New Dog/Puppy adoption packet

Congratulations on taking the wonderful step towards enriching your life with a furry companion! We are thrilled to welcome you to the Healing and Hope Animal Foundation family. Your decision to adopt a dog not only brings joy to your home but also provides a second chance at a loving life for a canine friend in need.

In this adoption packet, you will find valuable information and resources to ensure a smooth transition for both you and your new furry friend. From basic care guidelines to training tips and important contact information, we've compiled everything you need to kick-start this beautiful journey of companionship.

At Healing and Hope, we believe in creating lasting bonds between humans and animals, promoting a harmonious relationship built on trust and love. This packet serves as a guide to help you understand your dog's unique needs and quirks, making the adoption process a rewarding and fulfilling experience.

Thank you for choosing to adopt from Healing and Hope Animal Foundation. Your decision not only transforms the life of your new four-legged family member but also contributes to our mission of providing hope and healing to animals in need.

Wishing you and your new companion countless moments of joy, laughter, and unconditional love.

Adopting a Shelter Dog

Miranda Spindel, DVM, MS *Date Published: 06/12/2018*
Date Reviewed/Revised: 11/06/2023

Deciding to add a new animal to your family is an exciting time! It can be very rewarding to choose to adopt a dog or puppy from an animal shelter or rescue program. Not only will you be adding a wonderful companion to your family, but you will also be saving a life. There are still millions of shelter animals being euthanized annually in the United States that would have made wonderful family pets. Here are a few things to consider before, during, and after the adoption that can help ensure success.

Before Adopting

Make sure you're ready

Adopting an animal means that you are agreeing to be responsible for the animal's care for many years to come. It is always smart to think ahead and consider what might change in your life and how you will be able to ensure that you meet your new dog's needs as a beloved family member. Veterinary care, nutritional needs, exercise requirements, and how well the dog will blend with children and other family members are all important considerations.

Research what type of dog is right for you and your family

Many factors may play into the type of dog you seek to adopt. Breed, energy level, sociability, haircoat, age, your personality, and lifestyle are just a few. Many shelters are experienced at helping to make lasting matches and may even have standardized, research-backed questionnaires for you to fill out to help with this process.

Learn about your local shelters and rescues

Most areas have more than one animal welfare organization and each may have different missions and philosophies. You may wish to give your adoption support to the agency your philosophies align with the best. Consider asking your regular veterinarian about the local

shelters. Chances are, they've examined animals from most of the nearby facilities. They will have opinions about the health and well-being of newly adopted animals and about shelter operations. It can also be useful to ask friends what their experiences have been. Ultimately, you should not only feel great about the dog or puppy you are bringing home, but also about the organization you choose to support through your adoption. There are many things to learn about and consider!

During the Adoption

What to expect

Rescues and shelters take variable approaches to the adoption process. Some require you to fill out involved questionnaires and will call landlords and perform reference checks. Others take a more open, trusting, and conversational approach. Some shelters will send animals home the first day you visit and others take a slower approach. It can be helpful to familiarize yourself right away with how the shelter you visit works so you won't be disappointed after you've matched with a dog.

Almost all shelters will require their animals to be spayed/neutered before adoption. Many shelters will have already performed the surgery before animals are made available for adoption, while others wait until adoption papers have been signed. This is also something you may want to find out about early on. Less commonly, shelters will send animals home with a voucher or other system and require spay/neuter at some point after adoption. It can be helpful to try to keep an open and compassionate mind during the adoption process. Remember that shelters are busy and chaotic places not only for the animals they house but also for the humans that work there.

What to ask

Once you have found a dog that you are interested in, ask the shelter for as much information as can be provided! Get a complete history, but recognize that sometimes there is not much information known. Find out when and where the shelter obtained the dog; was it brought in as a stray, surrendered by an owner, transferred from another shelter, or in some other situation? Ask what is known about the previous living situation and how the dog has behaved since being at the shelter. You should also be shown the medical records the shelter has kept since intake (and any previous records that might exist). You will want to ask about any ongoing medical issues, whether the dog is on any medication, and if there are known medical issues what anticipated care will be required. Inquire about what sort of follow-up services the shelter offers such as health insurance, microchipping, obedience training, or consulting for behavioral issues

or medical issues. Finally, be sure to ask about return policies as it is important to know what options exist if the adoption does not work out.

After the Adoption

Veterinary visit

Although many sheltering organizations have staff veterinarians, many do not. The level of veterinary care can be advanced to non-existent. No matter what exists in the shelter your dog comes home from, it is always wise to schedule an appointment to see your regular veterinarian soon after adoption. Illnesses such as upper respiratory infection and diarrhea are quite common in the early period after adoption due to the stress of shelter stays, and your veterinarian can help provide appropriate care so that your new friend recovers optimally. Vaccination boosters, parasite examinations, microchip implantation, and other important preventive care may also be needed during the early time after arriving home.

Be patient

It can take weeks for a new dog to adjust to a new home, yard, family, and environment. Keeping things quiet for a week or so, learning about and employing crate training, and establishing a solid routine can help. Especially for an older dog, patience during the initial adjustment period, and offering enrichment (opportunities to play, learn and explore new things) often pays off in spades once the dog settles in!

Use your Community Resources

Finally, don't be afraid to ask for help if things aren't perfect initially or if you have questions. The shelter you adopted from will ideally be your first source of information and happy to hear from you and to provide support!

What First-Time Dog Owners Should Know

Phyllis DeGioia, Veterinary Partner Editor
Date Published: 05/25/2021

Congratulations! An adult dog has entered your life. If you've never owned a dog before, you're likely wondering what to expect.

The day the dog comes home, you will need the following.

- Food. If you know what the dog was eating just before arriving at your house, keep using that in order to avoid upsetting their stomach. If you don't know, ask your veterinarian's advice or you'll just have to guess. Buy small bags until you know what works well. Learn what foods are toxic to dogs (see below) and know that people food can make dogs gain too much weight. While some dogs can be fed one meal a day, most dogs do best with two meals a day.

- Food and water bowls. Steel and ceramic bowls are best, as plastic ones can harbor bacteria. Wash them regularly in hot water and dishwashing soap, preferably daily. Fresh water must be provided every day.

- Collar and leash, or harness and leash. Ideally, a collar should have enough space for you to put a couple of fingers between the collar and the dog's neck. Harnesses are more difficult to size and get on correctly, so have someone at the clinic or pet supply store help you the first time. Some harnesses are just meant to take pressure off the dog's neck, some are designed to help the dog pull less (front clip harness), and some are designed for safety in the car. Flat-faced (brachycephalic) dogs and those with trachea issues should wear harnesses, not collars. Dogs do not have to be seat belted in, but they should be in the back seat where they cannot distract your driving.

Items you will need eventually, but do not have to have on Day One.

- ID tag. You can order these at a pet supply store or numerous online sites. Put it on the dog's collar or harness.

- Depending on your local ordinances, your dog may need a city license. For the license, you will need to provide proof that your dog has been vaccinated for rabies.

- It is illegal everywhere in the U.S. for a pet dog not to be vaccinated against rabies. Once your dog is vaccinated, place the rabies tag on the dog's collar or harness with the

ID tag and city license.

- Toys to entertain the dog, lessen anxiety, and exercise the brain, including food dispensing and puzzle toys. Toys are helpful for redirecting the dog to appropriate items to chew. Don't let new dogs play with your old shoes or they will think all shoes are toys. Playing with your dog will help cement the bond between you.

- If you live in heartworm country, you will need to visit the veterinarian as soon as possible for a heartworm blood test before your dog begins taking a heartworm preventive. Many people in winter climates give it year round. Heartworm preventive is significantly less expensive than heartworm treatment, and heartworms can be fatal.

- Visit the veterinarian for a wellness check even if you don't live in heartworm territory, just to see if all is well. You may want to have your veterinarian check for parasites, such as ear mites, roundworms, tapeworms, and hookworms, or conditions such as an ear infection.

- Talk with your veterinarian about what flea and tick preventive options are best for your dog.

- Poop bags to pick up after your dog. You can buy the kind that compost, or plain plastic.

- Shampoo made specifically for dogs, not yours. Human shampoo has a lot of acidity can create an area hospitable for bacteria and parasites.

- Toothbrush and toothpaste for dogs. You can use gauze instead of a toothbrush, though. Human toothpaste has fluoride and detergents that are not meant to be swallowed, but doggie toothpaste can and will be swallowed.

- Toenail clippers or nail board, unless you plan to have the groomer trim them every month or so.

- If your adult dog does not have a microchip, it's a good idea to get one in case your dog gets lost.

Equipment you may need

- You don't have to provide a specific dog bed, but if you don't, your dog will end up sleeping in an undesignated spot. Even if you do buy a bed, the dog will not necessarily use it, but they usually do.

- Some dogs enjoy being in crates or exercise pens, thinking of them as their own den, while others don't. Unless the dog was a stray, the people who had the dog should be

able to tell you. Some dog owners think they are necessary, and some never find a need for one. However, the time you would need it most is the very beginning of the dog's time with you, particularly when you leave the house. Some people have their dogs sleep or eat in the crate. Many people use them to housetrain dogs because dogs don't like sitting in their own filth. A crate also provides a safe place for your dog to stay out of trouble when you are gone.

- Baby gates to prevent your dog from going in or out of a certain room.

- Brushes and combs depend on your dog's needs. Dogs with long coats need to be brushed regularly, and if they are the type to blow coat (shed a large proportion of their coat within a few days as a seasonal change) you will need a brush and a detangler appropriate to your dog's coat. Ask your veterinarian.

- Many dogs are nervous when moving to a new home…oops… and you may need some urine cleaner. The ones with enzymes work best.

