

What Is *Leptospira*?

- *Leptospira* is the name of a genus (group) of long, thin, spiral-shaped bacteria that are sometimes also called leptospirae.
- *Leptospira* can infect over 160 species of mammal. Infected animals typically shed the bacteria in their urine.
- Transmission of leptospirae to humans happens most often through contact with water that has been contaminated with urine of infected wildlife (e.g. rats, mice, raccoons, skunks).
- Direct contact with urine of infected wildlife or domestic animals can also result in transmission. Among pets, infection with *Leptospira* is most common in dogs.
- There are many different strains of *Leptospira*. They are divided into groups called serovars or serotypes, based on proteins found on the surface of the bacteria. Some examples of serovars are canicola, pomona and grippityphosa.
- Each disease-causing serovar has one or more reservoir host species, in which infection usually doesn't make the animal sick, but still results in bacteria being shed in the animal's urine. Contact with the urine can lead to transmission to incidental hosts, including humans and pets, in which infection can be much more severe.



How Common Is Infection With *Leptospira*?

The disease caused by infection with *Leptospira* is called leptospirosis, also known as "mud fever" or "fall fever." It is possibly the most widespread zoonotic disease in the world. Cases of leptospirosis occur more often during warm, wet weather (e.g. late summer, early fall) and during periods of high rainfall or flooding, when conditions favour survival of leptospirae in the environment. Leptospirae can survive for weeks to months in a warm (0-25°C), wet environment (e.g. urine-soaked soil), but they are very sensitive to changes in pH and most disinfectants.

Humans: The incidence of leptospirosis in people in developed countries is generally quite low. Approximately 100-200 cases occur in the USA each year, with about half of these occurring in Hawaii. However, because leptospirosis is not a notifiable disease in most of the USA and Canada, the number of cases reported may be much lower than the number of cases that actually occur.

- Individuals who may have increased exposure to animal urine or water contaminated with animal urine are at increased risk for infection with *Leptospira*. These include veterinarians, animal care personnel, farmers, rodent control workers, abattoir workers, sewer workers, miners, soldiers, gamekeepers, and people who participate in outdoor water sports (e.g. kayaking, swimming).
- Outbreaks associated with exposure to contaminated water sources are more common than disease secondary to transmission of *Leptospira* from dogs or other pets.



Animals: The incidence of leptospirosis in dogs in Canada and the USA has increased significantly in recent years, apparently as a result of spread from wildlife such as raccoons and skunks.

- Exposure to *Leptospira* varies greatly (1-50%) among dogs depending on their location, housing and lifestyle.
- Risk factors that have sometimes been identified for canine leptospirosis (e.g. large, outdoor, working, herding dogs, etc.) likely reflect increased exposure to urine of wild animals and rodents that may carry the infection.
- Dogs kept in crowded, unsanitary conditions are also more likely to be exposed to *Leptospira*.
- Pet rodents may also be susceptible to infection if they are exposed to the bacteria. Leptospirosis in cats is rare.
- In developed countries, leptospirosis is primarily a concern in livestock (particularly dairy cattle).

How Do Animals & People Become Infected With *Leptospira*?

Leptospirae can infect a host if they come in contact with a mucous membrane (e.g. eyes, nose, mouth), damaged skin, or skin that is very soft from being wet. Animals and people usually become infected by touching or drinking water in which an infected animal has urinated. This may include everything from lakes and ponds down to puddles on the sidewalk. Direct contact with urine from an infected animal can also lead to transmission.



What Happens If A Person Or Animal Gets Leptospirosis?

