



American Veterinary Medical Association Disease Precautions for Outdoor Enthusiasts and Their Companion Animals

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This reference guide is intended to be a general guide about diseases that outdoor enthusiasts (such as campers, canoers/kayakers, backpackers and hikers) and their companion animals may encounter. Links to additional information have been provided where appropriate.

Outdoor enthusiasts should always consult their physician if they are concerned that they have been exposed to a disease or are showing symptoms of illness.

If there are concerns that your animal companion may have contracted any of these diseases, consult your veterinarian.

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Introduction

There is an increasing awareness among campers, hikers, backpackers, and other outdoor enthusiasts that while we are enjoying the open spaces that nature has provided us, we should also be aware of the risks that come with the wilderness experience, and certain safety precautions should be taken. The American Veterinary Medical Association (AVMA) has the following advice on certain health concerns linked with outdoor activities.

This document is by no means intended to discourage people from enjoying outdoor activities; instead, it is intended to inform them of the risks they face and steps they can take to reduce those risks.

When asked about the risks of outdoor activities such as camping, hiking, backpacking, kayaking, etc., many people think first of wildlife attacks and physical injuries. Although these are real concerns, they are less common than you might think. In fact, the risk of exposure to disease is much higher than the risk of an animal attack.

Outdoor enthusiasts and their animal companions (including dogs and horses) can be exposed to infectious diseases not only from infected animals and improperly cooked food, but also via insect vectors and contaminated soil and water. Diseases that are transmitted from animals to humans, either through direct contact with the animal or a contaminated surface or water, through ingestion of animal products (including meat and milk) or through insect transmission from an animal are called zoonotic (pronounced ZO-oh-NOT-ik or zoo-NOT-ik) diseases. Insects such as mosquitoes, ticks, flies, fleas or mites serve as vectors, capable of transmitting infection from an infected animal to another animal or a person.

Hunters are also encouraged to read the AVMA's reference guide on [Disease Precautions for Hunters](#), which includes hunting-specific guidelines.

Some common sense guidelines:

- Avoid camping/backpacking/hiking if you are feeling ill or if your animal companion is ill. People and animals are more prone to disease if their immune systems are weakened by other illnesses or conditions.
- Keep your outdoor gear (including tents, netting, sleeping bags, etc.) in good condition and repair or replace damaged items.
- Take precautions to minimize insect bites.
- Wash hands thoroughly with soap and water or an alcohol-based sanitizer immediately after handling animals, soil, equipment, or food.
- Wash tools, cooking equipment and working surfaces (including tables and cutting boards) thoroughly with soap and water after use. If contamination with soil or animal feces (stool) is suspected or known, disinfect the equipment and surfaces immediately. Adding a minimum of 1 tablespoon of bleach to 1 gallon of water is usually adequate for use as a cleaning/disinfecting solution.
- Avoid eating raw or undercooked meat.

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- In the United States, campers and hikers/backpackers should report any signs of sick wildlife or wild bird die-off to the state's game and fish agency or wildlife agency.
- Make sure your animal companions are up-to-date on their vaccines, especially rabies, prior to camping/hiking season.
- Consult your veterinarian about proper preventive treatments for your animals, such as heartworm prevention for dogs and cats, and use the products as recommended.
- Consult your veterinarian about regular stool exams of dogs to check them for parasites, including those that can be passed to people.
- Do not allow your dog to eat dead wildlife.
- Outdoor enthusiasts who regularly travel with animal companions should consider getting some basic training in human and animal first aid techniques. In addition, carrying a first aid kit with supplies for humans and animals is extremely important.

Tick-borne diseases pose a hazard to outdoor enthusiasts and their animal companions. These diseases are usually transmitted to people through tick bites, but skin contact with the internal fluids of infected ticks also poses a risk of infection. Cases of tick-borne diseases, such as anaplasmosis, ehrlichiosis, Rocky Mountain Spotted Fever (RMSF) and others, have increased in the last decade. These diseases can be fatal. The symptoms of these diseases can be somewhat vague, making it difficult for physicians to diagnose the disease until it has become more severe. Outdoor enthusiasts and their dogs are especially vulnerable to tick-borne diseases because of time spent in tick-infested environments. Preventing tick bites is the single most important step in preventing tick-borne diseases.

The following guidelines are recommended to avoid tick-borne diseases:

- Prior to leaving for your outdoor adventure, check your tent(s) for and repair any holes that could allow insects to get inside the tent.
- Apply tick repellants to exposed skin and clothing.
 - DEET (N, n-diethyl-*m*-toluamide) and picaridin are commonly used insect repellents. The CDC provides guidelines [for selecting the appropriate insect repellent](#).
 - If skin becomes wet from perspiration or water, towel off and reapply to dry skin.
 - Spray permethrin-containing products on outer clothing, including shoes. Permethrin is not an effective repellent for use on skin.
 - If chemical odors are a concern, there are unscented and neutral odor products available, such as [DeepWoods Off! Sportsmen](#).
- Avoid wearing the same clothes on consecutive days without washing them first to remove ticks. Wash clothes immediately after returning home.

