

## Valley Fever in Dogs

### Do dogs get Valley Fever?

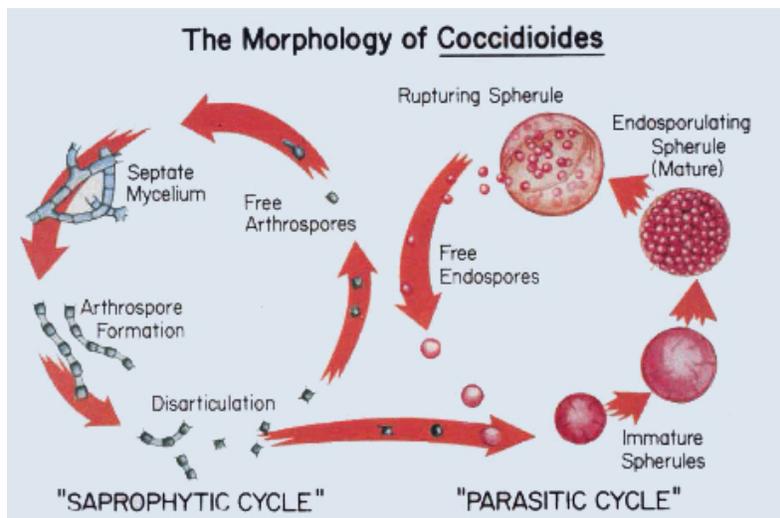
Yes, dogs get Valley Fever! Like people, dogs are very susceptible to Valley Fever. Dogs primarily contract Valley Fever in the low desert regions of Arizona, New Mexico and southwestern Texas and the central deserts of California. Dogs accompanying people traveling through these areas or wintering in these warm climates have about the same chance as their owners of being infected.



*Areas in the US where the fungus is found*

Dogs comprise the majority of Valley Fever cases in animals. However, other animals can get the disease as well. Cats, llamas, non-human primates, horses, zoo animals, and even wild animals have been reported with Valley Fever. For more information on Valley Fever in other species, go to [Valley Fever in Other Animal Species](#).

Valley Fever is caused by a fungus that lives in the desert soil in the areas described above. As part of its **life cycle**, the fungus grows in the soil (saprophytic cycle) and matures, drying into fragile strands of cells. The strands are very delicate, and when the soil is disturbed - by digging, walking, construction, high winds - the strands break apart into tiny individual spores called **arthroconidia** or **arthrospores**. Dogs and people acquire Valley Fever by inhaling these fungal spores in the dust raised by the disturbance. The dog may inhale only a few spores or many hundreds.



*Used with permission: Dr. H. Levine*

## Valley Fever in Dogs

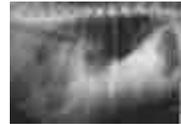
Once inhaled, the spores grow into **spherules** (parasitic cycle) which continue to enlarge until they burst, releasing hundreds of **endospores**. Each endospore can grow into a new spherule, spreading the infection in the lungs until the dog's immune system surrounds and destroys it. The sickness Valley Fever occurs when the immune system does not kill the spherules and endospores quickly and they continue to spread in the lungs and sometimes throughout the animal's body.

About 70% of dogs who inhale Valley Fever spores control the infection and do not become sick. These dogs are **asymptomatic**. The remainder develop disease, which can range from very mild to severe and occasionally fatal.

### Symptoms

The most common early symptoms of **primary pulmonary Valley Fever** in dogs are:

- coughing
- fever
- weight loss
- lack of appetite
- lack of energy



Some or all of these symptoms may be present as a result of infection in the lungs. As the infection progresses, dogs can develop a severe pneumonia that is visible on x-rays. Sometimes the coughing is caused by pressure of swollen lymph nodes near the heart pressing on the dog's windpipe and irritating it. These dogs sound like they have bronchitis.

