permanently identify your dog. A microchip is inserted under your puppy's skin. This microchip has a unique number, which can be read by a scanner at almost any veterinary clinic or animal shelter nationwide. Alternatively, your dog can receive a tattoo on the inside of the thigh, with a tattoo number issued by the county treasurer.

Licensing

All dogs over 12 weeks of age are required to have a county dog license. You may purchase annual Centre County dog licenses here at the hospital. The microchip can be used for Pennsylvania lifetime licenses. Lifetime Licenses can be purchased at the office of the county treasurer (for Centre County this is located at the Willowbank Building in Bellefonte). Fees for the license will vary.

Intestinal Parasites

A fecal sample should be checked on every new pet. Intestinal parasites are a very common problem among young animals. Therefore, it is recommended that a fecal sample be checked for the presence of parasites.

External Parasites

The most commonly found external parasite in this area is the flea. There are a variety of products available for flea control. Other parasites to be watchful for include ticks, lice, and mites. We recommend using flea/tick and heartworm preventives year-round to ensure full protection for your pet.

Heartworm Prevention

Heartworm Prevention should be started once your dog is older than 2 months of age. The preventative is given year-round to prevent hookworms and roundworms as well as heartworm disease.

Nutrition

The following feeding schedule is recommended for puppies:

Age	Number of feedings per day
<3 months	4
3-6 months	3
7-12 months	2
>12 months	1 (or 2)

A high quality puppy food (Growth Formula) is recommended for this time period (giant breeds should receive a high quality adult dog food or Iams Large Breed puppy food, or Hill's Large Breed puppy food). If table scraps and other treats are fed at all, they should be kept to a minimum (less than 5% of the diet). Extra vitamins and other supplements are not necessary if a good quality diet is fed.

Obedience Training

It is our recommendation that all dogs benefit from some form of obedience training. The best time to begin training your new puppy is right now! Socialization skills and good manners can be easily taught to most young puppies with positive reinforcement and gentle praise. Puppy Kindergarten classes are one of the best ways to start your new puppy off in the right direction.

Kitten Care

Feline Leukemia and Feline Immunodeficiency Virus Tests

Since these viruses are prevalent and represent a major health risk to your kitten, as well as other cats, it is recommended that your kitten be screened for these diseases during his or her first exam. By performing this test at this time, we can guarantee that your new family member is free of these life threatening diseases and will not be a source of infection to other cats in the neighborhood if your kitten will eventually be an indoor/outdoor cat.

Vaccinations

All kittens should receive a series of two "Distemper Group-4" (FVRCP) vaccines. These are given typically at 8 and 12 weeks of age. This vaccination is repeated at one year and then given every 3 years thereafter. If you have a large number of cats or work in cat rescue, we may recommend giving this as a yearly vaccine.

A Rabies vaccine is given at 12 or 16 weeks of age. This vaccination is repeated in one year. At that time, we have the option of administering the rabies vaccine yearly with a safer, non-adjuvant, feline only, Purevax rabies vaccine or we can change to a 3-year rabies vaccine. Rabies vaccinations are required by law.

If your kitten may be an indoor/outdoor cat, a series of two transdermal Feline Leukemia vaccines is recommended at 12 and 16 weeks of age. This vaccination is repeated annually and can always be discontinued if your cat, with age, become an indoor-only pet.

There are vaccines available for Feline Infectious Peritonitis (FIP) and Feline Immunodeficiency Virus (FIV). To date, these vaccines have not yet been proven to be highly effective in the prevention of these diseases.

Due to recent and ongoing research, new vaccine protocols have been established for the safety and lifestyle of your pet. You may have read or heard about a medical diagnosis in cats called a Vaccine-associated Fibrosarcoma. A cat can have a reaction at the vaccine site that can turn into a malignant cancer. Just as in people with malignancies, your cat's genetic makeup also plays a large role in the development of a Vaccine-associated Fibrosarcoma. Your kitten/cat is actually at greater risk for contracting Feline Leukemia, Feline Immunodeficiency Virus, and many life-threatening upper respiratory and gastrointestinal diseases. This is why it is still important to vaccinate your feline friend. We, however, are going to provide you with safer vaccine options, and depending on the lifestyle of your pet, we will likely not be vaccinating them as frequently as we did in the past. You may also notice that your veterinarian is vaccinating your kitten along his or her legs. This is being done now, because in the rare event that your pet develops one of these fibrosarcomas months or years later, amputation tends to be curative.

