Ixodes scapularis (the deer tick), Amblyomma americanum (the lone star tick) and Rhipicephalus sanguineus (the brown dog tick) are ticks that commonly parasitize dogs in the United States. In the first part of this article, we will examine their changing epidemiology to illustrate how being aware of their distribution and adapting diagnostic testing to include a broad range of pathogens may improve our ability to identify and help infected patients, especially those with suspected idiopathic immune-mediated disease. We will then discuss how to optimize testing for these pathogens using available panels.

Bartonellosis in Dogs and Cats, an Update

Rachel Taber, Anne Pankowski, Allison L. Ludwig, Maggie Jensen, Veronica Magsamen, and Erin Lashnits

The unique virulence factors of Bartonella spp make them stealth pathogens that evade the immune system and cause persistent infections that are often difficult to diagnose and treat. Understanding these pathogenic mechanisms allows clinicians to recognize when to pursue diagnostics, how to optimize diagnostic testing and treatment, and ultimately can lead to improved outcomes.

Babesia in North America: An Update

Jonathan D. Dear and Adam Birkenheuer

Canine babesiosis results from infection of 1 of 5 identified protozoal species in the United States (Babesia conradae, Babesia sp. “coco,” Babesia gibsoni, Babesia vogeli, and Babesia vulpes). They are part of the Apicomplexa family of protozoa and are obligate intraerythrocytic parasites. Domestic and wild canids are suspected of being intermediate hosts. This updated article aims to provide practical guidance about the clinical manifestations of disease, treatment options, and outcomes. In addition, the authors hope to provide some clarity about the taxonomy and nomenclature of these organisms, as they have undergone multiple changes since their initial discovery.

Cytauxzoonosis

Leah A. Cohn

Cytauxzoon felis is a hematoprotozoan parasite with a complex life cycle involving a tick-vector and a mammalian host. The mammalian hosts are all felidae but in the bobcat reservoir host, the parasite typically causes only a brief, self-resolving illness followed by a prolonged subclinical infection. In
domestic cats, however, infection often leads to an acute febrile illness characterized by severe morbidity and mortality. Diagnosis is based on microscopic identification of parasites or molecular testing. Treatment for ill cats is expensive, difficult, and often unsuccessful. Prevention is quite possible and depends on avoidance of feeding by vector ticks.

**Ehrlichiosis and Anaplasmosis: An Update**  
Pedro Paulo V.P. Diniz and Daniel Moura de Aguiar

Canine ehrlichiosis and anaplasmosis are zoonotic tick-borne diseases with broad distribution in the United States and abroad. Advances in serologic and molecular-based diagnostics have enhanced the understanding of the species of rickettsial organisms involved; their expanding geographic distribution; and their impact on the health of dogs, cats, and people. Although clinical remission is achieved with appropriate antimicrobial therapy, optimal treatment modalities for the elimination of infection remains uncertain. Protection through vaccines for ehrlichiosis or anaplasmosis remains elusive. This review provides practicing veterinarians with the most current information about transmission, diagnosis, and management of ehrlichiosis and anaplasmosis in dogs and cats.

**Veterinary Chagas Disease (American Trypanosomiasis) in the United States**  
Sarah A. Hamer and Ashley B. Saunders

Veterinary Chagas disease is a persistent threat to humans, dogs, and other wild or domestic mammals that live where infected triatomine “kissing bug” insect vectors occur across the Americas, including 28 states in the Southern United States. Animals infected with the Trypanosoma cruzi parasite may be asymptomatic or may develop myocarditis, heart failure, and sudden death. It is difficult to prevent animal contact with vectors because they are endemic in sylvatic environments and often disperse to domestic habitats. Challenges for disease management include imperfect diagnostic tests and limited antiparasitic treatment options.