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- Wear long-sleeved shirts and long pants.
 - Tuck pant legs into socks.
- Conduct body checks immediately after returning from outdoor activities in tick-infested areas, or at the end of each day (or more frequently).
 - Use mirrors if necessary, but check all body areas and remove all ticks found.
 - Check children, especially behind the ears, back of the neck, around the waist, and in and along the hairline.
 - Remove attached ticks by using fine-tipped tweezers. If tweezers are not readily available, you can improvise by shielding your fingers with tissue paper, a foil-covered gum wrapper, or plastic sandwich bag and grasping the tick as close to the skin as possible, pulling upward with steady, even pressure.
 - Do **not** twist the tick as you remove it – this may cause the tick’s mouthparts to remain in the skin, increasing the risk of infection.
 - Do not attempt to suffocate the tick with alcohol-soaked cotton – this will cause the tick to regurgitate while its mouthparts are still in the skin, and can increase the risk of infection.
 - Avoid direct contact with the tick’s body because its fluids may be infectious.
 - Wash the affected area with soap and water, and disinfect the bite site and your hands. Ordinary household brands of 70% isopropyl (rubbing) alcohol, chlorhexidine (such as Hibiclens®, Nolvasan®, etc.) or povidone-iodine (Betadine®) are adequate skin-surface disinfectants.

To protect their dogs, outdoor enthusiasts should consult their veterinarian, but basic guidelines include:

- Apply topical or systemic tick-control treatments. Consult your veterinarian about the appropriate product for your dog.
- If possible, limit access to tick-infested areas.
- Check dogs frequently for ticks or, at a minimum, at the end of each day’s activities. The ticks should be promptly and carefully removed, using the same guidelines as posted above for tick removal from human skin.

To protect their horses, outdoor enthusiasts should consult their veterinarian, but basic guidelines include:

- Apply topical insect repellent products. It is likely you will have to reapply the products regularly, especially if you are traveling through areas with high insect activity.
- If possible, limit access to tick-infested areas.
- Check horses frequently for ticks or, at a minimum, at the end of each day’s activities. The ticks should be promptly and carefully removed, using the same guidelines as posted above for tick removal from human skin. Be

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sure to check the tail, mane and ears thoroughly for ticks.

- Consider the use of insect nets designed to be worn over horses' eyes and ears to minimize insect bites, but do not consider them 100% effective. If you use these products, you should still check your horses regularly for ticks.

People involved in outdoor activities are naturally more exposed to the threat of being bitten by mosquitoes that can carry diseases such as West Nile virus and encephalitis viruses. For [protection against mosquito-borne diseases](#), outdoor enthusiasts should always:

- Use [insect repellent lotions and sprays](#) with DEET, Picaridin, oil of lemon eucalyptus, or IR3535 on exposed skin. The expected duration of exposure to mosquitoes determines the concentration of the product needed.
- If odorless mosquito protection is desired, consider the use of Area Repellent Systems such as [Thermacell](#)®.
- Spray permethrin-containing products on outer clothing and footwear.
- Wear long-sleeved shirts and long pants tucked into socks. Both clothing and shoes should be treated with permethrin or another insect repellent.
- In areas with heavy mosquito infestation (such as marshlands), increased protective gear is suggested (jacket, heavy pants and a fine-mesh “bug suit”).

Diseases

Anaplasmosis

[Anaplasmosis](#) is a tick-borne disease caused by the *Anaplasma phagocytophilum* bacteria (and less commonly by *Anaplasma platys*). It is spread by tick bites, primarily by the blacklegged and western blacklegged ticks.

Anaplasmosis is a reportable disease—this means that health care providers and laboratories that diagnose cases of laboratory-confirmed anaplasmosis are required to report those cases to their local or state health departments, which in turn report the cases to CDC. In 2008, [1,009 cases of anaplasmosis](#) were reported in the United States; the majority of the cases were reported in the eastern and Central U.S. The bacteria is considered endemic (established in the environment) in the upper Midwest, East and Northeast regions of the United States, as well as the Western coastal regions.

Symptoms of anaplasmosis in humans generally appear 5-21 days after a bite from an infected tick, and include headaches, fever, chills and muscle aches, and may be confused with flu symptoms. While some people may only experience mild symptoms and recover without medical attention, elderly or immunocompromised people may develop a more severe illness.

Dogs with anaplasmosis may show signs of lameness and joint pain, and some may also develop vomiting, diarrhea, coughing or labored breathing. It can be difficult to

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distinguish anaplasmosis from Lyme disease because the signs of disease are very similar and they occur in essentially the same areas of the country.

Horses infected with *A. phagocytophilum* can develop fever, lethargy, edema (“stocking up” in the legs), incoordination, and bleeding disorders.

As with all tick-borne diseases, preventing tick bites is essential to preventing the disease.