- Training classes may be old hat or something new for your new-to-you dog. Providing your dog an opportunity to socialize in a controlled environment may be beneficial. Technically, obedience classes are meant to teach you how to train your dog, so a refresher course for you and your dog is a good idea as long as your dog is not reactive to other dogs or people, in which case a group class may do more harm than good.

- If your dog is nervous during their first veterinary clinic – and many are – you can set up a few quick visits just so the dog gets treats, weighed, and used to the clinic.

- Decide immediately if you will let the dog get on your furniture or bed. If you don't let them start doing what you don't want, your life will be easier.

Time for your Dog

What else does your dog need?

Mostly, your dog needs YOU. They need time with you, they need your patience, they need your affection. They do not need any anger, punishment, or yelling. They do not speak your language but rely on your tone of voice. Most dogs are exquisitely tuned into human emotions. If they don't behave the way you expect, it is up to you to train them to the daily rhythm of your home.

Your dog's bladder will now rule your life. Many dogs are okay with eliminating three times a day: when they get up, dinner time, and bedtime, but that doesn't mean every dog will only need to go out three times a day. In the beginning, your dog may be nervous and need to go more often. Older dogs usually need to go more often.

Your dog needs exercise, depending on their age and physical condition. Even old, doddering dogs like to go up and down the block, but insufficient exercise for most dogs means they will burn out their energy in inappropriate ways, like chewing things they shouldn't. Messages are left in other dogs' urine, and they like to go out and read it and respond. They like to move and smell, leave their scent, and see the neighborhood and the neighbors. These are called sniff walks; they are about enrichment more than exercise and are very important. Use a leash to prevent accidental tragedy; check to see if there is a leash law in your area.

Most, but not all, dogs want affection – pats on the head, belly rubs, ear scritches, sweet nothings lovingly whispered to them. A consent test can tell you if a dog likes that kind of affection or prefers not to get it. They may want to fall asleep with their head or entire body on your lap, whether they are lap sized or not.

A regular schedule is best, if it's possible. They like to know when they'll be fed, when you'll get home from work, when they can nestle with you to watch a movie, and what signals bedtime. Try to give meals at approximately the same time each day, such as right when you get up, or right when you get home from work.

Your dog needs a doctor. Soon after your dog arrives, get an appointment with a veterinarian to establish a valid client-patient-doctor relationship. Your dog's doctor cannot treat anything without having that relationship, and the doctor has to meet the dog in person. If your dog did not come through a known contact, you may need certain vaccines or preventives that you can only get from your veterinarian.

Some of what we can eat or ingest - xylitol, alcohol, *Cannabis*, caffeine, ibuprofen, some nuts - will make dogs sick. See the box below for more information on toxins.

Starting a relationship with a new dog is a bit like dating someone new. Everyone is on their best behavior for approximately three weeks to three months. Once dogs get comfortable and come to realize this is home, their real temperament will emerge. They are no longer pretending that they have to behave in front of company. Often when they are comfortable, a rich sense of humor will be seen, or a penchant for playing with you in a certain way. Whatever it is, enjoy it!

Toxic Substances for Dogs

Dogs are a different species, so some things we can eat or ingest may essentially poison them. There's no need to panic if your 120-lb dog eats two M&Ms, but you do need to worry if your 20-lb dog eats half of a chocolate cake. If you know what your dog has ingested, you can call ASPCA Poison Control Center for a fee, at (888) 426-4435, or contact a veterinarian immediately.

- Alcohol
- Antifreeze
- Caffeine
- Chocolate
- Cigarettes, nicotine, e-liquid for electronic cigarettes
- Compost
- Dishwashing liquid, detergent/dishwasher tablets
- Fabric softener sheets
- Grapes and raisins
- Ibuprofen and naproxen
- *Cannabis*
- Minoxidil (Rogaine)
- Mosquito repellant with DEET
- Nasal decongestants
- Nuts (particularly Macadamia nuts)
- Onions, garlic, chives
- Pesticides and rodenticides
- Topical medications
- Wild mushrooms
- Xylitol
- Yeast dough

Vaccine Information for Dogs, Cats, Puppies and Kittens

Wendy Brooks, DVM, DABVP *Date Published: 01/01/2001*
Date Reviewed/Revised: 07/08/2022

Why Do Baby Animals Need a Series of Shots and How Many do They Need?

When a baby kitten or puppy is born, its immune system is not yet mature; the baby is wide open for infection. Fortunately, nature has a system of protection. The mother produces a certain kind of milk in the first few days after giving birth. This milk is called colostrum and is rich in all the antibodies that the mother has to offer. As the babies drink this milk, they will be taking in their mother's immunity. After the first couple of days, regular milk is produced and the baby's intestines undergo what is called closure, which means they are no longer able to take externally produced antibodies into their systems. These first two days are critical to determining what kind of immunity the baby will receive until its own system can take over.

How long this maternal antibody lasts in a given puppy or kitten is totally individual. It can depend on the birth order of the babies, how well they nursed, and a number of other factors. Maternal antibodies against different diseases wear off after different times. We DO know that by 14-20 weeks of age, maternal antibodies are gone, and the baby must be able to continue on its own immune system.

While maternal immunity is in the puppy’s system, any vaccines given will be inactivated. Vaccines will not be able to "take" until maternal antibody has sufficiently dropped. Puppies and kittens receive a series of vaccines ending at a time when we know the baby's own immune system should be able to respond. We could simply wait until the baby is old enough to definitely respond, as we do with the rabies vaccination, but this could leave a large window of vulnerability if the maternal antibody wanes early. To give babies the best chance of responding to vaccination, we vaccinate intermittently (usually every 2-4 weeks) during this period, in hope of gaining some early protection.

When a vaccine against a specific disease is started for the first time, even in an adult animal, it is best to give at least two vaccinations. This is because the second vaccination will produce a much greater (logarithmically greater) response if it is following a vaccine given 2-4 weeks prior.

If a Vaccine Lasts a Person for their Whole Life, Why do I Have to Vaccinate my Pet Annually?

In the U.S., vaccines are licensed based on the minimum duration they can be expected to last. It is expensive to test vaccines across an expanse of years, so this is not generally done. If a vaccine is licensed by the USDA for annual use, this means it has been tested and found to be protective to at least 80% of the vaccinated animals a year after they have been vaccinated. Some vaccines are licensed for use every three years and have been tested similarly. Do these vaccines last a lifetime? We cannot say that they do without testing and this kind of testing has yet to be performed.

It is also important to realize that some diseases can be prevented through vaccination while others do not. For a vaccine to generate solid long-lasting immunity, the infection must be fairly generalized to the entire body (such as feline distemper or canine parvovirus) rather than localized to one organ system (such as kennel cough or feline upper respiratory viruses). Vaccination for localized infections tends to require more frequent boosting, whereas there is potential for vaccination for systemic disease to last for many years.

Since the mid-1990s most veterinary teaching hospitals have restructured their vaccination policies to increase the duration of some vaccines from one year to three years based on independent studies rather than on the studies used by the USDA for vaccine licensing. The American Association of Feline Practitioners has vaccination guidelines for cats living in different exposure situations, and the American Animal Hospital Association has guidelines for dogs.

It is important to realize that these are just guidelines and different regions and different pet lifestyles will justify modifications. For example, Leptospirosis vaccination is generally considered "non-core," but the Los Angeles County Health Dept has recommended that it be considered "core" for Los Angeles County after the substantial 2021 outbreak.

What Do I Do if My Pet Skips a Year of Vaccination?

It depends on the vaccine and the hospital. Hospitals are likely to have different recommendations as vaccination policy tends to be individualized to the practice and its geographic location. At some hospitals, recommendations for adult animals who skip an annual vaccine include:

- Rabies - A three-year vaccine can be given any time after the initial one-year vaccine. This means that if a year is skipped, the next rabies vaccine given will still be a three-year vaccine. One-year vaccines can be boosted at any time and will be good for

one year from the time they are given.

- Canine distemper, canine parvovirus, nasal Bordetella (kennel cough) - Vaccinate normally. You do not need to restart the initial series as though the pet is starting over from the beginning.

- Canine Leptospirosis - If longer than 15 months have passed since the last dose, the series should probably be restarted.

- Lyme disease - Should a dog in a geographically affected area skip a year with this vaccine, some veterinarians recommend restarting the initial series.

What Vaccines Should I Get for my Pet?

What vaccines are recommended to an individual pet depends on many factors: what kind of exposure to disease the animal has, what diseases are common in the area, what kind of stress factors are present, etc. When you consider the multitudes of vaccine types and combinations and the many different situations dogs and cats live in, it is not too surprising to find that almost every veterinarian recommends a different group of vaccines. The best advice is to establish a relationship with a veterinary facility that you trust and go with their recommendation.

What Vaccines Should I Get if my Pet is Indoors Almost Completely?

Both the American Association of Feline Practitioners and the American Animal Hospital Association have published guidelines for vaccination. Vaccinations are divided into “core” vaccines that every pet should have, and “non-core” vaccines that a pet should have depending on exposure risk.

For cats, core vaccines are the basic distemper shot: feline distemper (panleukopenia), feline herpes, and feline calicivirus. Rabies vaccination is core except in Hawaii where rabies has been eradicated. Many people are surprised that rabies is often considered a core vaccine and is considered important even for indoor-only cats, but when one considers the consequences of rabies exposure (which can certainly happen indoors) and the legal consequences of owning a biting animal (what happens to the animal generally is dependent on its vaccine status), it is not hard to see why this vaccine is important. The feline advisory board does not consider feline leukemia virus vaccination to be core, but they strongly encourage every kitten to be vaccinated against this infection with a re-assessment of risk factors when the kitten is grown. This is

because young kittens frequently live indoors only, but this often changes when the kitten matures regardless of the original intentions of the owner.

