Whether clients travel everywhere with their pet or no farther than the local park, it is important they know local disease risks so they can take simple precautions to help protect their pet and themselves from infection.

Clients should also know that disease patterns are constantly changing. Global warming and climate change, urbanization and encroachment into wildlife territories, and the introduction (intentional or accidental) of foreign animal or insect species can affect the types and prevalence of diseases in any particular area.

The Devils You Know

Heartworm: There are major differences in heartworm prevalence across North America and the world. Generally, the farther south and the more the mosquitos, the higher the risk, making popular destinations like Florida heartworm hotbeds.¹
It is also important to consider the season—remember that dogs from northern regions where heartworm prophylaxis is not routinely administered during colder periods may require additional doses if they travel south for the winter. Avoiding outdoor activities during peak mosquito times is also an important preventive measure.

**Rabies:** The rabies exposure risk depends on where an animal goes and the wildlife encountered. Contact with bats is always considered a risk, but raccoons, skunks, or foxes may be the biggest terrestrial risk in different areas (see Map List for maps of wildlife reservoirs from the Centers for Disease Control & Prevention). All dogs and cats in the United States and Canada should be vaccinated against rabies, and direct contact with any kind of wildlife should be avoided if possible.2

**Lyme Disease:** Lyme disease transmission depends on the presence of certain species of ticks (primarily deer ticks \[*Ixodes scapularis*\] and western blacklegged ticks \[*Ixodes pacificus*\]), which requires the presence of a tick’s natural host (eg, deer, other small wildlife species) as well as circulation of the bacterium itself \((Borrelia burgdorferi)\) in the population.3

The North American areas where these factors most commonly come together include the northeastern United States, the bordering regions of Ontario and Quebec, the upper midwest and mid-Atlantic regions, and parts of California. Be sure to encourage clients to consider

<table>
<thead>
<tr>
<th>Table: Selected Regional Diseases of Dogs in North America</th>
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<tr>
<td><strong>Disease</strong></td>
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<td>Heartworm</td>
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<td>Rabies</td>
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<td>Lyme disease</td>
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<tr>
<td>Other tick-borne diseases: ehrlichiosis, babesiosis, anaplasmosis, Rocky Mountain spotted fever</td>
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<tr>
<td>Fungal infections</td>
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<tr>
<td>Plague</td>
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</tbody>
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Map List

The following maps are useful for disease information:


tick prevention if they live in or travel to these areas.

Lyme disease is not transmitted directly between pets and humans, but humans can be infected in the same way if exposed to infected ticks.

The Devils You Don’t Know

**Echinococcus multilocularis:** This is a species of tapeworm most commonly found in cooler climates such as northern Europe, Switzerland, the midwestern United States, southern regions of the Canadian prairies, China, Japan, and the Arctic. Up to 58% of stray dogs and up to 23% of pet or working dogs have been found to be infected, but this varies considerably by area and, in most regions, the prevalence in pet dogs is very low. In the last 3 years, at least 3 dogs in southern Ontario have been diagnosed with an alveolar cyst caused by *E multilocularis*, suggesting that this parasite may be present in Ontario (most likely primarily in wild animals). The parasite can cause an insidious infection in humans that can be difficult to treat. It is important for at-risk dogs to have regular fecal examinations for tapeworms and treatment when necessary. *Echinococcus* spp cannot be differentiated from *Taenia* spp based on ova identification with light microscopy; thus, any identification of a typical Taeniid egg in an *Echinococcus* spp area should be treated with caution.

**Other tick-borne diseases:** Ticks of various species can transmit a number of other zoonotic diseases (eg, ehrlichiosis, babesiosis, anaplasmosis, Rocky Mountain spotted fever). Most dogs, even if infected, do not get sick because their immune systems fight off the infection. When an animal (or a human) does get sick from one of these organisms, the signs are often similar to those of many other generalized illnesses and can be difficult to diagnose.

As with Lyme disease, the infection risk depends on where the different tick species live. If a human or dog will be in the woods or bushes where ticks might be, steps should be taken to avoid tick bites, and thorough tick checks should be performed afterward.

**Leishmaniasis:** *Leishmania infantum* is highly endemic in parts of Africa and the Mediterranean region (another popular vacation destination). The parasite, which is normally transmitted by sandflies, can infect both humans and dogs. The sandflies that transmit this disease in Old World regions do not live in North America; however, a veritable epidemic of leishmaniasis occurred in foxhounds in Ontario, Canada, and 21 U.S. states in the early 2000s. It is still unclear how the dogs became infected, but leishmaniasis is becoming more frequent in North America because it is being imported with rescue dogs from endemic countries. Should an infected dog meet some other species of insect that can transmit the parasite, further spread is possible. Another
species of *Leishmania (L. mexicana)* is considered endemic in Texas.6

In South and Central America and parts of Mexico, *Leishmania* spp can be transmitted by specific species of sandflies of the genus *Lutzomyia*.

**Fungal infections:** Ringworm (dermatophytosis) is the most common fungal infection in companion animals, but several other kinds of fungi can cause considerably more serious infections when spores are inhaled and spread to other parts of the body.

*Cryptococcus* spp and *Blastomyces dermatitidis* are typically found in moist soil and decomposing wood and leaves. *Blastomyces* is commonly found along the Ohio and Mississippi River valleys, whereas *Cryptococcus* is endemic along the Pacific coast. In contrast, *Coccidiodes*, which is found in more arid areas such as the southwestern United States, Mexico, and parts of Central and South America, can be spread through very dusty air. If a dog spends time in areas with a high exposure risk to fungus, fungal infections should be considered if signs of illness develop.7

**Plague (Yersinia pestis):** Most common in the southwestern United States, with occasional incursions into other areas such as Oregon and even as far north as Saskatchewan, this bacterium typically circulates in wildlife (especially rodents) and is mostly transmitted by fleas, though close contact with a sick pet (or human) is also a risk.8 Flea prevention products and keeping pets from hunting wild rodents will also help prevent plague.

**Conclusion**

Few companion animal diseases are reportable, so their occurrence is generally not recorded in any central database. Large diagnostic laboratories sometimes report statistics on numbers of positive tests, but depending on the test and the disease, this does not always translate directly to clinical cases.

Veterinary teams need to stay informed, as they are the best information source for local disease trends. Regional veterinary meetings are a good opportunity for informal information exchange among veterinarians about diseases being seen more or less often or diseases appearing for the first time. For clients and veterinary teams alike, grassroots surveillance systems such as the Worms & Germs Map (see Map List) can be useful for identifying emerging diseases in different geographic areas.

For any surveillance system, good output requires good input, meaning many veterinary practices need to participate and submit cases in a timely manner, according to clear case definitions, to keep the map accurate and up-to-date.

*Editor’s note:* Maureen Anderson graduated from the Ontario (Canada) Veterinary College and is an ACVIM-boarded internist with a special interest in zoonotic diseases and infection control. She has done graduate research on methicillin-resistant *Staphylococcus aureus* (MRSA) in horses and equine personnel, as well as hand hygiene and other infection-control practices in companion animal veterinary practice. She is also a co-founder and contributor to the Worms & Germs Blog.

**References**