Babesiosis

[Babesiosis](#) is a relatively unknown, malaria-like disease that is caused by *Babesia* parasites. It is transmitted by ticks – the same species of ticks that can carry Lyme disease and ehrlichiosis. It can also be transmitted by blood transfusion from an infected blood donor.

It is found mainly in Northeastern states, as well as Minnesota, Wisconsin and Washington state. Symptoms are flu-like and it can be difficult to diagnose.

[Babesiosis in dogs](#) can also be difficult to diagnose because of the variety of signs that may be observed. Infected dogs may appear normal, or they might suddenly go into shock from rapid destruction of their blood cells – these dogs show signs of fever, weakness, depression, swollen lymph nodes and very pale gums.

[Babesiosis in horses](#) is also called piroplasmiasis, but is caused by a different *Babesia* species than those that cause disease in people and dogs. Signs of disease include fever, lethargy, loss of appetite, depression, yellow membranes (jaundice), sweating, colic, incoordination, and swelling around the head and eyelids.

Campylobacteriosis (Campylobacter jejuni)

[Campylobacteriosis](#) is a disease caused by *Campylobacter jejuni* or *Campylobacter coli* bacteria. It affects the intestinal tract and, in rare cases, the bloodstream. It is one of the most commonly reported causes of bacterial diarrhea.

Campylobacter bacteria are generally spread by eating or drinking contaminated food or water, unpasteurized milk, and by direct or indirect contact with stool from an infected person, animal or pet. Many animals, including pigs (including wild pigs), cattle, dogs, moose, hares and birds, can carry the bacteria in their intestines.

Most infected animals will not show signs of disease, but they can develop diarrhea.

Cryptosporidiosis

[Cryptosporidiosis](#) is an illness caused by a simple, one-celled parasite named *Cryptosporidium* (there are several different species of the parasite that are capable of infecting animals and people), which is shed in the stool of wild and domestic animals. Infection generally occurs by contact with the stool of infected animals, contaminated surfaces or by drinking water or eating uncooked food contaminated with stool from infected animals. People can also become infected by [swimming in contaminated water](#).

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Although some people may not become ill after being infected, the most common symptoms of infection are extreme diarrhea, along with stomach cramps, nausea, vomiting, fever, headache and decreased appetite. People with weakened immune systems can develop severe disease if infected with *Cryptosporidium*.

Cryptosporidiosis is a reportable disease – this means that health care providers and laboratories that diagnose cases of laboratory-confirmed cryptosporidiosis are required to report those cases to their local or state health departments, which in turn report the cases to the U.S. Centers for Disease Control and Prevention (CDC).

The best way to prevent infection is by using good hygiene. Avoid drinking untreated water; water can be made safe by heating it to a rolling boil for at least 1 minute or by using [a filter that has an absolute pore size of 1 micron \(pt\) or smaller, or has been NSF rated for “cyst removal.”](#)

Infected persons can shed the organism in the stool for several weeks after infection, emphasizing the need for good hygiene.

[Dogs and horses can become infected with *Cryptosporidium*](#) but generally do not show signs of illness. Mild diarrhea may develop. To date, there is little evidence that dogs can readily infect their owners with *Cryptosporidium*; however, proper hygiene is always recommended when handling dog stool. There have been only a very small number of horses reported to be infected with *Cryptosporidium*, so there is not much data about the illness and the risk of transmission to people from horses.

Ehrlichiosis

[Ehrlichiosis](#) is a disease caused by bacteria that belong to the *Ehrlichia* species. There are several types of the bacteria that can cause illness. The disease is transmitted via the bite of an infected tick. It is a reportable disease – this means that health care providers and laboratories that diagnose cases of laboratory-confirmed ehrlichiosis are required to report those cases to their local or state health departments, which in turn report the cases to the CDC.

Symptoms usually occur within 1 to 3 weeks after exposure and can range from mild to severe. Common symptoms include fever, muscle pain, headache and chills. Occasionally, symptoms may include nausea/vomiting, a sharp drop in weight, mental confusion, cough and skin rash.

In dogs, the disease has 3 distinct phases. During the initial phase of infection, which generally lasts 1 to 3 weeks, the signs are nonspecific and include fever, loss of appetite, weight loss, depression and swollen lymph nodes. If the disease is not detected or treated during the initial phase, the dog may again appear normal. Chronic infection can develop, however, and can be life-threatening. Signs of severe ehrlichiosis include dramatic weight loss and loss of muscle tone, swollen lymph nodes, high fever, and bleeding.

In horses, clinical signs of disease can include fever, lethargy, loss of appetite, incoordination, and swollen limbs. If infected by *Neorickettsia risticii* (a member of the *Ehrlichia* family), horses can develop “[Potomac horse fever](#),” which can result in fever, loss of appetite, depression, colic, depression, and laminitis (founder).

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Equine Encephalitis Viruses

Equine [encephalitis viruses](#), including the [Eastern equine encephalitis virus](#) (EEE), [Western equine encephalitis virus](#) (WEE) and Venezuelan equine encephalitis virus (VEE), are transmitted by mosquitoes. As with [West Nile Virus](#) (WNV), the reservoir hosts for the encephalitis viruses are primarily wild birds.