Additional symptoms develop when the infection spreads outside the lungs and causes systemic or **disseminated** disease. This form of Valley Fever is almost always more serious than when it is only in the lungs. Signs of disseminated Valley Fever can include:

- lameness or swelling of limbs
- back or neck pain
- seizures and other manifestations of central nervous system swelling
- soft swellings under the skin that resemble abscesses
- swollen lymph nodes under the chin, in front of the shoulder blades, or behind the stifles
- non-healing skin ulcerations or draining tracts that ooze fluid
- eye inflammation with pain or cloudiness



Some of these symptoms are very rare and most need to be differentiated from other diseases of dogs. Still other signs can develop that are referable to affected internal organs and may only be detected by your veterinarian. While the lungs are the most common site of Valley Fever in dogs, it can infect almost any tissue of the body.

Sometimes a dog will skip any signs of having a primary infection in the lungs and only develop symptoms of disseminated disease, such as a swollen, lame leg but no coughing or fever, or fever, weight loss, and a draining tract, but eating and not coughing.

## Valley Fever in Dogs

### Symptoms of Valley Fever in cats

Cats can manifest the same signs as dogs, but fewer cases occur in cats (estimate 1 cat case for every 50 dog cases) and there is not as much information on them. Cats are often more ill than dogs at the time of diagnosis. Unexplained weight loss, sometimes without any other overt illness, can be a sign of Valley Fever in a cat. Skin ulcerations that don't heal may be more common in cats than in dogs and may be sufficient reason to run a Valley Fever test on a cat. Diagnosis may also be obtained by performing a biopsy on the skin lesions.

### FAQ - Is Valley Fever contagious from animal to animal or animal to human?

Valley Fever is considered a noncontagious disease. Even if multiple animals or humans are affected in a household, each infection was acquired by inhaling spores from the soil.

Coughing cannot spread it between animals or people. In the case of draining lesions, the form of the organism in the fluid is not considered to be infectious to people or animals. Nevertheless, such lesions are best handled by bandaging. Bandages should be changed daily or every other day and discarded in outside waste containers to minimize risk of contaminating the environment.

For immunocompromised persons living in a household with a pet that has a draining lesion, it is best to consult your physician regarding this issue.

### Diagnosis

Diagnosis of Valley Fever requires suspicion of the disease from the dog's history, its symptoms, and the results of examinations and tests performed by your veterinarian. If your dog has recently visited an area where the fungus can be acquired, telling your veterinarian about your dog's travel history can be very helpful in deriving the diagnosis.

In addition to examining your dog, your veterinarian is very likely to order diagnostic tests to help identify the Valley Fever infection. Common tests include:

- blood tests and blood cell counts
- chest x-rays
- bone and joint x-rays
- Valley Fever blood test (also called cocci test, cocci serology, or cocci titer)

Sometimes tests are negative early in the infection, especially the Valley Fever blood test, and they may need to be repeated in 3-4 weeks to establish the diagnosis. In difficult cases, the routine tests are not very helpful in the diagnosis. Your veterinarian may recommend other tests to find out what is making your dog sick. These tests are often more definitive:

- Culture of fluid or tissue samples from your dog to isolate and identify the fungus; this is highly specific
- Microscopic examination of cell, fluid, or tissue samples to visualize fungal organisms and inflammation in your dog

If your dog is having seizures or other signs of neurological disease, your vet may urge you to get a

- CT or MRI scan of the brain or spinal cord

Usually Valley Fever is easily confirmed with basic diagnostic tests, but occasionally it may be difficult to diagnose. In those cases, persistence and advanced diagnostics will be required to rule out other diseases and confirm Valley Fever.

Diagnosis of Valley Fever in cats is the same as for dogs.

## Valley Fever in Dogs

### FAQ - When does my dog need a Valley Fever test?

If your dog lives in a region where Valley Fever is typical, your dog could need a Valley Fever test for any illness that manifests the common clinical signs - coughing, fever, weight loss, etc. In addition, your dog will need some serum chemistries and white blood cell counts and sometimes x-rays to aid in diagnosing the illness. A positive test in and of itself is often not enough to diagnose Valley Fever.