**Schistosomiasis in the United States**  
Audrey K. Cook

Canine schistosomiasis is a well-established cause of a granulomatous enteropathy and hepatopathy in dogs. In a small subset of patients, infection triggers significant hypercalcemia. Clinical signs and clinicopathologic findings are fairly nonspecific but ultrasonographic evidence of heterogenous small intestinal wall layering and pin-point hyperechoic foci in bowel, nodes, and liver is highly suggestive of infection. A sensitive, commercially available, fecal polymerase chain reaction test can be used to establish the diagnosis. Treatment protocols rely on praziquantel with fenbendazole. Most dogs will recover, although retreatment may be necessary in a substantial proportion. Housemates should be screened as infection can be asymptomatic.

**Emerging Spotted Fever Rickettsioses in the United States**  
Linda Kidd

Spotted fever rickettsioses are important causes of emerging infectious disease in the United States and elsewhere. Rocky Mountain Spotted
Fever, caused by R. rickettsii causes a febrile, acute illness in dogs. Because it circulates in peripheral blood in low copy number and because of the acute nature of the disease, dogs may test PCR and seronegative at the time of presentation. Therefore, therapy with doxycycline must be initiated and continued based on the clinician’s index of suspicion. Combining PCR with serologic testing, repeat testing of the same pre-antimicrobial blood sample, and testing convalescent samples for seroconversion facilitates diagnosis. The prognosis can be excellent if appropriate antimicrobial therapy is begun in a timely fashion. It is well established that dogs are sentinels for infection in people in households and communities. Whether R. rickettsii causes illness in cats is not well established. The role of other spotted fever group rickettsia in causing illness in dogs and cats is being elucidated. Veterinarians should keep in mind that novel and well characterized species of SFG Rickettsia are important causes of emerging infectious disease. Veterinarians can play an important role in detecting, defining, and preventing illness in their canine patients and their human companions.

Hemotropic Mycoplasma 1319
Séverine Tasker

Hemoplasma infections are erythrocytic infections in both cats and dogs but are more common, and more often associated with disease, in cats. Mycoplasma haemofelis is the most pathogenic species in cats, causing hemolytic anemia and fever in immunocompetent hosts, whereas Mycoplasma haemocanis usually only results in hemolytic anemia in splenectomized or immunocompromised dogs. Diagnosis is by polymerase chain reaction on blood samples because cytology is unreliable. Prompt treatment of clinical disease with supportive care and at least 2 weeks of doxycycline is usually successful. Transmission pathways have not been confirmed, but indirect, via vectors, and direct via bites/fights/predation are likely.

Hepatozoonosis of Dogs and Cats 1341
Gad Baneth and Kelly Allen

Hepatozoon canis and Hepatozoon americanum are tick-borne infections of dogs transmitted by different tick species, with dissimilar geographic distributions, target organs, and clinical syndromes. H canis is transmitted mostly by the brown dog tick Rhipicephalus sanguineus sensu lato, affects hemolymphoid organs, is associated with anemia and other hematologic abnormalities, and is widely prevalent globally, whereas H americanum is transmitted by the Gulf Coast tick Amblyomma maculatum, causes severe myositis, and is an emerging parasite in the southern United States. Treatment of these 2 infections decreases the parasitic load without elimination. Domestic cats are infected with 3 Hepatozoon species.

Leishmaniasis 1359
Gad Baneth and Laia Solano-Gallego

Leishmaniasis caused by Leishmania infantum is an important zoonotic disease transmitted by sand flies with a high prevalence of infection in dogs and cats in regions whereby transmission occurs. Clinical disease
is systemic with variable presenting signs and degrees of severity. It affects the skin, lymph nodes, eyes, bone marrow, kidneys, and other organs. The clinical findings in dogs and cats with L. infantum infection are generally similar. Subclinical infection of canines and felines in endemic areas is frequent. Long-term treatment of the disease with allopurinol, or combination of allopurinol with meglumine antimoniate or miltefosine, is needed, and clinical relapse is probable.