Spaying and Neutering

If you are not planning on breeding your purebred cat, an ovariohysterectomy (spay) or castration (neuter) is recommended at about 5 to 6 months of age. Spaying prevents mammary cancer and pyometra (an infected uterus) in your aging female cat. Neutering of male cats will lessen the chance of urine marking (spraying) in the house. Also, as responsible pet owners, you will help decrease the overpopulated stray and feral cat colonies in your county.

Intestinal Parasites

Intestinal Parasites, including roundworms, hookworms, coccidian, whipworms, tapeworms, and giardia, are a very common problem among young animals and indoor/outdoor cats. They generally cause diarrhea or you may be lucky enough to see your pet vomit or pass these parasites in their feces. Kittens tend to get intestinal parasites while they are in their mother's womb or while they are nursing. Adult indoor/outdoor cats are at risk for getting parasites through flea bites and by snacking on what they enjoy to hunt. Therefore, it is recommended that a fresh fecal sample be checked for the presence of parasites during your first and second kitten visit and then at least annually. Some intestinal parasite can be zoonotic (passed to humans). This is why it is important to practice good hygiene after cleaning out the litter box.

External Parasites

The most commonly found external parasites are fleas and ticks. There are a variety of products available for flea and tick control, and we will help you decide which one will be the best to use on your kitten or cat. Never use a product on a cat that is intended solely for use in dogs. Also, cats can be extremely sensitive to flea and tick products that contain pyrethrins or permethrins. Since these ingredients can be quite toxic to cats, we recommend not using them. Cats can get Lyme disease from deer ticks, but they never become sick from having the bacteria in their bloodstream. Other parasites to be watchful for include lice and mites.

Nutrition

It is recommended that a high quality kitten food (Growth Formula) be fed for the first 6 months to 1 year of your kitten's life. We can suggest some brands of high quality kitten and cat foods if you are having trouble picking a food for your pet. The food should be fed free-choice rather than on a strict feeding schedule. If table scraps and other treats are fed at all, they should be kept to a minimum. Although most kittens and cats like the taste of milk, it is usually not digested well and often leads to diarrhea. Therefore, it is not recommended as part of their diet.

Microchipping

We can microchip your kitten or cat by injecting a permanent identification number in the form of a chip underneath the skin between the shoulder blades. This will stay with your pet for its entire life and can be used to safely return your pet if they should go astray. It is easiest to inject the microchip while they are under anesthesia during your pet's spay or neuter, but we can do it anytime. We primarily recommend this for indoor/outdoor cats.

Spaying

Ovariohysterectomy in the Dog and Cat

The Ovariohysterectomy (OHE), or "spay" surgery, is one of the most commonly performed operations at a veterinary hospital. However, it must still be considered a major abdominal surgery. The abdominal cavity must be surgically opened and explored so that the female reproductive organs (ovaries and uterus) can be properly identified, dissected free, and removed. Great care must be taken to prevent internal bleeding and to avoid contamination of the normally sterile abdomen. Peritonitis or infection of the abdominal cavity, which can be a life-threatening complication can result if proper sterile techniques are not followed.

These sterile techniques should include the use of: a separate operating room for sterile procedures; autoclaved or steam sterilized instruments; and sterile gloves and gown worn by the surgeon who also uses a cap and mask. The techniques used in a good veterinary hospital should be the same as their human counterparts.

The OHE surgery can be done at any time after 6 months of age. The recommended age for an OHE is before the first heat cycle or pregnancy (first heat cycles usually occur between 7 and 12 months of age). There are several medical advantages to spaying at an early age:

1. Animals at this age are normally very healthy and can better handle the stress of general anesthesia and surgery.
2. The reproductive tract and the associated blood supply is smaller in an animal that has not yet been through a heat cycle. This makes the surgery less difficult and reduced the risk of complications, such as post-operative bleeding.
3. Statistics have shown that animals spayed before the first heat cycle have almost no chance of later developing breast tumors. Breast tumors are fairly common in older female pets who were spayed late (after their 2nd heat) or never spayed at all. Over 50% of breast tumors are malignant or cancerous in the dog (over 80% in the cat).
4. Spaying eliminates the risk of accidental pregnancy. In addition to producing homeless "mix-breed" puppies or kittens, carrying a pregnancy can pose a great physiological stress on an animal's system (especially for a very young animal who is not finished growing herself). Difficult births, some of which require Cesarean delivery, are seen more frequently in first litter mothers, especially in dogs bred to a larger male.
5. Older female dogs (greater than 5 years) have an increasing risk of developing uterine infections (pyometra) within 60 to 90 days after a heat cycle. This condition is treated by performing an OHE on an emergency basis. The surgery is much more difficult on the infected uterus and the risk of complications arising from the surgery and anesthesia are much greater for the patient. For this reason, we recommend OHE on breeding females who are past their normal reproductive years.