Human infection with encephalitis viruses often causes symptoms such as fever, flu-like illness, muscle pain, vomiting and neurologic signs including seizures and convulsions. Infection with equine encephalitis viruses can be fatal. Infection with any of the equine encephalitis viruses is a reportable disease – this means that health care providers and laboratories that diagnose cases of laboratory-confirmed encephalitis are required to report those cases to their local or state health departments, which in turn report the cases to the CDC.

Although dogs can become infected with the viruses (particularly VEE), they do not usually develop illness.

Horses infected with an equine encephalitis virus usually develop signs of disease within 7 days. Clinical signs include fever, depression, loss of appetite, behavioral changes, trouble swallowing or whinnying, head pressing (pressing their head against walls, trees, other horses, etc.), inability to stand, blindness, circling, incoordination, aggression, seizures and death.

Escherichia coli Infection (*E. coli*)

[Escherichia coli, or *E. coli*](#), is a bacterium that causes diarrhea and stomach pain in people and is the leading cause of hemolytic uremic syndrome, a rare kidney disorder that can cause kidney failure. Many types of *E. coli* are harmless, but certain types can cause severe disease.

Although most cases of *E. coli* infection come from eating contaminated beef or drinking unpasteurized, contaminated milk products, disease-causing *E. coli* has been found in cattle, goats, sheep, deer, elk, pigs, horses and birds. Infection can also occur if a person drinks or swims in contaminated water. The bacteria are spread through fecal-oral transmission; an infected person or animal sheds the bacteria in their stool, and others are infected by accidentally eating the bacteria after they have touched a contaminated surface or had contact with infected stool. The bacteria are invisible to the naked eye, and people can become infected even if they don't see the contamination.

Dogs can become infected with *E. coli*. Intestinal infection often causes diarrhea and abdominal pain. *E. coli* infection in dogs can also cause urinary tract infections, uterine infections, ear infections and other problems.

The risk of *E. coli* infection and illness in adult horses appears to be very low. However, [horses and other farm animals can serve as sources of infection for people](#).

Giardiasis

[Giardiasis](#) is caused by infection with a microscopic parasite called *Giardia duodenalis*. The parasite is shed in the stool of infected wild and domestic animals. Infection generally occurs by contact with the stool of infected animals,

contaminated surfaces or by drinking water or eating uncooked food contaminated with stool from infected animals. People can also become infected by [swimming in contaminated water](#).

Although some people may not become ill after being infected, the most common symptoms of infection are diarrhea with “greasy” stools, along with gas, stomach cramps, nausea, vomiting, fever, and decreased appetite. It may take up to 1-2 weeks for these symptoms to occur, and illness may last 2-6 weeks. People with weakened immune systems can develop severe disease if infected with *Giardia*.

The best way to prevent infection is by using good hygiene. Avoid drinking untreated water; water can be made safe by heating it to a rolling boil for at least 1 minute or by using [a filter that has an absolute pore size of 1 micron \(pt\) or smaller, or has been NSF rated for “cyst removal.”](#)

Infected persons can shed the organism in the stool for several weeks after infection, emphasizing the need for good hygiene.

Dogs can become infected with *Giardia* but generally do not show signs of illness. Mild diarrhea may develop. The risk is very low that dogs can readily infect their owners with *Giardia*; however, proper hygiene is always recommended when handling dog stool.

Giardiasis is not likely to occur in adult horses, but young and/or immunocompromised horses could be at risk of illness. As seen with dogs, diarrhea is the most likely sign of disease, and proper hygiene is always recommended when handling animal feces (stool).

Hantavirus

[Hantaviruses](#) have worldwide distribution. [Rodents \(such as deer mice\)](#) are the natural hosts for these viruses. The viruses can be found in the rodents’ urine, feces, and saliva, and when these substances have been deposited and dried, the viruses can become airborne and infect humans when they breathe in the airborne particles. Another way to get infected, although not as common, is via a rodent bite or drinking or eating food or water contaminated by rodents. Hantavirus pulmonary syndrome (respiratory disease due to hantavirus infection) is a reportable disease – this means that health care providers and laboratories that diagnose cases of laboratory-confirmed hantavirus infection are required to report those cases to their local or state health departments, which in turn report the cases to the CDC.

The illness that develops in humans depends on the type of hantavirus. There is a severe illness known as *hantavirus pulmonary illness* that was first reported in the Southwestern U.S. in the early 1990s. This syndrome starts with fever, body aches, headache, nausea, vomiting, diarrhea and a dry cough. The major symptoms that indicate more serious illness are shortness of breath and difficulty breathing. This may lead to respiratory failure (which happens about 4 days after the symptoms first appear), when the lungs fill up with fluid and results in death in about 50% of infected patients.

Preventive measures to reduce the risk of hantavirus infection include:

- When hunting, avoid rodents and try not to disturb rodent nesting areas or burrows.

