Canine and feline infectious diseases are constantly changing in frequency and location. Numerous drivers or determinants of these changes are suspected, including emergence of new pathogens; change in virulence and resistance of existing pathogens; change in land use, climate, and weather; travel and trade; habitat destruction and urbanization; change in animal-animal contact networks; host susceptibility; availability and uptake of prevention measures; and change in ability to detect pathogens and track diseases. This article explores each of these proposed drivers and examines examples of feline and canine diseases likely to be influenced by them.

International canine transport programs are gaining popularity, moving dogs from limited-resourced facilities to those with an increased capacity to provide better animal care and outcomes. For many animals, transport is a lifesaving measure, but is not without risk. The long-distance movement of dogs can facilitate disease spread, particularly when exporting agencies are located in rabies-endemic areas and lack staff trained in infectious disease control. This article explains current trends in international dog transport and potential risks and benefits for participating agencies, and provides recommendations to mitigate the risk of unintentional infectious disease introduction and transmission.

Translocation of dogs inherently poses infectious disease risks when pathogen distributions vary between regions, even within the same country. Concerns include introduction of novel pathogens that can infect dogs, zoonotic pathogens, pathogens that can become established in existing reservoirs or vectors, and vectors that might carry pathogens and/or become established in a new region. This article presents the drivers of canine movement and their relative risks, and provides examples of diseases to show how different pathogen characteristics and transmission pathways can affect the impact of movement of infected dogs.
Desensitization to rabies is a result of successfully eliminating canine rabies in the United States, which occurred in 2007; however, the need for mandatory rabies vaccination in pets remains. Rabies cases are rare in comparison with other vaccine-preventable diseases in companion animals; however, because it is a zoonotic disease with the highest case fatality rate of any infectious disease demands the establishment of strict laws for disease prevention. Preventive strategies include addressing current concerns in consideration of disease surveillance, appropriate vaccination recommendations, and local regulations protecting public health.

Two different influenza A viruses have infected and spread among dogs since 2000, and both have been widespread in dogs in North America. The H3N8 canine influenza virus arose in the United States as a variant of equine influenza virus. The H3N2 canine influenza virus arose in Asia by transfer of an avian influenza virus to dogs. Both viruses cause mild respiratory disease and are associated with outbreaks in densely housed dogs or those with frequent connections to other dogs. The 2 canine influenza viruses each caused widespread epidemics over at least several years that were associated with localized outbreaks.

Feline panleukopenia (FPL) is caused by a Carnivore protoparvovirus infection. Feline parvovirus (FPV) causes most cases. When Canine parvovirus 2 (CPV-2) first emerged, it could not replicate in cats. All current CPV variants (CPV-2a-c) can infect cats to cause subclinical disease or FPL. Feline panleukopenia has re-emerged in Australia in shelter cats associated with failure to vaccinate. Parvoviruses can remain latent in mononuclear cells post-infection. Molecular methods such as polymerase chain reaction are used to determine the infecting strain. Current perspectives on causes, epidemiology, diagnosis, treatment, prognostic indicators, and management of outbreaks in shelters are reviewed.

The Lyme disease spirochetes are a highly diverse group of bacteria with unique biological properties. Their ability to cycle between ticks and mammals requires that they adapt to variable and constantly changing environmental conditions. Outer surface protein C is an essential virulence determinant that has received considerable attention in vaccine and diagnostic assay development. Knowledge of OspC diversity, its antigenic determinants, and its production patterns throughout the enzootic cycle, as
well as in the laboratory setting, is essential for understanding immune responses induced by infection or vaccination.

Feline Vector-Borne Diseases in North America 687
Barbara Qurollo

In North America, with the exceptions of Bartonella henselae and Cytauxzoon felis, feline vector-borne diseases (FVBDs) have been minimally studied in domestic cats. Cats can be infected with many of the same vector-borne pathogens that infect dogs. Nonspecific clinical signs linked to FVBDs and low prevalence of certain vector-borne pathogens contribute to a limited awareness of FVBDs in sick cats. As clinicians become informed about FVBDs and as vector-borne disease diagnostics are routinely applied to evaluate sick cats, we will gain a stronger understanding of vector-borne pathogens in cats. This article focuses on recent findings related to FVBDs.