For dogs, core vaccines are the basic distemper shot (DHPP) and the rabies vaccine. Since dogs go outside for walks, for grooming, to the vet's office, etc., we recommend vaccinating against kennel cough for all our canine patients though these are not listed as "core" by the aforementioned organizations. Recently, canine influenza has become a concern in the United States. Dogs that rarely contact other dogs probably do not need vaccination for this but dogs that go to daycare, grooming, or boarding facilities should be vaccinated.

What is the Difference Between a Live and a Killed Vaccine?

These terms apply to vaccines against viruses.

The goal of vaccination is to give the virus in question to the patient's immune system in as natural a way as possible; the hope is to best mimic the stimulation obtained by natural infection yet skip the illness.

There are two ways to achieve this goal. One way is to use a killed vaccine. Here, large amounts of dead virus are injected into the patient. They filter into the immune system and lead to stimulation. The other way is to use a live virus that has been modified such that the actual disease does not result in infection. The live vaccine is able to travel through the body in the same sequence as the naturally occurring virus would, creating immune stimulation in the same way the street virus would. An immunity similar to that created by a real infection is produced.

In general, the live virus vaccine is preferred as the most thorough immune stimulation will occur with it, but there are some circumstances where killed is better. A killed virus vaccine can never revert to virulence, which means there are no circumstances under which the vaccine can produce the disease it is trying to prevent. If the virus in question is particularly deadly (such as rabies), it is not worth taking any chances with a live virus vaccine even for superior immunity.

What is a Recombinant Vaccine and is it Really Better than the other Available Vaccine Types?

Recombinant vaccines represent the cutting-edge of vaccine technology in both veterinary and human medicine. For generations, we classified vaccines as either "killed" or "modified live" (see above). With the advent of genetic engineering, there are now new vaccines that do not fit this classification: the recombinant vaccines. While the USDA recognizes four categories of recombinant vaccines, only the "Vectored Virus" Category is commercially available for pets.

With vectored virus vaccines, the viral DNA responsible for stimulating the patient's immune system is cloned into a harmless live virus. The harmless virus is injected into the patient where it travels innocuously within the body, stimulating the patient's immune system to respond to the cloned viral DNA. In this way, the benefits of a live vaccine can be realized for a virus that is normally considered too dangerous for a modified live vaccine. Presently, recombinant vaccines are available for feline rabies, feline leukemia, Lyme disease, and canine distemper.

So are these vaccines better than the traditional ones? The chief benefit seems to be fewer vaccine reactions since there are fewer extraneous proteins to cause unnecessary immune stimulation when compared to killed virus vaccines. Since the virus used in recombinant vaccines is alive, there is no potentially harmful adjuvant included in the product (see below). There is also a zero chance of the vaccine virus reverting to virulence and causing infection.

Why do Vaccinated Pets still get Sick?

There are several reasons why a pet might get sick from a disease it is vaccinated against. Not every pet is able to respond to vaccination due to inherent individual immunological issues. Some vaccines are not intended to prevent infection but are intended to blunt the symptoms of the disease should infection occur, as with the feline upper respiratory infections.

In most cases, the pet got sick because of incomplete vaccination. This situation generally involves a puppy that did not finish its puppy series of shots or got exposed to infection before the shot series could be completed. True vaccination breaks are extremely rare but if you think your pet may have experienced one, your veterinarian will need to issue a report to the manufacturer.

Can a Pregnant Pet Be Vaccinated?

It is important that live vaccines (see above) NOT be used in pregnant pets. This is because a "modified" virus that will not cause illness in the mother may still be strong enough to infect the unborn puppies or kittens. Killed vaccines may be given during pregnancy though, as a general rule, it is best not to give any medical treatments during pregnancy if it can be avoided. While giving killed vaccines is commonly done in large animals and food animals, it is not routine for dogs or cats.

What is an Adjuvant?

An adjuvant is a material added to a killed vaccine to assist in generating immunity. When a killed vaccine is injected, the body recognizes a foreign substance and begins to break it down and remove it. If this process happens too quickly, the viral proteins will not be present long

enough to generate an immunological response. Adjuvants help hold the killed virus in place and stabilize it so that its presence can be prolonged and provide a more complete stimulation of the patient's immune system.

Adjuvants have become controversial in cats especially and may be associated with tumor (especially fibrosarcoma) formation. It appears to be desirable to avoid the use of adjuvanted vaccines in cats. Neither modified live nor recombinant vaccines use adjuvants.

What is a Vaccine Titer?

Antibody levels against certain infections can be measured in a patient's blood sample. These antibody levels are called titers.

The idea is to measure a titer and determine whether or not a patient is protected against the infection in question so that unnecessary vaccination can be avoided. There is some controversy associated with this procedure.

- Blood testing (titering) is frequently more expensive than simply getting the vaccines in question.
- Blood testing is only available for a few infections.
- Antibody levels are only a small piece of the protection puzzle and it may not be correct to say that a certain antibody level "equals" protection.
- Risks associated with giving vaccines to patients that are already protected are not clearly defined. Exactly what the risks are, or if there are risks at all, has not been determined.

Titering is available at many hospitals and if you are concerned about whether your pet is already protected, ask your veterinarian about it.

Can Vaccines Hurt my Pet?

Some muscle soreness, lethargy and mild fever persisting for a day or two are considered common (normal) reactions stimulating the immune system. Occasionally a firm swelling temporarily develops at a vaccine site, especially with killed vaccines. Vaccine reactions beyond this are unusual but possible. Allergic reactions characterized usually by facial swelling and hives are a strong sign that special care should be taken in administering vaccinations. Vomiting can be a sign of impending shock and should be taken seriously after vaccination. Since allergic reactions can potentially become worse with each episode, it is important to take heed of these signs as severe reactions can result in shock or even death.

Another reaction that has received tremendous press lately is vaccine-induced fibrosarcoma, a form of cancer in cats. See the next question.

Can Vaccines Cause Cancer?

Fibrosarcoma is an especially aggressive form of cancer that can affect cats spontaneously or by viral induction via the feline sarcoma virus. Recently, fibrosarcomas have been removed from areas of the body typically used for vaccination and, to the surprise of the veterinary profession, particles of aluminum-based vaccine ingredients (called adjuvants) were discovered within the tumor. The working theory is that vaccination may induce this form of cancer in rare cases (between 1 in 1,000 and 1 in 10,000 cats). The killed feline leukemia vaccine and the killed rabies vaccine have been implicated as being more likely to be involved. The problem is definitely not a matter of simply changing to non-aluminum-based adjuvants but is more complicated. A list of preventive measures has been issued by most veterinary associations.

Can Over-Vaccination Cause other Diseases?

As mentioned, in the mid-1990s recommendations for annual canine distemper and feline distemper vaccination shifted to every three years for these vaccines. The reason for this is not that annual vaccination was found to be harmful; it simply became accepted as unnecessary.

Many people have speculated that annual vaccination is responsible for cancer, immune-mediated diseases, kidney disease, and the most common ailments of senior dogs and cats. So far, there is no clear evidence that annual vaccination has increased the incidence of any specific health problems.

How Can I Have my Pets Vaccinated at a Low Cost?

Vaccination is an important part of a pet's health, and it should not be skipped. If cost is a problem, there are several approaches you can take, but each has advantages and disadvantages.

Option One: Omit the Examination and Choose Vaccination Only. Prices Vary from Veterinarian to Veterinarian

Some veterinarians are not comfortable administering vaccinations without completely examining the pet first. Others allow you the option of coming in for "vaccination only." Annual examination is recommended as part of basic care for any pet. The physical examination not only involves a professional assessment of the pet's condition but it is your opportunity to learn about what new products, technology, or services are available that you might otherwise never hear about. The importance of this cannot be over-emphasized, but if vaccinations are needed,

they may not need to be given in conjunction with a complete examination. In some states, "vaccination only" is not an option or there may be restrictions.

Option Two: Vaccination Clinic

These clinics are springing up everywhere to provide streamlined "shots only" service. These clinics may be mobile (traveling monthly or weekly to your local feed or pet supply store) or may be located in your own regular veterinarian's office. Here are some tips on what to look for in a clinic:

- *Are they using disposable needles?* You do not want to have your pet experience a needle that has been dulled on a previous patient or possibly inadequately re-sterilized.

- *Is the clinic using the latest guidelines to avoid vaccine-induced fibrosarcomas?* This might be a good indicator of whether the clinic is up-to-date in its quality control. See more information on the prevention of vaccine-induced fibrosarcomas.

- *Do they seem simply interested in selling you the maximum number of vaccines or do they seem genuinely interested in informing you on which vaccines you do and do not need?* Many vaccine clinics pay their staff commission for the number of vaccines sold.

- *Is your regular veterinarian's office sponsoring the clinic?* If they are, this will solve a lot of confusion about keeping vaccine records straight at your vet's office and will avoid the confusion of getting vaccine recommendations from different veterinarians.

- *Are the vaccines already drawn up or are they mixed fresh while you are present?* Modified live vaccines are sensitive about storage, especially after they are reconstituted. A mobile clinic must contend with the inherent difficulties of refrigeration. You do not want to use a vaccine that may have been reconstituted perhaps hours before.

Option Three: Vaccinating your Pets Yourself

It is physically possible to give vaccines yourself if you know how to give a subcutaneous injection. In many areas, pet vaccines are considered over-the-counter medications and you can get them from your local pharmacy or by mail order. ***Most veterinarians do not recommend this practice for the following reasons:***

- It may be difficult for you to properly dispose of the needles. (In California, for example, it is illegal to dispose of needles in the regular trash.)