For dogs that do not live in regions with Valley Fever but have traveled through or spent time in one, a Valley Fever test may be indicated for undiagnosed, unresolving illnesses. If your dog becomes ill outside the typical locations for Valley Fever, it is important to tell your veterinarian of your dog's travel history.

### FAQ - What is a Valley Fever test/titer and what does it mean?

A **Valley Fever test**, **Cocci test**, or **Cocci titer** checks the blood to see if your dog is making antibodies against the Valley Fever fungus. If the test is positive, it means your dog has been exposed to the fungus.

If the Valley Fever test is positive, the laboratory then performs a titer. The **titer** measures how much antibody your dog is making against the fungus. A titer is obtained by doubling dilutions of the positive blood (1:4, 1:8, 1:16, 1:32 . . .) until the test becomes negative. The **titer** that is reported to your veterinarian is the last positive dilution.

In broad terms, a higher titer is equated with more severe disease. However, some very sick animals have low titers, or even negative tests. For these dogs, other diagnostic tests are necessary for diagnosing the illness. X-rays, blood cell counts, biopsies, and microscopic examination of cellular specimens are a few of the tests your veterinarian may need to run.

Asymptomatic dogs (infected but not showing any illness) may also have low titers, such as 1:4 or 1:8, sometimes 1:16. The titer is helpful in diagnosing Valley Fever in sick dogs, but other tests are usually needed to confirm diagnosis.

Titers usually reduce over time as the animal's disease regresses. Dogs that start with low titers (1:4 or less than 1:4) may undergo little change in the titer. This is probably not to be interpreted that your dog is not getting well. Monitoring your dog's symptoms and other tests, such as blood counts and x-rays, will be better determinants of improvement in cases with low titers.

Some dogs will remain positive with a low titer for life. Continued treatment and monitoring of these animals needs to be determined by your veterinarian on a case by case basis.

## Treatment

In most cases, a dog ill enough from Valley Fever to be seen by a veterinarian will require treatment with antifungal medication. Courses of medication are usually extensive, averaging 6-12 months. Dogs with disseminated disease in bones, skin, or internal organs usually require longer courses of medication. Central nervous system (brain or spinal cord) involvement frequently requires lifetime treatment with medication to keep symptoms from recurring.

Oral antifungal medication in the form of daily pills or capsules is the usual treatment for Valley Fever. There are three common medications used to treat Valley Fever in dogs.

**Ketoconazole** (Nizoral) is the most commonly prescribed and the least expensive. Incidence of side effects is relatively high and the drug is usually administered twice daily with food. Absorption is an issue on an empty stomach and acidification usually improves uptake.

**Itraconazole** (Sporanox) is expensive with a moderate incidence of side effects. Administration is once to twice daily with food. Absorption is usually poor on an empty stomach. An oral liquid formulation with much better absorption is available and might be

## Valley Fever in Dogs

indicated for animals who are not eating very well but need this medication. However, expense may be an issue.

**Fluconazole** (Diflucan) is expensive with a low incidence of side effects compared to the other two medications. It is administered once or twice daily. Absorption is excellent even on an empty stomach and this drug is often a good choice for very sick dogs that aren't eating well. Fluconazole is the drug of choice for dogs and cats with infection of the brain, spinal cord, or eyes as it is the only drug that crosses into those tissues.

Other treatments for Valley Fever are mainly directed at supportive care: making your dog feel better while the antifungal medication starts to heal the infection.

- Cough suppressants - the cough may be so severe that your veterinarian will prescribe medicine to relieve it.
- Pain and fever relief - anti-inflammatories or pain medication prescribed by your veterinarian may greatly help your dog's attitude and appetite during the severe stages of the disease.
- Nutritional support - while some dogs eat reasonably well with Valley Fever, others will shun food entirely. These patients may need measures taken to get nutrition into them.
- Hospitalization - dogs that are too sick to eat and drink and are becoming dehydrated or are in severe respiratory distress may need 24-hour care, intravenous fluids, oxygen, or other medication that can only be given in the hospital environment.

