Leptospirosis

Among the infections that humans can acquire from animals is leptospirosis. Although cases are rare and usually mild, the infection can result in severe infections.

The Agent and Illness

Leptospirosis is caused by spiral-shaped bacteria (spirochetes) of the genus *Leptospira*. The spirochetes can be associated with animal hosts or be free-living; they are spread through the urine of infected animals and persist well in water, soil, and mud. Multiple pathogenic species exist, including *Leptospira interrogans* as the most common. Species are further subdivided into serovars. More than 250 serovars have been identified within *Leptospira* species. Common pathogenic serovars in the United States within the *L. interrogans* species are *pomona*, *icterohaemorrhagiae*, *canicola*, and *autumnalis*.

Transmission is mainly through skin contact with contaminated water. Other routes of exposure include ingestion of contaminated water or food (particularly food contaminated by rat urine), or inhalation of aerosolized water. Disease onset is typically two days to four weeks following exposure; the majority of infected persons are asymptomatic or have self-limited mild disease.

Approximately 10% of infections are symptomatic, characterized by fever, headache, muscle aches, vomiting, rash, or diarrhea. Severe disease occurs in 10-15% of patients with clinical disease, and may involve jaundice, meningitis, pulmonary hemorrhage, or renal failure. Effective treatment can be achieved with antibiotics, which should
be started promptly. Supportive care such as ventilation or dialysis may be needed for patients with severe complications.

Rats are universal reservoirs for leptospirosis, although farm animals and livestock, including cattle, pigs, horses, and dogs, and many wild animals including raccoons, can carry the bacteria. Some infected animals become sick while others have no symptoms. Common clinical signs in dogs include fever, vomiting, diarrhea, refusal to eat, and weakness, and may be more severe in younger animals.

Leptospires are shed in urine of infected animals. The organisms may survive in water or moist soil for weeks to months. In temperate climates, peak disease incidence is during the summer, when leptospires survive longer in the environment. Human cases of leptospirosis associated with exposures to infected dogs have been documented, but are thought to be rare. The potential for dogs to be useful as sentinels for environmental prevalence of pathogenic Leptospira spp. is likely of greater public health importance than direct transmission of the organisms from dogs to humans.

Although the disease incidence in the United States is relatively low (100-150 cases per year nationwide), leptospirosis is widespread worldwide. Leptospirosis can be an occupational hazard for people who work outdoors or with animals, such as farmers, sewer workers, dairy farmers, veterinarians, rice or sugarcane field workers, military personnel, and others. The disease is also a recreational hazard for participants of sports involving water or mud, particularly in temperate or tropical climates; infections have occurred from swimming, wading, rafting, and adventure racing, among other activities. Another source of outbreaks is associated with heavy rainfall or flooding in endemic areas. Outbreaks of leptospirosis have been identified in the United States after flooding in Hawaii and most recently in Puerto Rico following Hurricane Maria.

**Leptospirosis in Washington State**

Leptospirosis is rare in Washington residents. Historically, Washington Department of Health (WA DOH) received up to five reports of leptospirosis per year; however, in the past decade, the number of reports has decreased to two or fewer per year.

![Leptospirosis Cases Reported to WA DOH, 1996-2017](chart)

About a third of cases reported in the state are exposed within Washington. The majority of locally-acquired cases reported to WA DOH are exposed in western parts of the state (see map). For the cases with exposures in Washington, all but one acquired their infection west of the Cascade Range. Among persons reporting Washington exposure and for whom further exposure details are available, the most common exposure reported was recreational water (46%), followed by exposure to animals or animal carcasses (31%), and occupational exposure to mud or water (23%). Males are overrepresented among cases (93%), likely reflecting higher rates of both occupational and recreational risks.
The WA DOH Environmental Public Health Zoonotic Disease Program maintains a surveillance program for canine leptospirosis. Veterinarians report cases of dogs with leptospirosis to the Washington State Department of Agriculture; these reports are forwarded to WA DOH. Each year 18 to 66 dogs diagnosed with leptospirosis are reported.

**Prevention**

Leptospirosis can be prevented by avoiding wading, swimming, bathing, or swallowing floodwater or any fresh water source that may be contaminated by floodwater or animal urine. Cover cuts or scratches with bandages before any potential exposures, and do not walk outside barefoot. Wear waterproof clothing and closed shoes or boots near water or wet soil that may be contaminated by animal urine or floodwater. Treat potentially contaminated water before drinking, and prevent rodent infestations by keeping food and trash in closed containers. Veterinarians and other animal workers should follow infection control practices to prevent occupational exposures to potentially contaminated material. Farm animals and pets should be vaccinated to prevent leptospirosis. People who suspect they have been exposed to leptospirosis should report early signs or any febrile illness to a healthcare provider.

Although rare, leptospirosis can be a severe disease. Those with potential for occupational or recreational exposures should be aware of their risks. Prompt disease reporting can identify risk environments for appropriate public health actions.

**Resources**

Leptospirosis serosurvey for dogs and raccoons in Washington:  

Information from CDC about leptospirosis including information from clinicians and publications:  
https://www.cdc.gov/leptospirosis/resources/index.html

Information about leptospirosis in dogs:  
https://www.doh.wa.gov/YouandYourFamily/IllnessandDisease/AnimalTransmittedDiseases/CanineLeptospirosis