

# PROTECTING YOURSELF FROM ZONOTIC INFECTION

## What is a Zoonoses?

A zoonotic disease is an infection that is naturally transmitted from vertebrate animals to human beings. Many of these infections are transmitted directly but others are passed via vectors such as mosquitoes or fleas. Not all animal diseases are zoonotic and far more human illnesses result from contact with other humans than from animals. However, it is important for anyone working with animals to be aware of the potential for infection and takes steps to prevent exposure. The following lists some of the more common or severe zoonoses and ways to help protect yourself and others from exposure.

## IMPORTANT RULES TO HELP YOU AVOID DEVELOPING A SERIOUS ZONOTIC ILLNESS:

- Stay current on appropriate vaccinations, such as tetanus and rabies.
- Wash your hands frequently with antibacterial soap, especially after handling any animal and prior to eating or smoking.
- Wear long pants and sturdy shoes or boots.
- Use gloves when handling animals and when cleaning up feces, urine, or vomit.
- Immediately disinfect scratches and bite wounds thoroughly. Keep scratches or other abrasions covered, especially when cleaning up after animals.
- Learn safe and humane animal-handling techniques and use proper equipment.
- Seek assistance when handling animals whose dispositions are questionable.
- If exposed to tick-infested areas, check your body and clothing frequently. Use tweezers and wear gloves to remove ticks, taking care not to squeeze or puncture the body of the tick.
- Report any bites or injuries to a supervisor and seek medical treatment as appropriate.
- Tell your physician that you work closely with animals, and visit him or her regularly.
- If you are pregnant or immunocompromised notify the lead veterinarian prior to the clinic. Discuss appropriate precautions with your physician.

# COMMON ZONOTIC INFECTIONS

## **Bartonellosis (Cat-Scratch Disease)**

Commonly known as cat-scratch disease (CSD), bartonellosis is caused by the bacterium, *Bartonella henselae*.

The bacteria are transmitted to humans through cat scratches and bites, most likely as a result of contaminated flea dirt infecting the wound. Most people who get CSD are under the age of 20. Symptoms in humans include swollen lymph nodes, fever, fatigue, loss of appetite, and headache. In extreme cases, encephalitis or other severe illnesses can develop.

Kittens younger than one year old are more likely to be associated with CSD than are older cats. The agent is transmitted between animals by flea bites. Cats are almost always asymptomatic.

Since fleas are essential for transmission of the disease, flea control is key to limiting spread of this disease. All bites and scratches should be promptly and thoroughly washed with soap and water.

## **Campylobacteriosis**

Campylobacteriosis is a bacterial infection that affects the intestinal tract and sometimes the bloodstream. Although less well known than the widely publicized gastrointestinal disease salmonellosis, campylobacteriosis is actually more common.

Wild animals, especially birds, carry Campylobacter. Also, domestic animals can carry the infection. Young animals are a higher risk. Most animals are asymptomatic, but may have diarrhea with or without vomiting, anorexia and fever. The disease is transmitted between animals by ingestion of infected feces.

Most people contract the disease by consuming contaminated food or water, such as unpasteurized milk and uncooked poultry. Infected animal can also transmit the disease and those handling ill animals are at greater risk of infection via this route. Inadequate sanitation, disease control, and personal hygiene compound the risks. Symptoms in humans include abdominal pain, cramps, fever, chills, and diarrhea.

## **External Parasitic Infections (lice, fleas, ticks, etc.)**

People can contract, mite, lice or flea-related infections by coming into close physical contact with infested animals and their bedding. Symptoms of infection will vary depending on the parasite. Some parasites (fleas, ticks) also act as vectors for more serious zoonotic diseases.

Most of these parasites (mange mites, fleas, lice) that live on animals or in the environment cause only a transient infection in humans (will bite people but not likely infest or reproduce on them). The zoonotic mite disease sarcoptic mange (see below) can cause mild to severe skin infection and sometimes a secondary bacterial infection. Lice-caused pediculosis can also cause mild to severe skin irritation, which may develop into a bacterial infection when people scratch. Flea allergy dermatitis can create skin irritation and lesions in some people.

*Sarcoptes scabiei* is an arachnid mite that burrows under the skin of the infected dog to lay eggs. Affected dogs show intense itching, rash, reddened, crusty skin, and hair loss. The ear flaps, elbows, ventral abdomen and chest, and legs are most commonly affected.

Humans can contract the mite via close contact with infected animals. Signs in humans include itchy, raised rash, usually on the arms, legs, abdomen or chest. The disease is generally self-limiting in humans as the mites will bite but do not reproduce on a human host.

*Note: Demodectic mange, while severe and often difficult to treat in animals, is not transmissible from animals to humans.*

### **Giardiasis (also known as Beaver fever)**

Giardiasis is caused by a protozoal parasite (*Giardia spp*) which affects the gastrointestinal tract.