- If there is any type of acute allergic reaction, you will not be prepared to address it.

- In cats, there are specific guidelines regarding where vaccines should be placed. This makes the process trickier, especially with uncooperative cats. You may get bitten. It is also very important to know where to give each type of vaccine, as giving multiple vaccines in the same area causes increased inflammation, which can lead to vaccine-site tumor formation.

- You may not have kept proper records of vaccination should proof of vaccination be needed. Facilities requiring proof of vaccination may be unwilling to accept your own word that your pet is vaccinated adequately.

- Modified live vaccines are somewhat sensitive to proper storage. They cannot be mixed up in advance and their components must be kept at the proper temperature. This may be difficult depending on how the vaccine is transported to your home.

- It is illegal for anyone but a veterinarian or licensed person to give a rabies vaccine.

If you are looking for a low-cost method of vaccination, consider a low-cost vaccination clinic rather than trying to give vaccines on your own.

Option Four: Pet Insurance

A pet insurance wellness plan will cover vaccination at least in part. Not all pet insurance companies offer wellness coverage, but many do with a great deal of variability in how vaccination is covered (some cover a straight percentage of your expense, some reimburse a specific amount for vaccination services, etc.) If you would like more information on how to choose a pet insurance plan, click here.

A pet insurance wellness plan will cover vaccination. Learn more about how to choose a pet insurance plan.

Preparing Puppies for Veterinary Visits

January 17, 2023 (published)
Christine D. Calder, DVM, DACVB

The veterinary hospital can be a scary environment for puppies. Everything from the waiting room full of people and animals to handling and restraint during physical exams can be overwhelming. Vaccinations are unexpected and often painful, and stepping on the scale results in panic. It doesn't have to be this way. With a little bit of preparation at home, you can make veterinary visits low stress.

Early Socialization

The ideal age to purchase or adopt a puppy is somewhere between eight and ten weeks of age. This gives ample time for your puppy to adjust to their new environment and form relationships with people, dogs, and other animals that share their home. If adopted later in life, puppies will still have opportunities for socialization; however, the process may take longer or never happen at all.

During the socialization period, puppies need a variety of good experiences; however, the quality rather than quantity of these experiences is important. Interactions should never be forced, and the puppy should be closely monitored to make sure they are having fun and want to interact. Food and play are great ways to keep a puppy engaged while positive associations are developing in their mind.

Socialization with Other Dogs

Dogs are not born instinctively knowing how to "speak dog." Puppies learn this critical skill through interactions with their mother, littermates, and other dogs living in the home. Giving your puppy opportunities to interact with dogs of all ages, shapes, and sizes will help them master these skills into adulthood. During these interactions, direct supervision is a must. Adult humans should be on hand to make sure all dogs continue to have fun, and frequent play breaks are taken when needed. Dog parks are not an ideal place to learn these skills therefore, "play dates" should only take place with other dogs that are up to date on their vaccines and know how to play politely with other dogs.

Socialization Classes

Puppy socialization classes, or "Puppy Kindergarten", provide a great opportunity to socialize your dog in a safe environment. Puppies in these classes are often similar in age, and their

vaccine status is known. Classes offered at veterinary hospitals, training facilities, or local shelters will have strict sanitation protocols in place to reduce the spread of disease and keep your puppy safe and healthy.

When taught by a trained professional, these classes often provide enriched environments full of fun toys that make noise, objects to explore, different surfaces to walk on, and people to interact with. A family affair, children are often encouraged to attend and interact with the dogs while supervised. Basic social skills are introduced, and house-training strategies are discussed. Learning about “normal” puppy behaviors while troubleshooting solutions to common nuisance-type behaviors like play biting, jumping, and nipping is included. Overall, these classes are a great way to learn from professionals and socialize your puppy at the same time.

Handling Exercises

Handling your puppy’s feet, legs, individual toes, and nails while rewarding constantly using high-value treats can help prepare your puppy for future veterinary exams, nail trims, and grooming procedures. The same is true for touching their mouth and ears. When doing these exercises, it is important to constantly monitor your dog to make sure they are not stressed by these interactions. Never force your dog to accept your touch, and always give them a choice to walk away when they are uncomfortable or not willing to participate.

Teaching Choice and Problem-Solving Skills

When young, it is impossible to expose your dog to everything they may encounter later in life.

Teaching your puppy critical problem-solving skills is important. Food dispensing and puzzle toys are a great way the engage your dog’s brain, build confidence, and teach independence from you. These tools reduce destructive behaviors and help your dog remain calm and quiet while you watch television, take a phone call, or are stuck on a zoom call. They also reduce frustration and help your dog work through problems they may encounter later in life.

Training is another way to encourage your dog to use problem-solving skills while building strong relationships with their humans. Positive reinforcement training improves communication between you and your dogs. Learned behaviors such as touch, chin rest, go to a mat, and stationing on side and front feet up on a platform are all behaviors that encourage choice and are the basic foundations for cooperative veterinary and husbandry care.

The Car Ride

Car rides can be scary for puppies, and many will get carsick. Taking your puppy for short frequent rides can be helpful to acclimate your puppy to the car. Treats given at drive-thru windows and rides that end at fun places are all ways to help your puppy associate the car with something fun and exciting. If your puppy does get car sick, talking with your veterinarian about anti-nausea medication can help make the ride more pleasant for you and your puppy.

Photo Courtesy of Christine Calder, DVM, DACVB

Putting it all Together: The Veterinary Hospital

Veterinary visits will never be free of fear but preparing your puppy using the techniques and strategies listed above will make these visits less stressful for all. Dogs that are comfortable riding in cars and have been well-socialized as puppies are less likely to become overwhelmed, anxious, and fearful when arriving at the hospital and entering a crowded waiting room. Due to the positive associations your dog has now formed, handling and restraint by the veterinary team will result in a calm and relaxed dog instead of hiding, trembling, growling, or trying to bite.

Consent for procedures such as blood draws is freely given because your dog knows what touch and chin rest mean, which makes it easy to position your dog without force. Bringing snuffle mats, licking mats, and frozen feeders from home can be used to encourage your dog to willingly step on the scale, sniff and explore the exam room, and provide distractions when needed during the physical exam and vaccination process.

De-Skunking Your Dog or Cat

Sharon M. Gwaltney-Brant, DVM, PhD, DABT, DABVT
Date Published: 11/02/2020

Skunk Funk

If your little punk

Has been skunked

Have no fear,

Read here my dear

A recipe you will need

His funk to cede

By Valerie Brons, BVetM

Getting sprayed by a skunk happens to curious dogs who stick their noses into places that annoy skunks. It happens to cats, too, just not nearly as often. Unless your pet has been skunked, you may not realize that the odor stuck to your pet is not the same minor one that you smell driving down a road where a skunk has released its scent. The up close and personal smell won't just make you wrinkle your nose and gag a bit; it's a bit like the acrid smell of burning rubber or chemical fire that grasps your lungs and hurts your eyes. If people have this reaction from being next to their pet, imagine what pets, with their highly sensitive noses, feel.

Unfortunately, it is up to you to remove the odor. While you can take them to veterinarian, getting sprayed often happens outside clinic hours. Emergency rooms see some of these cases, although that is a costlier approach than doing it yourself. You can bathe them yourself with the formula created by a scientist in a laboratory.

1 quart 3% hydrogen peroxide

1/4 cup baking soda

1 teaspoon of liquid dish soap or hand soap

Hand soap is milder and won't strip out the oily residue as well as dish soap, so dish soap is preferable, but use what you have available.

It is unlikely that one shampoo with this recipe will be enough to eliminate that odor. Depending on the length of the pet's coat, the volume of spray, and how long you are able to rub shampoo into the coat, you may need do it more than once, or even a few times.

Mixing

Typically, 3% hydrogen peroxide is sold in pint bottles, so two are needed for this recipe. Anything stronger than 3% is not recommended. If your bottle is expired, get fresh ones instead.

The best place to mix the formula is in a clean plastic bucket with plastic utensils to stir. Metal is not a good choice because it encourages the peroxide to decompose.

If needed to cover your whole dog, up to a quart of lukewarm water (not hot or cold water) can be added to the solution.

Apply the solution immediately, and ***do not store it*** in a bottle or spray bottle to avoid having the bottle explode. Bottles of hydrogen peroxide do not burst in the store because underneath the cap, on the cap liner, the manufacturer has left teeny holes through which the oxygen gas is released.

How Does it Work?

The nasty part of the skunk odor (is there any part that isn't horrific?) is created by organic compounds called thiols, which are responsible for making other hideous odors such as decomposing flesh. The oxygen created by combining hydrogen peroxide and baking soda neutralizes the thiols.

Bathing

Skunks tend to aim for a dog's face. Both the skunk spray and the solution you've made will sting (and possibly harm) a dog's eyes, so keep the solution away from the eyes.

As soon as you can, wash your dog in this solution and really work it into the fur, particularly on long coated breeds. Leave the solution on the dog for about 5 minutes. Some areas that reek more than others may need more baths. Wash the dog as many times as it takes for the dog to smell like a wet dog rather than a dog sprayed by a skunk. It is possible that for a few months afterward the dog will smell slightly of skunk when wet.

Rinse the dog with lukewarm water.

Rinse any leftover solution down the drain with added water.

Safety Warnings (There are Several)

DO NOT SMOKE while shampooing as ***this mixture is flammable***.