**Amphotericin B**, is an old but very effective antifungal medication that is mainly used for extremely sick dogs in today's veterinary practices. Amphotericin B is only available for intravenous administration and has the serious drawback of toxicity to the kidneys. Newer formulations of amphotericin B (**lipid-complexed amphotericin B** - brand names: Abelcet; Ambisome) with much lower kidney toxicity have recently become available. For dogs that are either very ill with Valley Fever or dogs that are not recovering on oral medication, intravenous treatment with amphotericin B, especially one of the newer lipid formulations, may be indicated. Cost is very high.

Drugs very recently introduced to the market for treatment of fungal disease in humans include:

- Voriconazole (Vfend)
- Caspofungin (Cancidas)

The role of these drugs in treating human Valley Fever is not yet clear. They are likely cost-prohibitive for use in animals at this time, as well as of unknown efficacy and safety, but they may have a role in the future for treating dogs.

### **FAQ - What is the best treatment for Valley Fever?**

Treatment choices vary by the individual veterinarian and patient. Reasons for choice of medication include practitioner's experience with the drugs, costs, side effects, efficacy, severity of illness, and convenience to the owner. If one medication is unsuccessful, another will often be tried.

For disease of the brain and spinal cord, fluconazole (Diflucan) is the drug of choice. Fluconazole is also the only drug that penetrates tissues of the eye and should be employed in ocular cases.

### **FAQ - What is the proper dose of Valley Fever medications?**

Your veterinarian is skilled in the diagnosis and treatment of your pet's illness. Should you feel that your dog is not responding or may have side effects to the medicine, you should first discuss your concerns with your veterinarian. If the results are not satisfactory, you can

## Valley Fever in Dogs

seek a second opinion.

### **FAQ - What are the side effects of oral Valley Fever drugs (ketoconazole, itraconazole, and fluconazole)?**

**Ketoconazole** (Nizoral) has the highest incidence of side effects. Loss of appetite is the most common and may be severe in some dogs. Others include lightening of the haircoat (may grey in blacks), vomiting, diarrhea, elevated liver enzymes, and reduced fertility of males. Giving the drug with food may reduce gastrointestinal side effects as well as improving absorption of the medicine.

The coat color effects reverse with discontinuation of the medication (with the exception of a few black dogs this author has heard about that have remained grey).

Liver enzymes are monitored by routinely testing your dog's blood. If your veterinarian determines that they are significantly elevated, the medication may be stopped or the dose decreased.

**Itraconazole** (Sporanox) may also cause lack of appetite and GI signs, though with less frequency than ketoconazole. It may increase liver enzymes. Occasionally, itraconazole can cause ulcerated lesions of the skin. If this happens, a reduction in dose may clear it up, or your dog may need to be treated with a different medication. Monitoring of liver enzymes is as for ketoconazole.

Effects of itraconazole on coat color are unknown by this author but may be similar to ketoconazole in an occasional dog. Itraconazole is not known to affect fertility of males.

**Fluconazole** (Diflucan) has the fewest side effects. Gastrointestinal signs can occur, though are often mild, and elevations in liver enzymes are relatively uncommon. Unlike itraconazole and ketoconazole, fluconazole is mainly eliminated by the kidneys. Dose reductions may be needed in animals with poor kidney function. Liver enzymes also need to be monitored because of occasional problems with enzyme elevations. Fluconazole has minimal to no effect on male fertility.

All the oral Valley Fever drugs cause birth defects in fetuses and should be avoided in pregnant animals unless the benefit to the mother outweighs any risk to the fetuses.