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- Avoid contact with rodent feces, urine or saliva. If contact happens, wash hands thoroughly with soap and water.
- If camping: Keep your outdoor gear (including tents, netting, sleeping bags, etc.) in good condition and repair or replace damaged items.
 - Avoid sleeping on bare ground; pitch camps away from woodpiles
 - Avoid sleeping in cabins or other structures that are currently, or have recently been, infested with rodents.
 - Keep food in rodent-proof containers and do not drink untreated surface water.

To date, hantavirus infections in dogs or horses have not been reported.

Leptospirosis

[Leptospirosis](#) is caused by *Leptospira* bacteria. The bacteria are found worldwide. Many species of both wildlife and domestic animals can spread leptospirosis. It is transmitted through an infected animal's urine. Leptospirosis is a risk during any recreational activity that involves exposure to water in lakes, rivers, or ponds that could be contaminated by urine from infected animals – this includes camping, swimming, kayaking, canoeing, rafting, trail biking, etc.

Outdoor enthusiasts and their animal companions can become exposed to *Leptospira* bacteria when they wade in contaminated waters or swamps; walk through contaminated soil, mud and wet plants; by direct contact with infected animals; or by eating food or meat or drinking water contaminated with the bacteria. The bacteria can also infect people and animals through open wounds or if contaminated water or food comes into contact with mucous membranes (e.g., linings of the nose, mouth and eyes). Person-to-person transmission is rare.

Symptoms of leptospirosis in humans range from mild to severe. The symptoms usually appear 5-14 days after infection, with a mild fever, chills, muscle ache and headache. Symptoms may progress to abdominal pain, vomiting, diarrhea and skin rash. The most severe cases develop liver and kidney problems, heart dysfunction and mental confusion. These severe cases are more common in older people and can result in death.

The signs of leptospirosis in dogs vary and can be vague. Infected dogs might not show any signs of disease, or they may exhibit fever, vomiting, diarrhea, loss of appetite, weakness and depression, stiffness or infertility. Younger animals may be more likely to develop the disease.

[Horses can become infected with leptospirosis](#) by eating grain or hay that has been contaminated with infected urine or by drinking contaminated, standing water. Signs of illness can develop 1-3 weeks after infection and can include fever, loss of appetite, swelling of the eyes, increased sensitivity to light, discharge from the eyes, cloudiness of the eyes, lethargy, and abortion.

Lyme Disease (*Lyme borreliosis*)

[Lyme disease](#) is an illness caused by a bacterium, *Borrelia burgdorferi*, which is a “spirochete” (a bacterium that has a worm-like, spiral-shaped form). Deer ticks are the primary carriers of the bacteria.

In humans, often the earliest indication of infection is a “bull’s eye” rash at the site of the tick bite – so named because it resembles a target. As the infection develops, symptoms include fever, headache, fatigue, and muscle and joint pain. The disease can progress to cause chronic joint problems as well as heart and neurological problems. Lyme disease is not contagious from one person to another. Lyme disease is a reportable disease – this means that health care providers and laboratories that diagnose cases of laboratory-confirmed Lyme disease are required to report those cases to their local or state health departments, which in turn report the cases to the CDC.

Dogs infected with Lyme disease may not show signs for 2-5 months, at which time they usually develop fever, loss of appetite and lameness. It can be difficult to distinguish Lyme disease from anaplasmosis because the signs of disease are very similar, and they occur in essentially the same areas of the country.

[Horses with Lyme disease](#) can develop lameness, joint pain, neurologic disease, eye problems and dermatitis.

Because it can be a difficult disease to diagnose, it is best to prevent infection by taking appropriate measures to prevent tick bites.

Plague

[Plague](#) is a disease caused by infection with *Yersinia pestis* bacteria, the same bacteria responsible for the “Black Death” that killed millions of people in the 1300s. The bacteria is still present in the environment in several regions of the nation, and the disease has recently been reported in mountain lions, rodents, rabbits, squirrels and other carnivorous animals. There are two common forms of plague – pneumonic plague, which involves the lungs and is more life-threatening; and bubonic plague, which is more common and less severe.

Plague can be transmitted to outdoor enthusiasts and their dogs through bites of infected fleas or by direct contact with infected animal tissues. The highest risks of exposures come from infected blood and tissues. The disease is more commonly found in areas with high populations of prairie dogs or other rodents.

The symptoms of plague in humans include high fever, chills, weakness, headache, nausea, and often a painful enlarged lymph node (in the groin area or armpit). Plague is a reportable disease – this means that health care providers and laboratories that diagnose cases of laboratory-confirmed plague are required to report those cases to their local or state health departments, which in turn report the cases to the CDC.

Signs of infection in dogs are usually open sores around the head and neck, and a veterinarian should be consulted immediately. Do not allow hunting dogs or pets near established prairie dog colonies, because they may become infested with plague-carrying fleas and may become ill and/or bring the infected fleas into your home or onto your property, increasing the risk of human infection.