- Once leptospires penetrate get inside a host, they enter the bloodstream and begin to multiply. The bacteria can then invade other tissues including the kidney, liver, spleen, central nervous system, eyes and genital tract.
- Usually the body's immune system soon destroys the bacteria in most tissues, but some bacteria are able to hide from the immune system in part of the kidney. The bacteria can survive there for weeks or months, and are sometimes found in the urine.
- In humans and animals, the majority of infections likely do not cause illness, or may cause mild, flu-like signs such as fever, lethargy, and muscle pain that go away without any treatment. If illness occurs, it usually happens 5-14 days after exposure to the bacteria, but it can happen anywhere from 2-30 days after.
- More severe disease occurs in a small percentage of cases, and rarely can be fatal.
 - ▶ **Humans:** Illness may last from one week to several months. Headache, chills, vomiting, muscle pain (sometimes severe) and a skin rash may occur initially. The infection can also affect the lungs and heart. After about a week, meningitis, uveitis (inflammation of the eye), and signs of kidney and liver disease may develop. Overall 1-5% of people with leptospirosis may die from the infection.
 - ▶ **Animals:** Leptospirosis in pets is most common in dogs. Very severe infections may cause sudden bleeding problems, shock and death. Less abrupt infections typically cause kidney or liver failure, which can also be very serious. Recurrent uveitis may also occur in some cases. The survival rate for dogs with leptospirosis, if properly treated, ranges from 78% to 88%.
- **There are many diseases which can cause signs similar to those of leptospirosis in people and animals, so it is very important to see your doctor or take your pet to the veterinarian if you feel sick or your pet appears ill.**



How Is Leptospirosis Diagnosed?

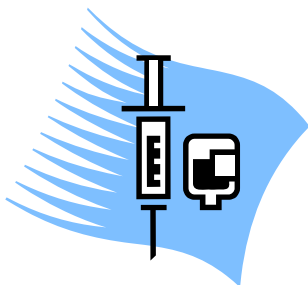
Leptospires are very difficult to culture in a lab compared to other bacteria, therefore blood tests are typically used to detect antibodies to the bacteria in order to confirm infection. It can be very difficult to detect these antibodies very early in the infection.

How Is Leptospirosis Treated?

- In both animals and people, treatment for leptospirosis depends on what organs are affected and how severe the damage is.
- Specific therapy for the infection itself requires antibiotics. Treatment is needed initially to help the body eliminate the bacteria from most of the organs and tissues before they cause more damage, but antibiotics must be continued for at least a few weeks in order to clear the bacteria from the kidneys.
- **For both animals and people, it is critical that all antibiotics be taken on time and that the prescription is finished completely, or the leptospires in the kidneys will not be eliminated, and will be found in the urine again as soon as the antibiotics are stopped.**
- Pregnant women who have been exposed to *Leptospira* are at some risk of miscarriage, in which case a physician may prescribe antibiotics even though the person does not appear sick.



Vaccination



- The most common serovars of *Leptospira* vary considerably by area. Currently the most prevalent serovars of *Leptospira* found in dogs in North America include grippotyphosa, pomona, bratislava and perhaps autumnalis. Previously the most common serovars were canicola and icterohemorrhagiae.
- Dogs are the only companion animal species for which vaccines for *Leptospira* are available, but the vaccines only include certain serovars.
- Vaccination is particularly important for dogs that are outdoors a lot, especially in brush and wooded areas where wild animals may urinate frequently, and for dogs who may be in contact with immunocompromised individuals (e.g. HIV/AIDS, cancer or transplant patients).
- It is important to remember that no vaccine can prevent 100% of infections, especially those caused by serovars not included in the vaccine. Leptospiral vaccines for people are not available in North America.



Infection Control



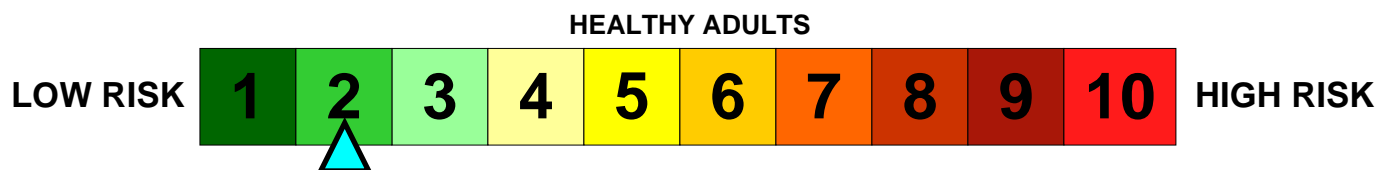
Hand Hygiene: Hands should be thoroughly washed with soap and water after handling any pet, or after coming in contact with any surface or object potentially contaminated with an animal's urine, feces or other body fluids.