### **FAQ - Are there vitamins, nutritional supplements, or alternative therapies for pets with Valley Fever?**

Most ill dogs could receive a pet multivitamin supplement safely and possibly with benefit to overall well-being. Vitamin C is often prescribed to be administered with ketoconazole. This aids absorption of the drug by helping to acidify the stomach and may also "boost" the dog's immune system. Use of the vitamin C should be checked with your veterinarian as high doses may cause gastrointestinal irritation.

Talk to your veterinarian about your dog's overall nutrition status and the nutritional goals you need to meet while your pet is ill. The more ill your dog, the more important it is to discuss this issue with your vet.

For dogs that will eat nothing at all, force feeding may be an option to attempt to meet nutritional needs. For help in determining if this drastic measure should be taken and what food should be used to implement it, talk to your veterinarian. Force feeding is a big commitment and an unpleasant venture for both dog and owner, but in occasional situations it may mean the difference between recovery and loss of the dog. If the dog's nutritional needs can't be met any other way, surgical placement of a feeding tube may be an alternative.

Alternative therapies, such as herbs or acupuncture, have not been scientifically tested against Valley Fever. If you wish to pursue alternative treatments, this author recommends you consult a veterinarian trained in holistic medicine. These professionals are your best source of help.

## **Valley Fever in Dogs**

**For cats**, it is highly recommended that no herbs or supplements be given without the guidance of a veterinarian. Cats have a much different metabolism than dogs and what might be harmless in a dog could prove very toxic to a cat. For cats that won't eat at all while sick, surgical placement of a feeding tube may be necessary to make sure the cat does not develop fatty liver syndrome because of the lack of food intake.

### **Prognosis/Outcome**

#### **Will My Dog Recover From Valley Fever?**

The good news is that most dogs, with adequate antifungal therapy, do recover from this disease, especially with early diagnosis and intervention. Dogs with infection only in the lungs have the best prognosis for recovery and usually respond the quickest to treatment.

Dogs with disseminated infection almost always have a more guarded prognosis. As with lung infections, it seems that the majority respond well to medication and lead normal lives. A small proportion of animals must take medication for life, and another small number, unfortunately, die of Valley Fever in spite of drug treatment.

For dogs that are seriously ill, requiring hospitalization and supportive therapy, the prognosis can be grave. With aggressive treatment, possibly including intravenous antifungal medication, some dogs will get well.

Dogs with central nervous system disease (seizures, etc) also carry a guarded prognosis. Among those that respond to medication, about 80%, most will remain well with fluconazole (Diflucan), but treatment may be required for life.

In animals with severe bone infections and the pain that goes with them, pain relief will often provide the support needed to allow the Valley Fever medication time to take effect. Treatment of high fevers with anti-inflammatories is helpful, also, as fever reduction can improve the appetite and energy level of the dog. Pain medicine and anti-inflammatories can be prescribed by your veterinarian.

Some dogs do not recover in spite of everyone's best efforts, either due to the severity of illness at the time of diagnosis or because of long-standing, poorly responsive disease. Fortunately, these animals represent a minority of dogs with Valley Fever.

Statistics regarding how many dogs recover compared to those which do not are not available.

#### **Stopping Treatment**

Treatment of the Valley Fever in your dog is monitored by rechecks with your veterinarian. Your veterinarian will examine your dog to look for improvement as well as performing blood tests and possibly x-rays to monitor progress and make sure the medication is not harming your dog. If your dog is very ill, rechecks may be frequent at first. As the disease stabilizes and recovery becomes apparent, your veterinarian will probably only need to evaluate your dog every 2-4 months.

It is very important to continue medicating your dog as directed until the veterinarian confirms that the blood tests are negative and tells you to stop medication. If you stop treating too soon, symptoms may recur. If symptoms recur after your dog is taken off medication, your veterinarian will probably recommend resuming treatment and may suggest the dog remain on medication for life.