Q fever

[Q fever](#) is a disease caused by the *Coxiella burnetii* bacteria. Cattle, sheep and goats are the primary reservoirs of *C. burnetii*, but cats, dogs, some wild mammals, birds and ticks are also natural reservoirs. The bacteria can be present in high numbers in the birth tissues (e.g., amniotic fluid, placenta and uterus) of infected animals and in lower numbers from their milk, urine, vaginal mucus, semen and manure/feces. The nesting sites of infected animals pose a high risk for infection. The bacteria most often infects humans and animals through an aerosol route – as the infected fluids dry, the bacteria remains in the dust. Infection can also develop following ingestion of contaminated, unpasteurized dairy products.

Both people and dogs can become infected with Q fever. In humans, Q fever is often mistaken for a flu or cold; symptoms include fever, chills, headache, muscle pain, weakness and severe sweats, usually lasting 2 weeks. There is a possibility of complications involving the lungs, nervous system or heart. Q fever is a reportable disease – this means that health care providers and laboratories that diagnose cases of laboratory-confirmed Q fever are required to report those cases to their local or state health departments, which in turn report the cases to the CDC.

Many animals do not exhibit signs of the disease, but infected dogs can shed the bacteria in their urine or milk and serve as sources of infection of their owners. Although not common in the U.S., *C. burnetii* can cause abortions and placental disease in horses.

Rabies

[Rabies](#) is caused by different variants (similar to strains) of the rabies virus. The virus is transmitted primarily through bites and causes severe damage to the brain. Non-bite transmission of the rabies virus is very rare but can occur through scratches, abrasions, open wounds or mucous membranes contaminated with saliva or other potentially infectious material (such as brain tissue) from a rabid animal. Once clinical signs of rabies are observed, it is 100% fatal in animals and almost 100% fatal in humans.

In the United States, rabies is most common in raccoons, foxes, skunks and bats. The virus can infect any mammal, and there are documented cases of rabies in many wildlife and domestic species.

The symptoms of human rabies cases can vary, but early symptoms may include fever, headache, sore throat, tingling at the site of the bite and fatigue. As the disease progresses, infected humans can develop disorientation, paralysis, hallucinations, seizures, coma and death.

Rabies is a reportable disease – this means that health care providers and laboratories that diagnose cases of laboratory-confirmed rabies are required to report those cases to their local or state health departments, which in turn report the cases to the CDC. Suspected cases are also reportable to local and state health departments.

The first clinical signs of rabies seen in animals are usually nonspecific and may include lethargy, vomiting, fever and anorexia (loss of appetite). Signs rapidly progress and in days may include restlessness, confusion/disorientation, ataxia/incoordination,

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lameness, hypersalivation, weakness, paralysis, aggression, self mutilation, tremors, seizures, choking, or difficulty breathing or swallowing. Contrary to popular belief, rabid dogs are more likely to exhibit lethargy and paralysis than aggression. Rabid horses commonly show worsening muzzle tremors, throat problems (difficulty swallowing or whinnying), incoordination, weakness, lethargy and dullness, but can show aggression.

Common sense guidelines for avoiding exposure to rabies include:

- Don't hunt any animal that behaves in an abnormal or uncharacteristic manner, such as:
 - aggressive animals
 - animals that display no fear of humans

- animals that appear disoriented or are wandering aimlessly
- animals showing any signs of sickness or paralysis
- Don't touch or any animal you find dead.

Do not take any extraordinary risks if you do see a potentially rabid animal – the presence of a potentially rabid animal should be reported to the proper authorities. If it is necessary to kill the animal before the proper authorities can be contacted or can arrive, try to avoid killing the animal by a head shot or causing any trauma to the animal's head – the brain must be intact for rabies to be confirmed. Do not handle any potentially rabid animals without proper protection (such as gloves), and avoid any contact with the animal's mouth, eyes and nose.

If you are bitten or come into physical contact (scratches or direct contact with the brain or saliva) with a potentially rabid animal, **immediately** wash the area with soap and water. Contact your physician immediately; rabies is almost always fatal if not treated immediately. Also contact the local or state health department.

View the [AVMA's World Rabies Day page](#) for more information.

Raccoon Roundworm (Baylisascaris procyonis)

The [raccoon roundworm, *Baylisascaris procyonis*](#), is a large parasitic worm that lives in the intestines of raccoons, although over 90 species of mammals, including dogs, rabbits, rodents, birds and humans can become infected with it. It is a common parasite in raccoons and has been reported throughout the U.S. (mainly in the Northeast, midAtlantic, Midwest and West Coast states).

The adult worms shed millions of microscopic eggs that are passed through the infected animal's stool into the soil, where the eggs can survive for months or even years. Humans become infected through accidentally eating eggs in contaminated food or water, or through contact with raccoon feces or objects that have been contaminated with raccoon feces. Because raccoons tend to use specific "latrine" areas, there can be a very high number of infective eggs in the soil in these areas.