Infected Pets: Once a dog is being treated with an appropriate antibiotic to eliminate bacteria in the kidneys, live leptospires should no longer be present in the urine. Nonetheless, the animal's urine should be treated as potentially infectious until the treatment course is complete. Disinfect any surface on which an infected dog has urinated.

General Precautions:

- Where possible, control rodent, raccoon, skunk and other wildlife populations around the home that can harbour and spread *Leptospira*.
- Prevent build up of stagnant water and dampness, especially in areas where pets or wildlife may urinate.
- Keep smaller pets (e.g. guinea pigs, hamsters, rats, mice) in a secure enclosure that prevents escape and also prevents wild rodents from getting in. Do not allow the pet to roam loose in the house.
- Clean up areas where animals have urinated with a household disinfectant such as a 1:10 solution of bleach.
- Always wash fruit and vegetables thoroughly before eating them, in case they may have come in contact with urine from rodents or other wild animals, or contaminated water.
- Do not drink untreated water from open water sources such as lakes and ponds.

The risk of disease to the general population posed by *Leptospira* in dogs is:



Individuals with Compromised Immune Systems:

Immunocompromised individuals (e.g. HIV/AIDS, transplant and cancer patients) are more susceptible to many kinds of infections, including those which may be transmitted by pets. Patients with HIV/AIDS are at risk of developing particularly severe infection if they are exposed to the *Leptospira*, although in general they respond well to treatment if it is provided promptly. While these individuals are not advised to get rid of their pets, precautions, as outlined above, should be taken to reduce the frequency of contacts that could result in pathogen transmission, as well as the ability of infectious agents to survive in the household.

- ▶ Dogs should be vaccinated regularly, and can be screened for infection if necessary.
- ▶ Cats should be kept indoors to prevent exposure to leptospires, as well as other zoonotic pathogens.

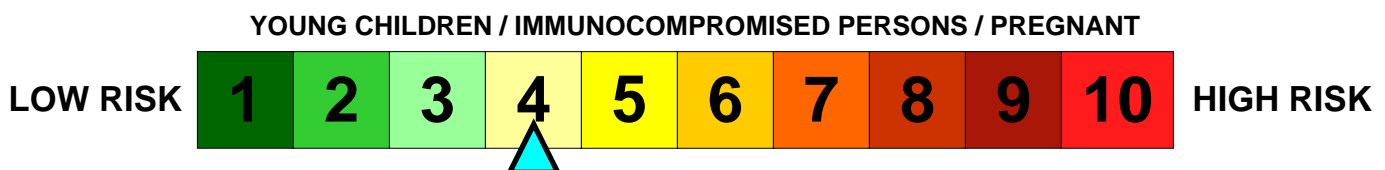
Women who are pregnant should take similar precautions to avoid being exposed to leptospires.

Infants and Young Children:

Young children are more likely than adults to extensively handle animals if given the opportunity, more likely to touch their faces or mouths, and less likely to wash their hands after handling an animal. Children may "snuggle" with pets such as dogs and cats; this very close contact can increase the risk of disease transmission.

- ▶ Young children should be supervised when playing with animals, and an adult should ensure that they wash their hands afterwards, and especially prior to handling food. Older children should be taught to do the same.

For these groups, the risk of disease posed by *Leptospira* in dogs is likely:



Additional Information

Centers for Disease Control and Prevention (CDC) Leptospirosis and Your Pet webpage:
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/leptospirosis_g_pet.htm