Toss out what you haven't used; it can't be bottled. The chemical reaction of pressure from hydrogen peroxide and baking soda will make it burst, and the explosion can cause injuries. The chemist who discovered it should have become filthy rich from it, but it can't be bottled for long enough to package and sell it. It won't even last an evening, so toss out what you haven't used. If you intend to bathe your pet again tomorrow, make another batch then; it's better to bathe them a few times the day it happens. Remember that a similar eruption in paper mache volcanoes is caused by combining dishwashing soap. baking soda and vinegar.

Hydrogen peroxide will lighten black hair to a bronze color, and that will not return to the usual darker shade on its own; note that hydrogen peroxide is an ingredient in permanent hair dye and some blonde hair dye. The fur will have to grow out. If you plan to show your black dog in conformation, consider some other option instead (see below).

Not unexpectedly, the solution will bleach out towels and fabric, so while you bathe the dog, wear old clothes and towels you don't mind getting bleached.

Keep the solution out of your pet's eyes. It can be irritating enough to cause shallow corneal ulcers. That may be difficult to prevent if the dog is sprayed directly in the face.

Other Choices

That old silliness about using tomato juice or sauce to get rid of the odor is likely based on the acidity of tomatoes. It simply does not work.

Most veterinarians keep Thornell's Skunk-Off at the clinic. Many over-the-counter products like this can be found at pet supply stores. It can also be used in the carpet, car seats, furniture, and so on. It does not contain hydrogen peroxide, so it can be used on black dogs. It is available in shampoos for pets and spray bottles for carpeting, bedding, clothing, upholstery, and so on. It can cause minor irritation.

A water and vinegar douche can work. First wash the dog in liquid soap and rinse it out well. Then apply the douche (a spray bottle works well) and leave it there; don't rinse it off. Usually, unmedicated varieties do not expire.

For your house or car, keep the windows open, run air conditioning if you have it, and use whatever household product you have to eliminate odors indoors. The product may not help much, or at all, but it can't hurt.

A Health Risk from the Skunk Spray

Dogs who get a full shot of skunk spray in the face can develop a form of damage to their red blood cells that causes anemia. This result can make the dog weak and turn their mucous membranes (gums, inside cheeks) a chocolate color. If that happens, veterinary intervention is needed. The dog may need blood transfusions and supportive measures. Severely skunked dogs should be monitored closely for 12 hours for such signs as lethargy, weakness, lack of appetite. Extremely severe cases of this resulting anemia can be fatal.

Most dogs that get sprayed by a skunk do not get bitten because they retreat after being sprayed. But if a dog is bitten by the skunk, the owner should seek veterinary attention due to rabies risk and for possible wound care.

Some dogs are more likely to encounter skunks, depending on their geographic area and temperaments, and you may need to do this more than once. If that is the case, consider keeping unexpired supplies on hand.

No Bones About It - Chewing Bones is Bad for Dogs' Teeth

Jan Bellows, DVM, DAVDC
Date Published: 07/29/2023

The Food and Drug Administration warned pet owners about bones and bone treats to include not only harmful bacteria (*E.coli* and *Salmonella*) that dogs can get and pass on to humans but the actual damage caused by the bone's trauma to a dog's teeth.

Other issues can occur with bones, such as blocked intestines, choking, wounds in the mouth, vomiting/diarrhea, and rectal bleeding (some of which could be fatal if not treated promptly).

Are Any Bones Safe for My Dog's Teeth?

No. Steak bones are too hard for teeth. Antlers are worse than bones because they're even harder. Poultry bones - chicken, turkey, and duck - are awful because they are full of air and thus splinter easily. The pieces can get stuck in your dog's palate (roof of the mouth) and cause infection or get stuck in the esophagus or intestines, most of which require a surgical fix.

What Happens if My Dog's Teeth Are Injured by Bones? How Will I Know if There is a Problem?

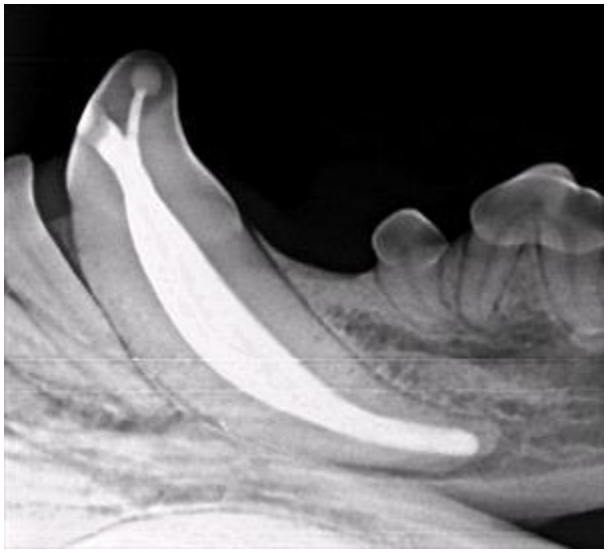
For many dogs, broken teeth do not show signs of discomfort even though they experience pain like humans. Some show apparent signs and symptoms of disease, including an open tract below the eye or under the chin that may be draining. When the nerves die, the pain decreases until infection sets in. Signs relating to dental disease from a broken tooth include:

- chewing on one side;
- dropping food from the mouth when eating;
- excessive drooling;
- grinding teeth;
- pawing at the mouth;

- facial swelling;
- fistulous tract below the eye or under the lower jaw;
- regional lymph node enlargement;
- shying away when the face is petted;
- refusing to eat hard food;
- refusing to chew on hard treats or toys.

Treatment for Broken Teeth

When presented with a tooth that is fractured and has pulp exposure (complicated tooth fracture), your veterinarian essentially has two choices:



1. Extract the tooth.
2. Refer to a veterinary dental specialist to perform treatment, which usually allows the tooth to be saved and returned to function. Specific treatment depends on the severity of damage to the tooth structure and if any other disease is affecting the tooth, and the functional significance of the tooth.

Types of Tooth Damage

- *Enamel fracture:* A fracture with loss of crown substance confined to the enamel
- *Complicated crown fracture:* A fracture of the crown that exposes the pulp
- *Uncomplicated crown-root fracture:* A fracture of the crown and root that does not expose the pulp
- *Complicated crown-root fracture:* A fracture of the crown and root that exposes the pulp
- *Root fracture:* A fracture involving the root

How Severe is the Damage to the Tooth?

Some fractures are limited to the enamel and require little or no therapy; others involve dentin and might not require endodontic care; others expose enamel, dentin, and pulp and require root canal care or extraction. The goal of endodontic care is to return the tooth to function if possible, and if not, extract the tooth to prevent further pain.

How Important is the Tooth?

The upper and lower canines (eye teeth) are the most common teeth broken, followed by the incisors and the upper cheek teeth.

Although endodontic care can be performed on any tooth, the canines and maxillary fourth premolars generally are the only teeth where endodontic therapy would be considered due to the importance of the tooth and ease of pulp chamber access.

Age of the Patient

The age of the patient is also essential when choosing endodontic therapy options. Canine teeth of patients younger than twelve months of age may have open root apices (the tip of the tooth's root). Lower molar teeth generally have closed apices by seven months of age. Standard root canal therapy is not performed on teeth with open root apices because appropriate sealing of the apex cannot be assured.

Treatment options for teeth with open root apices include:

1. Vital pulp therapy (partial coronal pulpectomy, direct pulp capping, and restoration) to promote the preservation of vital pulp tissue or
2. A procedure called apexification is used to stimulate root development if the pulp is dead. Teeth with pulp exposure and closed root apices can be treated with standard root canal therapy.

Age of the Fracture

The age of the fracture affects endodontic treatment. Inflammation occurs less than two mm from the exposure site shortly after pulp exposure. In acute (sudden) fractures, the pulp appears pink or red at the fracture surface. The pulp of a long-standing fracture will appear brown or black. Healthy pulp tissue can be found several millimeters deeper within the pulp, which might respond to vital pulp procedures (i.e., vital pulp therapy).

In the mature animal that has an acutely fractured tooth with a closed apex, standard root canal therapy results in a more predictable outcome compared to vital pulp therapy.

Aftercare Support

Tooth support is critical to the long-term success of endodontic treatment. If obvious periodontal disease is present before therapy, victory will be unlikely unless epic measures are taken, and strict home care is provided.

Dogs love to chew. To find out what products are safe and effective in decreasing the accumulation of plaque and tartar, discuss with your veterinarian.

Low Stress Toothbrushing

April 14, 2021 (published)
Sherrie Yuschak, RVT, VTS (Behavior), KPA-CTP

Dental disease is painful and most pets over the age of three suffer from gum disease. Recommended by veterinarians, daily toothbrushing is one of the best ways to slow the progression of dental disease, lengthen the time between professional cleanings, and has many other benefits to your pet's overall health. For some pets, a toothbrush is scary and, for many pet owners, hard to maneuver in the mouth making brushing a chore. Be aware that if your pet has dental disease, brushing with your finger may cause pain and use caution not to get bitten.

How can we make brushing less of a chore and more fun for all?

The answer: 3"x3" cotton gauze squares

Gauze is more abrasive and effective than rubber finger brushes and less invasive than a brush with a handle. Gauze allows you to feel when you're touching the teeth instead of the delicate gums. Check with your veterinarian and stop brushing immediately if your pet seems painful or bleeding occurs.

Choosing the Toothpaste:

When brushing teeth, it is important to choose a toothpaste specifically designed for pets and approved by the VOHC (Veterinary Oral Health Council). Avoid human toothpaste since some contain Xylitol which is toxic to pets. From the many flavors available, find one your pet likes best. If your pet is still resistant, start the training process with tuna juice or gravy to help create a strong positive association with brushing.

Let's start brushing!

Step 1: Unfold the gauze square and wrap it around your index finger. Pinch the tail of the gauze with your thumb.