While the worm does not cause harm to raccoons, it can cause serious illness in humans. Symptoms include nausea, lethargy, liver enlargement and loss of muscle control, eventually resulting in coma and blindness. Deaths are rare, but permanent liver, eye or brain damage can occur.

Dogs can be infected with the raccoon roundworm by contact with the stool of infected raccoons (or soil or water contaminated by the stool) or by contact with (or eating) the intestinal contents of an infected raccoon. Signs of illness include fatigue, blindness, incoordination and other nervous system problems. It is possible that an infected dog could shed eggs that can infect its owner. It has been suggested that monthly heartworm preventives may decrease the risk of infection in dogs.

To date, there have been no reports of confirmed *Baylisascaris* infection in horses.

Rocky Mountain Spotted Fever (tick-borne typhus fever) and other spotted fevers

[Rocky Mountain Spotted Fever](#) (RMSF) is caused by the *Rickettsia rickettsii* bacteria and can be transmitted to hunters via tick bites. Person-to-person transmission does not occur.

Symptoms of RMSF usually appear within 3 to 14 days after the bite of an infected tick, with moderate to high fever (which may last for 2 to 3 weeks), severe headache, fatigue, muscle aches, chills and skin rash. The rash looks like blood spots or heavy freckles, explaining the “spotted fever” part of the name, and begins on the legs and arms and may include the soles of the feet and palms of the hands, spreading rapidly to the rest of the body. It is important to note that not everyone who has RMSF will develop a rash. RMSF is a reportable disease – this means that health care providers and laboratories that diagnose cases of laboratory-confirmed RMSF are required to report those cases to their local or state health departments, which in turn report the cases to the CDC.

In dogs, the first sign observed is usually a high fever, occurring 4-5 days after a bite from an infected tick. Blood spots (pinpoint or larger in size) may be seen on the lips, gums and nonhaired (or shorthaired) areas of the dog’s skin. The dog’s legs may swell, as well as the lips, ears and sheath. In the late stages of the disease, or sometimes during recovery, the damage in the legs can be severe enough that sloughing of the skin and tissues can occur.

To date, there are no reports of horses with RMSF.

There are [new spotted fevers](#) being detected worldwide that are similar to RMSF, and these are also transferred via tick bites. In the United States, the most frequently diagnosed rickettsial infection associated with hunters returning from international travel is African tick bite fever.

Salmonellosis (*Salmonella species*)

[Salmonellosis](#) is a bacterial infection caused by *Salmonella* species. There are many *Salmonella* species that can cause infection and illness. Many species of animals, including pets, livestock, reptiles, birds and wildlife, can be infected and can spread *Salmonella*.

These bacteria usually infect the intestinal tract but also can be found in urine, blood or in other body tissues.

Salmonella bacteria are spread through fecal-oral transmission; an infected person or animal sheds the bacteria in their stool, and others are infected by accidentally eating the bacteria after they have touched a contaminated surface or have had contact with infected stool. The bacteria are invisible to the naked eye, and people can become infected even if they don’t see the contamination.

Symptoms in humans and animals may include mild to severe diarrhea, stomach pain, fever and vomiting. Infections in the bloodstream are rare but potentially can be very dangerous. Salmonellosis is a reportable disease – this means that health care providers and laboratories that diagnose cases of laboratory-confirmed salmonellosis

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are required to report those cases to their local or state health departments, which in turn report the cases to the CDC.

Sarcoptic mange

[Sarcoptic mange](#) is a skin disease caused by sarcoptic mange mites, which are found nationwide. This mange can be found in feral swine, foxes, coyotes and wolves, as well as in big game (including moose, elk, caribou, lions and water buffalo). It is spread by contact from animal to animal or from an infected environment to an animal and becomes more common when animal populations are high and contact is more likely.

Sarcoptic mange mites burrow through the top layer of the dog's skin and cause intense itching. Clinical signs include generalized hair loss, a skin rash and crusting. Skin infections may develop secondary to the intense irritation. It usually appears first in the hind end and tail regions, and gradually expands up along the back to the head.

People who come in close contact with an affected dog may develop a skin rash and should see their physician. When hunters come across an infected carcass, they should burn or bury the carcass, and as always, when dealing with a wild animal carcass, gloves should be worn and the workplace disinfected afterwards. If a dog comes in contact with a mange-infested carcass, prompt use of mite-killing topical products can prevent infection. Consult your veterinarian for a product recommendation.

Toxoplasmosis

[Toxoplasmosis](#) is caused by *Toxoplasma gondii*, a single-celled parasite.

A person can get toxoplasmosis by eating raw or undercooked meat, especially venison, lamb or pork, or from consuming unpasteurized milk or milk products. Humans can also get toxoplasmosis by consuming food, water, or soil contaminated with cat feces.

Healthy people rarely develop toxoplasmosis. If illness occurs, symptoms include fever and swollen lymph nodes. Eye problems can also occur. Less common symptoms include skin rash, fatigue and muscle pain, and serious cases (usually in persons with weakened immune systems) develop pneumonia and central nervous system (brain or spinal cord) disorders. If a pregnant woman becomes infected, it may result in severe birth defects or death of the baby.