Both wild and domestic animals carry the disease. Animals are commonly asymptomatic, but may have diarrhea, chronic weight loss, and pale, malodorous feces. The parasite is shed in the feces and can be transmitted between animals via direct contact with infected feces, contaminated water or fomites.

Although humans are much more likely to be infected via contaminated drinking water, contact with animal feces or contaminated surfaces can bring animal care workers into frequent contact with infectious materials. Inadequate sanitation and personal hygiene compound these risks.

Although some people experience no symptoms, typical symptoms include mild or severe diarrhea, abdominal pain, nausea, and occasional weight loss. Fever is rarely present.

### **Leptospirosis (also known as Canicola fever and Weil's disease)**

Caused by a spirochete (*Leptospira spp.*), leptospirosis is carried by domestic and wild mammals.

Dogs with a history of hunting or exposure to livestock or wildlife are at increased risk. Infected dogs are commonly asymptomatic. Severe cases can cause vomiting, anorexia, lethargy, fever, ocular/nasal discharge, kidney and liver disease and death. The infectious agent is primarily present in urine. The most common route of infection is through contact with contaminated water or soil.

People can contract leptospirosis by consuming contaminated food or water or by coming into close contact with an infected animal's urine. For veterinary personnel, the predominant risk is from dogs; cats are rarely infected. Although the disease is relatively rare in humans, animal care workers' close contact with animals puts them at higher risk. Symptoms include prolonged fever, chills, weakness, abdominal and muscle pain, and sometimes jaundice and anemia. Fatality is low but the disease is especially dangerous for the elderly, people with compromised immune systems, and people with kidney damage.

### **Lyme Disease**

Lyme disease is a tick-borne disease caused by the spirochete *Borrelia burgdorferi*.

Wild and domestic mammals, including dogs, cats, white-tailed deer and others, serve as hosts to the disease-carrying tick. Symptoms in animals include fever, lethargy, decreased appetite, sudden or severe lameness, and joint swelling.

Humans contract Lyme disease through a bite from a very small tick commonly referred to as a deer tick. To transmit the disease, the tick must be attached for several hours. Prompt removal of ticks from the skin is important in preventing infection.

The first symptom of the disease is normally an expanding circular (or "bull's eye") rash appearing at the site of the tick bite 2 to 30 days after the bite occurs. Flu-like symptoms (headaches, nausea, fever, muscle aches) may also appear. Left untreated, the disease may cause complications in the heart and nervous system. Arthritis, swelling, and joint pain may be recurring effects of untreated Lyme disease.

### **Nematode (Worm) Infections**

The nematode infections of most concern to animal care workers and pet owners are: canine roundworm disease (visceral larva migrans, toxocariasis), hookworm disease (cutaneous larval migrans, creeping eruption) and raccoon roundworm disease (*Baylisascaris procyonis*). All of these diseases are caused by parasitic worm larvae that usually infest their hosts via contaminated food sources or feces but sometimes by burrowing directly into the host's skin.

Parasitic larvae can infest both wild and domestic animals. Common symptoms in animals include anemia, weight loss and diarrhea.

Humans typically acquire worm-related zoonotic diseases when they come into close contact with infested animals or by ingesting or touching infected feces or contaminated surfaces. Infections can also

be contracted when larvae penetrates the skin. Symptoms depend on what organs the larvae migrate to and may include gastrointestinal, respiratory, dermatologic, CNS or visual symptoms.

### **Rabies**

Rabies is a deadly disease caused by an RNA virus (of the family *Rhabdoviridae*) which attacks the central nervous system of mammals. With rare exception, rabies is always fatal.

Any warm-blooded mammal can get rabies. However, some animals, such as skunks, raccoons, and bats, are more susceptible to the virus than others. Cats and dogs, while less susceptible to rabies than many animals, are more likely to transmit the virus from wild animals to humans. Animals rarely afflicted with rabies include humans, rats, squirrels, opossums and rabbits.

The virus, which is present in the salivary glands of infected animals, is usually transmitted through a bite or a break in the skin, and can be transmitted through mucous membranes, but this is less likely. Because the virus shows up only intermittently in saliva, exposure to a rabid animal does not necessarily mean the virus was transmitted.

Symptoms of rabies in animals can be variable. The first visible sign is often a change in behavior, ranging from depression or disorientation to aggression and violence. Several other animal diseases, such as distemper and toxoplasmosis, may mimic rabies, which further complicates potential diagnosis.

The first rabies symptoms in humans mimic the flu (weakness, fatigue, lack of appetite, headache, fever). Many also report tingling at the exposure site. Symptoms progress to hyperactivity, disorientation, hallucinations, and convulsions. The disease slowly and painfully paralyzes its victims resulting eventually in death from respiratory arrest.