Step 2: Dip your fingertip into the juice or gravy or place a pea-sized dot of pet toothpaste on your fingertip and allow your pet to lick your fingertip. Repeat three times. Your pet should quickly and eagerly approach and lick your finger before you move to the next step.

Step 3: Repeat steps 1-3 and slide your finger under your pet's upper lip and make a gentle brief brush action. Then allow them to lick the remaining toothpaste. Repeat three times. Your pet should approach and not back away from your finger. Avoid restraining your pet's head or

following them if they move their head away. Repeat until your pet is holding still and eagerly licking the toothpaste.

Step 4: Repeat the above steps and place your finger farther towards the top back teeth. Gradually increase the gentle brushing swipes then allow your pet to lick the remaining toothpaste. You can place your hand under their chin to steady their head if necessary.

Step 5: Repeat the above technique to brush the outside of the lower teeth on the same side.

Step 6: Wrap a new piece of gauze around your finger to regain abrasiveness, apply more toothpaste and brush the top and bottom teeth on the other side of the mouth. Your pet's mouth is now healthier!

Remember:

When you brush your pet's teeth it's okay if you aren't perfect. It is more important for your pet to be comfortable and willing to accept frequent brushing. Strive for brushing every day. Set yourself up for success by placing your pet's toothpaste where you will incorporate it into your daily routine.

Spend a little bit of time teaching your pet to enjoy toothbrushing for positive results. Your pet's health will improve, your veterinarian will be pleased you're being proactive, and you can save money by decreasing the frequency and intensity of professional dental cleanings.

Blood Work is a Basic Evaluation Tool

Becky Lundgren, DVM
Date Published: 03/01/2004 Date Reviewed/Revised: 05/24/2021

What does it mean when a veterinarian says she needs to run some blood work on your pet? Blood work - presurgical or otherwise - is usually a combination of a complete blood count (CBC) and a blood chemical analysis. Blood work is a basic evaluation tool. Pets, particularly senior ones, should have a CBC at every annual examination. In addition, blood work allows a veterinarian to monitor the progression of a pet's disease.

When the blood sample is drawn from your pet, both the cells and the fluid they "travel" in are examined.

Complete Blood Count (CBC)

The cell part of the blood is examined in the CBC. The CBC determines the number of erythrocytes (red blood cells), the number and type of leukocytes (white blood cells), the number of platelets (thrombocytes), the hemoglobin level, and the hematocrit (packed cell volume, PCV). Erythrocytes carry oxygen throughout the body. Leukocytes fight infection and are part of the immune system. There are five different types of white blood cells: neutrophils, lymphocytes, basophils, eosinophils, and monocytes. Platelets are clotting proteins and indicate how fast your pet's blood can clot; slow clotting can be a serious problem. A CBC can tell your veterinarian if your pet has an unusual number of erythrocytes (anemia, polycythemia), leukocytes (leukopenia, leukocytosis), or platelets (thrombocytopenia).

Blood Chemistry

A chemistry panel (blood chem, chemistry screen), tests kidney function, liver function, electrolyte levels, etc. Blood chemistries are run on the fluid in the blood sample. (The CBC is the examination of the cells in the blood sample.)

The chemistry panel usually includes the following tests: alkaline phosphatase (SAP, ALP), alanine transaminase (alanine aminotransferase, ALT), bilirubin total (T Bili), blood urea nitrogen (BUN), creatinine, creatine kinase (CK, CPK), sodium, potassium, glucose, total protein, albumin, etc. Alkaline phosphatase, alanine transaminase, bilirubin, and albumin give your veterinarian information about the pet's liver function. Blood urea nitrogen, creatinine, and creatine kinase tell your veterinarian how well your pet's kidneys are functioning.

Alkaline phosphatase

An elevated alkaline phosphatase is the most common biochemical abnormality seen in "normal" animals. (In other words, clinically-normal animals can have mildly elevated levels.) Elevated levels are seen in liver injury, bone injury, pregnancy, dental disease, skeletal growth, reactive hepatopathies, and animals who are or have been taking glucocorticoids. Growing animals also normally have higher levels of this enzyme. Elevated levels can be used as a tumor marker, particularly with tumors that have metastasized to the liver. Low levels of alkaline phosphatase may not be clinically significant. However, in humans, decreased serum levels have been observed in hypothyroidism, scurvy, achondroplastic dwarfism, magnesium deficiency, malnutrition, cardiac surgery, cardiopulmonary bypass, and hypophosphatasia.

Alanine transaminase

Decreased ALT in combination with increased cholesterol levels is seen in cases of a congested liver. Increased levels are also seen in liver damage, kidney infection, chemical pollutants, or myocardial infarction.

Bilirubin (total)

Elevated in liver disease, hemolytic anemia, low levels of exposure to the sun, and toxic effects to some drugs. Decreased levels are seen in people with an inefficient liver, excessive fat digestion, and possibly a diet low in nitrogen bearing foods.

Blood urea nitrogen

Increases can be caused by excessive protein intake, kidney damage, certain drugs, low fluid intake, intestinal bleeding, exercise, or heart failure. Decreased levels may be due to a poor diet, malabsorption, liver damage, or low nitrogen intake.

Creatinine

Low levels are sometimes seen in kidney damage, protein starvation, liver disease, or pregnancy. Elevated levels are sometimes seen in kidney disease due to the kidneys job of excreting creatinine, muscle degeneration, and some drugs involved in impairment of kidney function.

Glucose

Elevated in diabetes, liver disease, obesity, and pancreatitis due to steroid medications, or during stress. Low levels may be indicative of liver disease, overproduction of insulin, or hypothyroidism.

Total protein

Decreased levels may be due to poor nutrition, liver disease, malabsorption, diarrhea, or severe burns. Increased levels are seen in lupus, liver disease, chronic infections, leukemia, etc.

Albumin

High levels are rarely seen and are primarily due to dehydration. Low levels are seen in poor diets, diarrhea, fever, infection, liver disease, inadequate iron intake, third-degree burns and edemas, and hypocalcemia.

Leptospirosis in Dogs

Wendy Brooks, DVM, DABVP
Date Published: 01/01/2001

Date Reviewed/Revised: 02/16/2022

About the Organism

Leptospira organisms are spiral-shaped bacteria called spirochetes. There are several species of leptospires, but the ones that cause disease have been grouped into one particular species called *Leptospira interrogans sensu lato*. From here, *Leptospira interrogates sensu lato* has been sub-classified into smaller related groups called serovars. Over 250 serovars have been named and at least 10 are important for pets. Vaccine for dogs, however, exists against only four serovars. Different serovars produce different types of disease and are in different geographical areas.

Canicola - This serovar is the most common in Mexico. It produces primarily kidney disease. With a constant influx of dogs across the border, watch out for this serovar in states near the Mexican border.

Pomona - This serovar is associated with livestock and tends to produce severe disease in both the kidney and liver.

Grippotyphosa - In a survey of over 1,200 healthy dogs in Michigan, 24% of them tested as exposed to *Leptospira* and the Grippotyphosa serovar was the most common.

Icterohaemorrhagiae -This serovar is mostly associated with exposure to rats and rat urine in standing water. It tends to attack the liver.

Leptospires live best in warm, slow-moving water such as after heavy rains or flooding. After the water clears, they contaminate soil for many months. Wildlife are common carriers of infection. A survey in Connecticut found 36% of racoons had been exposed while a survey in Illinois found 48% of raccoons had been. Another survey found 50% of rats had been exposed. Classically, infection of dogs and humans stems from the urine of infected animals getting into environmental water. Leptospirosis is a common human disease in tropical areas, especially where rice is farmed and rats infest the paddies. Health authorities believe that rat populations are involved in the rising incidence of canine leptospirosis in urban areas, and leptospirosis is no longer considered a rural disease. Leptospires can survive for months in contaminated soil.

This all sounds outdoorsy but the 2021 leptospirosis outbreak in Los Angeles started in boarding facilities where dogs are commonly exposed to the urine of other dogs in play yards and kennel drainage pathways. Anywhere with potential urine contact is a potential home for Leptospira organisms.

Canine Infection

Dogs become infected by leptospires when irritated or cut skin comes into contact with infected urine or water contaminated with infected urine. Alternatively, bite wounds, exposure to reproductive secretions, and even eating infected tissues can transmit this infection. The organisms quickly spread through the bloodstream, leading first to inflaming the blood vessels: fever, abnormal bleeding, abnormal bruising and tissue edema appear after an approximately 7-day incubation period. By 2 weeks post-infection, the leptospires have set up shop in the kidneys where they continue to generate inflammation, pain, and potentially total kidney failure with their inability to produce urine. Some serovars also go to the liver and generate inflammation there, though the liver disease is generally not as severe as that of the kidney.

A particularly devastating situation occurs if the organism gets into the lungs where the leptospire toxins produce what is termed "*Leptospira* Pulmonary Hemorrhage Syndrome." The lung bleeding that results is associated with a 70% mortality rate and bodes especially poorly.

If the dog is able to keep the acute illness at bay, a chronic form may emerge. There can be a more chronic kidney insufficiency and/or hepatitis. Furthermore, the long-term immune stimulation can lead to a deep eye inflammation called uveitis that can cause the eyes to look cloudy or even change color. If the disease is treated in this form, it may not be possible to reverse the long-term damage that has already set in.

The Different Clinical Pictures of Leptospirosis

As you might gather, leptospirosis can look different: fever with bruising and bleeding; fever with different degrees of kidney failure; liver disease and kidney disease together; chronic hepatitis; and eye inflammation etc. Another way to look at leptospirosis is to look at the time frame of the illness and how quickly or slowly it came on.