#### **FAQ - Can Valley Fever relapse and can dogs be reinfected?**

Valley Fever is well known to relapse in both humans and dogs. In particular, cases of disseminated infection have a 30-50% rate of relapse in humans, no matter how well the initial

## Valley Fever in Dogs

infection was treated. It is not known how many canine cases of Valley Fever relapse, but relapses are not uncommon.

In the case of a relapse, a return to medication is usually enough to make symptoms subside, but the dog may require several additional months of treatment. Dogs that experience more than one relapse or get very sick with the relapse should probably have lifetime treatment with medication considered.

Reinfections in humans are documented only rarely. It is not known at this time whether dogs are susceptible to reinfection.

## Prevention

Currently, there is no sure fire way to prevent Valley Fever in pets short of never residing in or traveling through the areas where the fungus grows. Valley Fever endemic areas are among the fastest growing regions in the country right now, which makes encounters of animals and people with the fungus a likely event.

Things you can do to reduce the likelihood of your dog's exposure to the fungus are to avoid activities that generate dust, reduce digging behavior by dogs, prevent sniffing in rodent holes, and keep dogs indoors more than outdoors. Treating the soil is currently not practical as the fungus lives in spotty areas and can live up to 12 inches deep in the ground. Yard ground cover that reduces dust, however, is helpful: grass and deep gravel or other dust-controlling cover.

A vaccine is under development. It is possible a vaccine will be available in the future to prevent Valley Fever or make it only a very mild illness in dogs. Vaccination against Valley Fever would be very useful for animals traveling to places like southern Arizona and southern California as well as those dogs that live in these places.

## **Other Animals**

Valley Fever can affect many other animals besides dogs. Most mammals can be shown to be infected with the fungus, even if they do not get sick from it very often. Species in which Valley Fever has been found include:

- cattle and other livestock
- horses
- llamas
- apes and monkeys
- many kinds of zoo animals such as kangaroos, wallabies, tigers, bears, badgers, otters, etc.
- marine mammals - sea otters and dolphins
- occasional wildlife that lives in the endemic area - skunk, cougar, javelina

Valley Fever can be what is considered an "incidental finding" after death: the organisms are present but are not causing the disease Valley Fever in the animal. This is very typical of **cows** and **other ruminant livestock**. Occasionally, a livestock animal may become sick and die from the illness but it is very rare.

Clinical infections are uncommon in **horses** but if they manifest the disease, it is usually disseminated at the time of discovery. Of the 20 or so cases reported in the literature, one was treated successfully. The remainder were euthanized. As most of the case reports are old and the medications currently available are both more efficacious and more economically feasible, treatment of horses today may be more successful.

**Llamas**, which are difficult to decide whether to call livestock or exotic pets, appear to be exquisitely sensitive to Valley Fever, unlike most other hoofed species. They develop severe

### **Valley Fever in Dogs**

and fulminant disease. Death is the usual outcome. This author is unaware of successful treatment at this time, but your own veterinarian that treats your llamas may have experience treating the infection.

**Cats** have many fewer infections than dogs and information on cats is interspersed with the canine information above as diagnostic and treatment information for canines is relevant to this species as well.

**Apes, monkeys,** and all other **smaller primates** are very susceptible to Valley Fever. Many of the animals in the Phoenix, Tucson, and San Diego zoos, as well as primates in centers and refuges that exist in the endemic area, are being treated long term for Valley Fever, and the zoos lost many of these creatures before treatments for Valley Fever were developed. Treatments are the same as for dogs and people.

Other zoo animals, most of which are exotic to this part of the country, are variably susceptible to the disease. The zoos are very aware of this disease and often get early testing of animals that are not feeling well. The animals can then be medicated.

Unusual cases crop up periodically in marine mammals such as sea otters and dolphins, suggesting the spores can be blown out over the water where these animals inhale them and become sick. An occasional case is also found in wild native animals. Likely, these animals have become debilitated in some way, making them susceptible to the disease. The infection is discovered after the animal has died or been euthanized for poor condition.