Infected animals will show clinical signs of rabies within 10 days of the time virus is present in the saliva, which forms the basis of rationale for the standard quarantine period. Definitive diagnosis can only be made by post-mortem antibody testing of brain tissue.

All bites should be reported, and the appropriate quarantine or testing performed. Local or state public health department should be contacted for specific quarantine guidelines. Bite wounds should be immediately and thoroughly cleaned with soap and water. The Center for Disease Control recommends pre-exposure vaccination and serologic testing every 2 years to ensure adequate antibody levels for those at high risk (most veterinary personnel).

### **Ringworm (Dermatophytosis)**

Ringworm is the common name given to external fungal infections of the hair and skin. Most ringworm infection in animals is caused by either *Microsporum caninum* or *Trichophyton mentagrophytes*

In animals, ringworm infection will usually present as circular areas of hair loss and scaling. The most common locations are the face, ears, feet and tail. However, infection can present differently and can mimic other dermatological conditions. Asymptomatic carriage is also possible.

Infection is spread via direct contact, contaminated environment, or fomites and may be spread to animals from infected humans. In humans, the disease presents as ring shaped areas of scaling and hair loss, with or without redness, crusting and itching.

Positive or suspect animals should be isolated and handled with protective clothing. Environmental decontamination is essential to prevent recurrence of the disease. Without aggressive cleaning spores may persist and remain infectious for years. All surfaces must be cleaned, using bleach diluted at 1:10 where ever possible.

### **Rocky Mountain Spotted Fever**

Rocky Mountain spotted fever (RMSF) is the most severe tick-borne rickettsial illness in the United States. This disease is caused by infection with the bacterial organism *Rickettsia rickettsii*.

The organism that causes RMSF is transmitted by the bite of an infected tick or by contamination of the skin with the contents of an attached tick when it is removed from the skin. Ticks acquire the organism by feeding on infected small mammals which function as reservoirs for the organism. Dogs and humans also function as reservoirs for the RMSF; however, they are incidental hosts and are the only reservoirs that display clinical signs of disease. While the disease is generally thought to be self-limiting, recent evidence has shown that untreated RMSF may lead to death of the affected animal.

In humans, initial symptoms usually appear 5-10 days after a tick bite and may include fever, nausea, vomiting, muscle or joint pain, severe headache and rash. The three important components of the clinical presentation are fever, rash, and a previous tick bite, although one or more of these components may not be present. RMSF can be a severe illness, and without antibiotic treatment, the infection can be fatal

Limiting exposure to ticks reduces the likelihood of Rocky Mountain spotted fever infection. It may take several hours of attachment before organisms are transmitted from the tick, prompt careful inspection and removal of crawling or attached ticks is an important method of preventing disease.

### **Salmonellosis**

Salmonellosis is caused by the bacteria species *Salmonella*.

Birds and reptiles (especially iguanas and turtles) are the animals most frequently associated with *Salmonella*. Wild and domestic animals, including dogs and cats, occasionally carry the disease. Diarrhea and vomiting are the most likely signs that a dog or cat may have salmonellosis. Severe cases can resemble panleukopenia or parvo and can lead to septicemia and death.

Most people have a much greater risk of contracting salmonella from eating undercooked chicken and other meat products than they do from contact with animals. Careful hygiene is important though, particularly when handling high-risk animals.

In humans, symptoms include diarrhea (usually watery and occasionally bloody), nausea, vomiting, fever, chills, and abdominal cramps. If the bacteria leaves the bloodstream and enters the central nervous system, meningitis/encephalitis may develop.

### **Toxoplasmosis**

Toxoplasmosis is caused by the single-celled protozoan *Toxoplasma gondii*. The organism resides in the intestinal tract of cats and in the tissues of many rodents and animals raised for human food.

Although cats are the only animals that can shed the parasite's eggs (oocysts) in their feces, *T. gondii* also resides in animals' tissues and is released when other animals or humans consume that tissue. Most cats are asymptomatic. When symptoms are apparent, they usually include vague signs like diarrhea, weight loss, and transient fever.

People are most commonly infected as a result of eating raw or undercooked meat, but can also get the disease if they ingest food or water contaminated with cat feces.

Most cases of clinical disease resemble the flu; symptoms include fever, enlarged lymph nodes, fatigue, headache, and sore throat. However, although many people are infected with *T. gondii*, most healthy people develop minimal or no symptoms. People likely to develop clinical symptoms are children and people with compromised immune systems. Pregnant women who become infected with toxoplasmosis for the first time while pregnant risk infecting their fetus, which can result in stillbirths, spontaneous abortions, and birth defects. Once inside the body, the parasite never leaves it. Although in healthy people the parasite remains inactive, it can "reactivate" in immunocompromised individuals.