Optimal Vector-borne Disease Screening in Dogs Using Both Serology-based and Polymerase Chain Reaction-based Diagnostic Panels 703
Linda Kidd

Vector-borne disease and idiopathic immune-mediated disease present similarly. Diagnostic panels that include multiple organisms help detect infection and identify coinfections. Comprehensive diagnostic panels that combine polymerase chain reaction (PCR) and serology should be used in initial screening to maximize sensitivity and identify infection. Repeat testing using PCR is warranted in dogs at high risk of infection with organisms that circulate in blood in low numbers or intermittently. Convalescent serologic testing can help diagnose acute infection. This article discusses the pathophysiology and epidemiology of the organisms, panel selection, and how to recognize when more aggressive testing for an organism is warranted.

Diagnosis of Canine Leptospirosis 719
Krystle L. Reagan and Jane E. Sykes

Several diagnostic tests are available to aid veterinarians in diagnosis of leptospirosis. Understanding the course of infection is imperative to determining which diagnostic test to order and sample to submit. Diagnostic tests for dogs suspected of having leptospirosis include antibody-based tests and polymerase chain reaction (PCR). Paired acute and convalescent microscopic agglutination test (MAT) are diagnostic for leptospirosis. PCR performed on blood and/or urine can be a valuable tool to aid in diagnosis of leptospirosis. Commercially available rapid point-of-care diagnostics have been validated in dogs and have value early in the course of illness before MAT and PCR results are available.

Update on Feline Hemoplasmosis 733
Emi N. Barker

The wall-less, hemotropic, mycoplasma species Mycoplasma haemofelis, "Candidatus Mycoplasma turicensis" and, to a lesser extent, "Candidatus
Mycoplasma haemominutum” have the potential to induce clinical hemolytic anemia in infected cats. Prevalence varies markedly between infecting species, complicated by a chronic carrier state. Accurate and prompt confirmation of infection and identification of the infecting hemoplasma species enables appropriate antibiotics (eg, tetracycline; fluoroquinolone) to be prescribed. Although cats with hemoplasmosis respond rapidly to antibiotics and supportive care, initial monotherapy treatment rarely results in clearance of infection. A protocol now exists for the clearance of the most pathogenic feline hemoplasma M haemofelis.

Cutaneous and Renal Glomerular Vasculopathy: What Do We Know so Far? 745
Rosanne E. Jepson, Jacqueline M. Cardwell, Stefano Cortellini, Laura Holm, Kim Stevens, and David Walker

Cutaneous renal glomerular vasculopathy (CRGV), colloquially named “Alabama rot,” is an emerging condition in the United Kingdom, previously reported from the United States and Germany. The cause of CRGV is not yet determined; no definitive link to an infectious agent has been made. Dogs diagnosed with CRGV initially develop cutaneous lesions, and a proportion of these dogs go on to manifest acute kidney injury, which may result in oligoanuric acute renal failure. Antemortem diagnosis is challenging given the lack of a specific diagnostic test, and confirmation of CRGV is therefore currently dependent on identification of thrombotic microangiopathy on renal histopathology.

Canine Brucellosis: Old Foe and Reemerging Scourge 763
Lin K. Kauffman and Christine A. Petersen

The genus Brucella is a primary cause of reproductive diseases. Widely known as a problem in livestock, Brucella is gaining notoriety as a cause of canine reproductive disease and as a scourge to dog breeders. Only within the last few decades has the risk of severe brucellosis in dogs, and the people who own and work with them, been more fully appreciated. This review summarizes the epidemiology, clinical signs, and advances in diagnosis and management of Brucella canis. Canine brucellosis prevention, owner education, and possible therapies for the future are also discussed.