Spaying also eliminates the management problems associated with an animal in heat:

1. In dogs this can include fending off interested male dogs as well as soilage of the house with the blood-tinged discharge seen during the 3 to 4 week heat cycle.
2. In cats the surgery will help prevent males from being attracted to your home and urine marking when your female cat is in heat. In addition, many cats in heat show dramatic behavioral changes including howling, agitation, excessive rolling, licking, tail-flagging, and increased attempts to escape to the outside. Unlike dogs which usually come into heat once every 5 to 12 months, most cats continue to come in and out of behavioral heat every 2 to 4 weeks during the Spring, Summer, and Fall seasons until they are bred and become pregnant. Cats may have 2 to 3 litters of kittens per year if left to go outside and breed.

The doctors and staff and Centre Animal Hospital are very proud of the operating facility and monitoring equipment we can offer to our clients. We invite all of our clients to take a tour of our hospital facilities. All OHE or spay operations are performed in our separate sterile surgery area, using full sterile technique as previously described. Dogs are anesthetized using inhalant gas anesthesia equipments. Cats are anesthetized using a combination of injectable agents, which may be supplemented with inhalant gas anesthesia. The anesthetized patient is monitored during the surgery by an animal health technician. We also use electrocardiogram and pulse oximetry monitoring to further ensure patient safety.

The surgery itself is performed using as small an abdominal incision as possible to permit complete access to the structures involved. The incision is then closed in two layers using synthetic absorbable sutures. Both layers are buried so no skin "stitches" are visible to the owner or patient. Both the smaller incision and the buried absorbable stitches mean less post-operative pain for you pet. Also, the pet cannot lick at or chew out the sutures and doesn't need to come back for suture removal.

Neutering

Castration of the Male Dog

Castration, or neutering, is a frequently performed operation at a veterinary hospital. It is major surgery involving removal of the testicles and requires a general anesthetic.

The operation is performed in the surgery room, a separate, sterile area of the hospital. The surgical instruments and other materials used during surgery have been heat sterilized in an autoclave. The surgeon is outfitted with cap, mask, and sterile gloves and gown. The patient's status is monitored by an animal health technician. The techniques employed to ensure the safety of your dog are like those used in a human hospital.

A small incision is made just in front of the scrotum. Both testicles are then identified, freed from attachments and surgically removed. The incision is then closed using synthetic absorbable suture material. The sutures are buried so that no stitches are visible. No repeat office visit is necessary for the stitches to be removed.

If your dog is not to be used for breeding, we recommend neutering at 6 months of age, prior to the onset of significant levels of male hormone and thus prior to "male" behavior. The advantages of having a male dog neutered include:

1. Greatly reducing male sexual behavior such as roaming after female dogs that are "in heat", mounting behavior, masturbation, and urine marking.
2. Not adding to the already overwhelming unwanted pet population.
3. Greatly reducing the likelihood of several types of aggressive behaviors that are linked to testosterone levels (most notably aggression between male dogs).
4. Decreasing the incidence of prostatic disease, perineal hernias, perianal adenomas (a type of tumor), and testicular tumors all serious medical conditions seen in older unneutered male dogs.

Contrary to popular folklore, dogs that have been neutered do not necessarily become fat and lazy. In most cases, overfeeding and underexercising are responsible for obesity. Most owners find a neutered dog to be a better pet.

Castration of the Male Cat

Castration or neutering is a frequently performed operation at a veterinary hospital. It is a major surgery involving removal of the testicles and requires a general anesthetic.

Two small incisions are made at the base of the scrotum. Both testicles are identified, freed from attachments, are surgically removed. Since the incision is so small, sutures are not necessary. Thus, no repeat office visit is necessary for suture removal.

If your cat is not to be used for breeding, we recommend neutering at 5-6 months of age, prior to the development of significant levels of male hormone and thus prior to "male" behavior. The advantages of having a male cat neutered include:

1. Eliminating male sexual behavior such as roaming after female cats that are "in heat", and spraying or urine marking (often inside the house).
2. Not adding to the already overwhelming unwanted pet population.
3. Reducing several types of aggressive behavior that are linked to testosterone levels (most notably aggression between male cats).
4. Decreasing the incidence of infectious diseases, principally Feline Leukemia Virus, Feline Immunodeficiency Virus, and Feline Infectious Peritonitis. These viruses are much more common in unneutered, free-roaming males who tend to fight frequently with other cats.

Contrary to popular folklore, cats that have been neutered do not necessarily become fat and lazy. In most cases, overfeeding and underexercising are responsible for obesity. Most owners find a neutered cat to be a much better pet.