Dogs can become infected with *T. gondii*, but it is uncommon for them to develop illness. Illness is more likely to develop in dogs with weakened immune systems, and the signs of illness include incoordination, weakness and seizures.

Toxoplasmosis in horses is rare, but infected horses can show incoordination, circling, weakness and blindness.

Preventive measures include thoroughly cooking meat and using proper food hygiene (washing hands and utensils after contact with raw food, washing fruit before eating it, etc.) Avoid eating raw eggs or unpasteurized milk.

Tularemia

[Tularemia](#) is caused by infection with *Francisella tularensis* bacteria, commonly found in the United States in rabbits, squirrels, muskrats, beavers, prairie dogs, cats, bobcats, deer and sheep. Rabbits are the most common source of tularemia in the United States. It is a potentially fatal disease. It can be spread to animals and people by deerflies and other insects. Tularemia is a reportable disease— this means that health care providers and laboratories that diagnose cases of laboratory-confirmed tularemia are required to report those cases to their local or state health departments, which in turn report the cases to the CDC.

Historically, people that work outdoors (landscapers, etc.) have been more likely to be infected with tularemia. Hunters are at risk of exposure because of the amount of time they spend outdoors and in their handling of game species prone to infection.

Routes of exposure may include:

- Exposure of skin or mucous membranes (eyes, nose and mouth) with blood or tissue when handling infected animals or game.
- Via infected flea or tick bites.
- Handling/eating undercooked infected meat. Rabbit meat can remain infective even after being frozen several years.

Less common routes may include:

- A scratch or a bite from a cat.
- Drinking contaminated water.
- Inhaling dust from contaminated soil.
- Handling contaminated animal pelts.

Symptoms of tularemia in people usually include skin lesions and swollen glands. If the infection is caused by eating infected meat, symptoms may include sore throat, intestinal pain, diarrhea and vomiting. Inhalation of the bacteria may produce a fever or may also cause a pneumonia-like illness. While the symptoms may appear anywhere from 2-10 days after exposure, they usually appear after 3 days. Simple measures can be taken to minimize the risk of tularemia, including the following:

- Wear rubber gloves when handling or dressing game (especially rabbits).
- Always thoroughly cook rabbit and/or squirrel meat.
- Use protective clothing and insect repellants and check for ticks frequently.
- Avoid drinking untreated water.
- Avoid handling any sick animals or any dead animals that you have not shot.

Dogs can be affected by tularemia, but the signs observed may be mild and nonspecific. The signs that may be observed are related to the mode of transmission and include fever, depression, mucopurulent (mucus with pus) discharge from the nose and/or eyes, pustules at the sites of contact, swollen lymph nodes, and loss of appetite. In most cases, the disease is self-limiting with supportive treatment.

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Reports of tularemia in horses are rare, but fever, difficulty breathing, incoordination and depression have been described in horses with extensive tick infestation.

West Nile Virus

African mosquitoes carrying the [West Nile virus \(WNV\)](#) first arrived in New York City in 1999. The virus has since spread throughout North America. The virus infects wild birds, and mosquitoes then transfer the virus to other animals and to humans.

Approximately 20% of people who are exposed to the virus via mosquito bites develop symptoms. Approximately 1% develops encephalitis (inflammation of the brain) or meningitis (inflammation of the linings of the brain or spinal cord) that can lead to death. West Nile Virus infection is a reportable disease – this means that health care providers and laboratories that diagnose cases of laboratory-confirmed West Nile Virus infections are required to report those cases to their local or state health departments, which in turn report the cases to the CDC.

Since 1999, there have been 17,000 reported cases and more than 650 deaths due to West Nile virus infection.

Sudden bird die-offs can indicate the presence of West Nile virus in the area. Hunters should report any noticeable increase in dead birds to [the state or local agencies](#).

[Avoid handling dead birds](#). Hunters should avoid handling dead birds they encounter that have not been shot during the hunt. Follow the state or local health department's instructions regarding what to do with the dead bird. If instructed to dispose of the bird, use gloves or protect your hands with a plastic bag to place the bird carcass in a garbage bag and dispose of it in the trash.

Dogs are [not likely to show signs of disease](#) when infected with the West Nile virus.

Horses infected with WNV usually develop signs of disease within 7 days. Signs include behavioral changes, incoordination, stumbling, depression, anxiety, weakness, inability to stand, localized muscle twitches, seizures, coma and death.

We would like to thank the AVMA's Committee on Environmental Issues for their participation and advice on this project.

Additional resources:

U.S. Department of Agriculture (USDA)

[Fact sheets: Food Safety while Hiking, Camping & Boating](#)
[Safe food handling](#)

Centers for Disease Control and Prevention (CDC)

[Protect yourself from tick bites](#)
[Tickborne rickettsial diseases](#)
[Updated information regarding insect repellents](#)
[Wildlife, Exotic Pets, and Emerging Zoonoses](#)