Peracute Disease: Peracute disease means super-sudden onset. These are usually younger dogs with an overwhelming exposure. The large amount of leptospire toxin causes rapid death before the kidney or liver disease even happens.

Acute Disease and Subacute Disease: This is more the classic form described above: fever with bruising and bleeding, general muscle pain, painful belly from the kidney and/or liver disease. There may be jaundice and inflammation in the eyes that makes them look cloudy.

Chronic Disease: Recurring fevers, chronic hepatitis, chronic kidney disease, uveitis, poor appetite, weight loss.

Younger dogs (less than 1 year of age) tend to get the most severe forms of leptospirosis.

87-100% of infected dogs will have some degree of azotemia, which means renal parameters will be elevated on routine blood testing.

Excessive water consumption is frequently seen at home.

Testing

PCR Testing

PCR testing is used to detect leptospire DNA. A blood sample is best in the first 10 days after infection, but after that a urine sample is more likely to be positive. It may be prudent to submit both blood and urine samples. Past vaccination will not interfere with this test, although antibiotic exposure certainly will, and results can be back in a day or so. PCR testing will not determine which serovar is present.

MAT Testing (the Traditional Test)

The Microscopic Agglutination Test or MAT test is still considered the test of choice though it has some disadvantages. It measures antibody levels against different leptospirosis serovars with the idea being that the one with the highest level is most likely to be the serovar causing the disease.

Antibody levels are expressed as titers, which are ratios reflecting how much dilution is needed before it is too dilute to detect antibodies. For example, a titer of 1:32 means a serum diluted out 32 times still had detectable antibody. A titer of 1:32 may sound pretty high but it is actually pretty low; an MAT titer must be at least 1:800 to be considered positive. If the serovar under consideration has an associated vaccine, a titer more like 1:3200 is considered positive. To really obtain high confidence in the diagnosis of Leptospirosis, a second titer is submitted 2-4 weeks later showing at least a four-fold increase in antibody production. Treatment with antibiotics should not interfere with the validity of the second (or "convalescent") titer level.

There are two problems with this testing:

- No one wants to wait 2-4 weeks to confirm the diagnosis especially with a disease contagious to humans. PCR testing gets results much faster.
- Vaccination interferes with results (remember the entire goal of vaccination is to generate an antibody titer). Vaccination history can make interpretation difficult.

In-House Test Kits and other General Antibody ELISA Tests

Recently in-house screening tests have become available so that a result can be obtained in 20 minutes or so. These tests screen for antibodies against *Leptospira* organisms. They are either positive or negative. They will not tell you which serovar is involved nor tell you how high the titer is. They will not distinguish antibodies from vaccination versus those from true infection. Clearly a positive test needs to be followed by another test. A negative test, however, is very helpful (see below).

Other Tests

In the past, cultures and darkfield microscopy were used to detect leptospires. This technology is now considered old fashioned.

Which Tests to Use?

A good approach to begin with is a general antibody test combined with urine and blood PCR testing. If any PCR test detects *Leptospira* DNA either in blood or in urine, infection is confirmed. An MAT test will determine which serovar is afoot and the antibody level can be tracked to be sure treatment is working.

If the PCR tests are negative (meaning *Leptospira* DNA was not detected) but a general antibody test is positive, the MAT test will determine if the antibodies are related to prior vaccination or active infection.

If PCR tests are negative (*Leptospira* DNA not found) and no antibodies are found either, then it should be safe to cross leptospirosis off the list of possible diagnoses.

Treatment

Fortunately, *Leptospira interrogans sensu lato* is sensitive to doxycycline, a readily available antibiotic. Leptospires are cleared from the blood within 24 hours of starting it but it takes about a week for them to clear from the urine, so it is important for you to wear gloves, goggles, etc. and be conscious of contamination. Infected animals should be isolated from other animals at least until their antibiotic course is complete and probably for a couple of weeks after. Check with your veterinarian for instructions.

Intravenous fluids are crucial to support blood flow through the damaged kidneys so that recovery is possible. Any areas at home that have been contaminated with urine should be disinfected with an iodine-based product and you should wear gloves while cleaning any urine. Prognosis is guarded depending on the extent of organ damage; with appropriate treatment 80-90% survival rates are reported.

This sounds wonderful but it is important to keep in mind factors that can interfere with this rosy outcome. While most leptospirosis-related kidney injury responds to fluid therapy as can be given by most animal hospitals, more severe cases can require dialysis, which has limited availability. As mentioned, lung involvement has poor survivability. Infection with the *Pomona* serovar is associated with more severe disease.

A good two weeks of doxycycline is generally needed. If this antibiotic is not tolerated, amoxicillin may also work.

Previously infected dogs may become reinfected. Past infection does not confer future immunity.

Prevention

Vaccination against *Leptospira interrogans sensu lato* is only available for the serovars called C*anicola*, G*rippotyphosa*, P*omona* and *Icterohaemorragiae*. (Some vaccines cover all four serovars while others cover only two out of four.) As a result of long-standing use of this vaccine, it is hard to assess how important it is to vaccinate against leptospirosis. As you might imagine, most recent outbreaks involve serovars for which vaccination does not exist, which suggests that the vaccine is working.

Vaccination against *Canicola* and *Icterohaemorragiae* has been traditional for dogs as it is included in the basic distemper shot (DHLPP - the “L” stands for leptospirosis). The American Animal Hospital Association vaccine guidelines consider vaccination against leptospirosis to be optional but recommends that if you are going to vaccinate for leptospirosis, use a vaccine covering all four serovars.

In the past, the leptospirosis vaccine was thought to be associated with a higher chance of immunological vaccine reactions, but vaccines made from leptospires grown in protein-free media have made vaccination reaction less likely. Reactions considered to be normal to vaccination include fever, swelling at the injection site, and joint/muscle pain. These symptoms should resolve after a day or so. Small dogs are more likely to experience reactions.

Vaccination will reduce the severity of disease but will not prevent infected dogs from becoming carriers.

Other important aspects of prevention include controlling rodents in the pet's environment and removing standing water.

The Infection in Humans

The Centers for Disease Control and Prevention monitors leptospirosis cases in people, it seems that one third come from contact with infected dogs and one third come from contact with rats (usually through field work). Recreational activities involving water and exposure to flood waters are also associated with human outbreaks. Other human risk factors include farm work, animal care work, camping, and sewer work. Remember, leptospires come from contaminated urine which, in turn, contaminates environmental water and soil.

The same symptoms occur in humans as would be seen in dogs.

Heartworm Preventive Comparison Chart for Dogs and Cats

Wendy Brooks, DVM, DABVP
Date Published: 01/01/2001

Date Reviewed/Revised: 04/11/2023

Confused about heartworm prevention options? These two charts compare current heartworm preventive products side by side to assist you in determining which is right for your situation.

In the second chart, LD50 stands for lethal dose to 50 percent of a population. Typically lethal doses are expressed as oral (toxin taken by mouth) or by dermal (toxin placed on the skin). LD50s are usually determined with lab animal species such as rats, mice, and rabbits, but occasionally information is available for dogs. LD50s are expressed in milligrams of ingredient per kilogram of animal body weight (i.e. mg/kg) and provides a way to compare the toxicity of different substances.

The higher the LD50, the less toxic a substance is. Some of the materials reviewed here are so safe that LD50 has not been determined and we can only say that it is greater than a certain amount tested. The highest numbers represent the safest numbers.

Not all products listed here are available in every country. Always check with your veterinarian about the best options for your pet.

	For Dogs or Cats	Heartworm Preventing Ingredient	Other Ingredients for Control of Other Parasites	Other Parasites Controlled	Mode of Application	Youngest Age to Start Using
Heartgard for Dogs	Dogs	Ivermectin	None	None	oral	6 weeks

Heartgard Plus, Iverhart Plus, Iverhart Max, Triheart Plus, Pet Trust Plus	Dogs	Ivermectin	Pyrantel Pamoate Iverhart Max also has praziquantel	hookworms, roundworms Iverhart Max also covers tapeworms	oral	6 weeks
Heartgard for Cats	Cats	Ivermectin	None	hookworms	oral	6 weeks
Interceptor, MilbeGuard, Milbehart	Dogs and Cats	Milbemycin Oxime	None	hookworms, roundworms, whipworms	oral	4 weeks for puppies 6 weeks for kittens
Interceptor Plus	Dogs	Milbemycin Oxime	Praziquantel	hookworms, roundworms, whipworms, tapeworms	oral	6 weeks (and at least 2 lbs)
Sentinel, Sentinel Spectrum	Dogs	Milbemycin Oxime	Lufenuron Sentinel Spectrum also has praziquantel	hookworms, roundworms, whipworms, sterilizes fleas Sentinel Spectrum also covers tapeworms	oral	6 weeks (and at least 2 lbs)

Revolution, **Paradyne**, **Revolt**	Dogs and Cats	Selamectin	None	**For dogs:** fleas, ticks, ear mites, sarcoptic mange mites **For Cats:** fleas, ear mites, hookworms, roundworms	topical	6 weeks for puppies 8 weeks for kittens
Advantage Multi, Imoxi Topical	Dogs and Cats	Moxidectin	Imidaclopr id	**For dogs:** fleas, hookworms, roundworms, whipworms **For Cats:** fleas, ear mites, hookworms, roundworms	topical	7 weeks for puppies 9 weeks for kittens
Proheart 6, Proheart 12	Dogs	Moxidectin	None	hookworms	injectable	6 months for Prohear t 6, 12 months for

						Prohear t 12
Trifexis	Dog s	Milbemyc in Oxime	Spinosad	fleas, hookworms, roundworms, whipworms	oral	8 weeks
Coraxis	Dog s	Moxidecti n	None	roundworms, hookworms, whipworms	topical	7 weeks (and at least 3 lbs)
Simparica Trio	Dog s	Moxidecti n	Sarolaner, pyrantel pamoate	fleas, ticks, roundworms, hookworms	oral	8 weeks (and at least 2.8 lbs)
Bravecto Plus	Cats	Moxidecti n	Fluralaner (for fleas and ticks)	ticks, fleas, hookworms, roundworms	topcial	6 months
NexGard Spectra	Dog s	Milbemyc in Oxime	Afoxolane r	flea, tick, mites, heartworm, hookworm, roundworm, whipworms, flea tapeworms	oral	8 weeks (and at least 4.4lbs)

	How Often Used	Approved for Pregnancy and Lactation?	Water-proof?	Safe to Give to Heartworm Positive Animal?	Manufacturer Website	LD50
Heartgard for Dogs	Monthly	yes	yes	yes	Heartgard	10 mg/kg in rats orally according to MSDS sheet for Parade Equine Gel
Heartgard Plus, Iverhart Plus, Iverhart Max, Triheart Plus, Pet Trust Plus	monthly	yes	yes	yes	Heartgard Plus Iverhart Plus Iverhart Max Triheart Plus PetTrustPlus	10 mg/kg in rats orally for ivermectin; >690 mg/kg in dogs orally for Pyrantel Pamoate according to The Elephant Formulary by Mikota and Plumb

Heartgard for Cats	monthly	yes	yes	yes	Heartgard	10 mg/kg in rats orally
Interceptor, MilbeGuard, Milbehart	monthly	yes	yes	In most cases yes but if microfilariae numbers are high then no	Interceptor MilbeGuard	LD50 information unavailable Symptoms of tremors and incoordination result at 19 times recommended dose
Interceptor Plus	monthly	not tested for lactation, consult your vet regarding use in pregnancies	yes	In most cases yes but if microfilariae numbers are high then no	Interceptor Plus	LD50 information unavailable Symptoms of tremors and incoordination result at 19 times recommended dose

Sentinel, Sentinel Spectrum	monthly	yes	yes	In most cases yes but if microfilariae numbers are high then no	Sentinel	LD50 information unavailable Symptoms of tremors and incoordination result at 19 times recommended dose
Revolution, Paradyne, Revolt	monthly	yes	yes	yes	Revolution	>1600 mg/kg in the rat orally
Advantage Multi, Imoxi Topical	monthly	no	no	yes	Advantage Multi	Moxidectin: 106 mg/kg orally; Imidacloprid: 450 mg/kg in the rat orally

Proheart 6, Proheart 12	every 6 months for Proheart 6, every 12 months for Proheart 12	yes	yes	No, in fact, owner must agree to pre-treatment labwork including heartworm testing	Proheart 6	263 mg/kg in the rat when given by injection (the dose used therapeutically is 0.17mg/kg)
Trifexis	monthly	Manufacturer cautions use, says to discuss with your veterinarian	yes	In most cases, yes but if microfilariae numbers are high then no	Trifexis	Milbemycin Oxime: LD50 information unavailable Spinosad: >3,000 mg/kg in rats; >2,000 mg/kg in rabbits (translates to over 30 times recommended dose)

Coraxis	monthly	no	no	yes	BayerDVM	106 mg/kg orally
Simparica Trio	monthly	no	yes	no	Zoetis	783 mg/kg for rats orally
Bravecto Plus	every 2 months	no	no	manufacturer recommends use with caution	Merck	Fluralaner: Dermal LD50: >2000mg/kg (rat) Moxidectin: 106 mg/kg orally
NexGard Spectra	monthly	not tested for pregnancy or lactation, consult your vet regarding use in pregnancies	yes	Not evaluated by manufacturer	NexGard Spectra	Afoxolaner: up to 1,000mg/kg orally in rats Milbemycin oxime: range of 532mg/kg-946mg/kg, varied in mice and rats.

Heartworm Disease in Dogs

Wendy Brooks, DVM, DABVP
Date Published: 01/01/2001

Date Reviewed/Revised: 08/17/2023

Early Infection

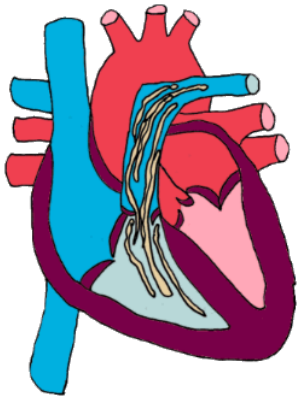
We have covered the worm; now let's cover the dog once after becoming infected. As we have said, the migration of the young worm once it enters the dog's body is a long one: a journey of five to seven months. In that time, the worm is growing, maturing, and preparing to mate. While all this is happening, nothing is happening to the dog, and no one knows an invasion has taken place.

Heartworm Disease: Disease In the Heart and Blood Vessels

Worms in the Pulmonary Arteries

At the end of this long migration, the worm lodges in a distal pulmonary artery branch and then grows to around 12 inches (30 cm) long (females are longer than males). The dog's immune system recognizes the foreign proteins in the worms and creates inflammation that involves the pulmonary arteries adjacent to the worms and the lung tissue surrounding the artery. The pulmonary arteries enlarge and become tortuous as a result of producing the typical pattern of heartworm disease seen on thoracic radiographs.

Contributing to the inflammation is a bacterium called *Wolbachia pipientis*, which normally lives inside the heartworm but is released in large numbers every time the heartworm molts to a new developmental stage, gives birth to its young, or dies. Doxycycline is used to kill *Wolbachia* organisms which reduces inflammation, especially when administering an adulticide to kill the worms.



The inflammation calls in numerous immune cells that in turn, generate even more inflammation as they attempt to destroy a parasite that is realistically too large for them to destroy. The lung itself becomes inflamed and, in time becomes scarred, creating an even larger high-resistance area for the heart to pump through.

If there are many worms, the problem is multiplied. Some pulmonary arteries may become fully blocked by the crowd of worms. Blood

cannot pass through these arteries as they are plugged up by a wad of worms. This in turn means the area of lung that would have been served by these arteries is rendered useless. If the lung cannot present its oxygen to a working pulmonary artery, oxygen exchange cannot take place.

Dying Worms

As if that wasn't bad enough, the real damage comes from worms that have died in place. The dead body of the heartworm breaks apart and is carried through the vasculature of the lung until it lodges somewhere and obstructs blood flow. The arteries that are supposed to form delicate branches, branching tinier and tinier, are now blunted and closed off, similar to a tree branch broken off close to the tree trunk. As above, this leaves more areas of the lung blocked off and unable to receive blood and participate in oxygen exchange.

Scarring

All the inflammation generated by the worms, as well as the inflammation generated by the areas of the lung that aren't receiving proper circulation, ultimately translates into scarring in the lung vasculature. Scarring and fibrosis make it difficult for the heart to pump blood through the lungs effectively. There is a point where the heart is not strong enough to pump blood through all the narrowed, stiff, damaged capillary beds. Right-sided heart failure ensues.

How Many Worms Are Too Many?

In naturally infected dogs, the number of worms does not correlate to the severity of the disease, even in dogs of the same size. It's not the number of worms that matters so much as the dog’s activity level. The factors that come into play to create the severity of disease are the dog’s activity level (the more active the dog, the fewer worms are needed to create disease), the size of the dog, and the number of worms the dog has. The infected dog that sits around at home may appear relatively normal, but once some exercise or even anxiety puts more demand on his heart, symptoms erupt.

Symptoms of Heartworm Disease

- Coughing
- Shortness of breath/panting
- Easy tiring/intolerance of exercise
- Fluid accumulation in the abdomen or chest
- Nose bleeds
- Sudden death

Obviously, not all of these things necessarily occur in the same dog, nor is there necessarily a progression. An infected dog may have no symptoms at all or may develop any of the signs on the list at any time.

Chronic Immune Stimulation and Kidney Disease

A dog harboring heartworms in its body basically has an infection that cannot be cleared. The dog's immune system tries and tries, but the worm is too big. This means the immune system is stimulated all the time, long term, and there is damage associated with the by-products of all this stimulation. Antibodies are more than just tools of the immune system; they are inflammatory proteins, and in heartworm disease, they are produced in high amounts all the time. Antibodies can cause a lot of trouble when they deposit in the delicate membranes of the eye, blood vessels, joints, and kidneys. Antibodies stuck in these areas call in inflammatory cells and damage these delicate membranes, thus setting up tremendous tissue damage and pain. In particular, heartworm infection is a cause of a type of kidney inflammation called glomerular disease.

So What Happens in Glomerular Disease?

The filtration system of the glomerulus keeps proteins inside the body where they belong but allows for tiny waste molecules to be filtered out and dumped in urine. When antibody-antigen complexes abound, they get stuck in the delicate filtration membranes and ultimately punch holes there. As you might guess, a leaky filtration membrane allows for important proteins to be lost. What happens after that depends on what proteins are lost (see the above link for more details), but rest assured, the results are not good. Fortunately, this inflammation and its consequences can frequently be resolved with treatment for heartworm infection.

Caval Syndrome: A Special Catastrophe

Caval syndrome is an especially disastrous form of heartworm disease. Here, there are so many worms (around 100) that the entire right side of the heart is filled with worms and they are backing out into the large veins that feed the right side of the heart. Usually, there have been no signs of heart disease prior to the collapse, shock, and red blood cell destruction associated with this syndrome. Death usually occurs within one to two days and the only effective treatment is to open the dog's jugular vein and physically remove the worms with a clamp. If enough worms can be removed to re-establish blood flow, the dog may survive.