

## Infectious Disease

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Dr. Christine Petersen said she applauds the use of vaccines, but does not recommend their use for every disease.

While canine rabies is the primary strain that causes human deaths in the rest of the world, the disease has been eliminated in the United States, where cases generally originate in other species such as raccoons, bats, and foxes. However, 55,000 people died from rabies worldwide in 2006, 24 of them in the United States. To prevent rabies, Dr. Petersen said all dogs should be vaccinated, as well as at-risk humans such as veterinarians and animal shelter staff.

Intestinal parasites produce a condition that is generally very manageable in dogs. The eggs of hookworms or roundworms are spread to humans through dog feces. Dr. Petersen said a study of playgrounds in Connecticut found 30% of soil samples contaminated with roundworm eggs. These parasites also can be transmitted from bitch to puppy, so it is important that breeders follow Centers for Disease Control and Prevention guidelines.

Dr. Petersen noted that cases of brucellosis, a bacterial disease primarily found in the bowel, vaginal secretions, or semen, are on the rise in Iowa and Missouri. Occasionally puppies are exposed through mother's milk, but she said that if the bacteria are present in milk, the puppy probably acquired it *in utero*. The lack of reliable treatment leads many breeders to euthanize infected dogs.

"That's not much of a decision," she said, "as this disease isn't something you want in your kennel."

Brucellosis can cause disease in humans, so gloves should be worn when handling feces.

Though inexpensive screening tests are available, she said the tests have a high false-positive rate. The polymerase chain reaction (PCR) test, which tests for bacteria rather than immune response, allows infected animals to be identified sooner, potentially preventing exposure to other dogs. A positive culture confirms the presence of the disease while a negative culture means only that parasites did not grow in that particular specimen.

To prevent exposure to animals in a kennel, Dr. Petersen suggested that all dogs be screened with a rapid slide agglutination test, or tube agglutination test. Any positive results can be confirmed with an agar gel immunodiffusion test or culture. She recommended that retesting be conducted once a month for three months, and that new dogs be quarantined before breeding.

Since infected males can shed the bacteria in their semen for up to two years, Dr. Petersen suggested euthanizing culture-positive males. Treatment with antibiotics is only occasionally successful, takes a long time, and does not usually result in a sterile cure. In exceptional circumstances bitches can be treated, but any future breeding should be done through in vitro fertilization, she said.

Tularemia, a tick-borne bacterial disease, is present throughout the United States, but is currently centered in Missouri. Four ticks are known to be carriers. Biting flies can also transmit the disease, especially in the Southwest United States. Symptoms of tularemia range from benign ulcers to lesions and glandular diseases in both dogs and humans. Although gentamycin has been used to treat the disease in humans, the efficacy of antimicrobial therapy for dogs has yet to be determined.

Leptospirosis is a potentially fatal disease that presents with kidney-, liver-, and vascular-related ailments. Herding dogs, hounds, and working dogs appear to be at greatest risk, Dr. Petersen said, although outbreaks have been reported after exposure to sources of standing water. Two studies showed 10–15% prevalence in the US Midwest. A study of veterinary clinics showed an incidence range of 4–33%.

The newest vaccines should be given twice a year and contain four strains, or serovars, believed to be tied to a decrease in seroprevalence. When clinical signs such as renal failure are present, Dr. Petersen said, an appropriate therapy is recommended. While antibiotics such as penicillin remain the treatment of choice, doxycycline appears to be the best route to eliminate the disease when it presents in the kidneys.

Canine influenza virus (CIV) is a highly infectious respiratory disease closely related to the virus that causes equine influenza. Although dogs are not traditionally carriers, an outbreak was reported among Greyhounds at a racetrack in Florida in 2004. Dr. Petersen said clinical signs of the disease include rapid onset fever, cough, increased respiratory rate, and bleeding from the nose. Nearly 100% of dogs exposed to the virus will develop the disease, although the mortality rate is only 5%, and is usually attributed to secondary infections.

The treatment for CIV is antibiotics, and Dr. Petersen said isolation from other dogs for seven days greatly reduces the risk to the rest of the kennel population. Since the virus is spread mainly by respiratory droplets, good hygiene practices are critical in preventing an outbreak.

Mosquito-borne West Nile virus (WNV) was introduced into the United States in 1999. It usually attacks birds such as crows and jays, horses, and humans, but Dr. Petersen said it is relatively rare in dogs. Symptoms include lethargy, poor appetite, frequent drinking, eye discharge, fever, and watery diarrhea. The disease then progresses to the next stage, where neurological symptoms like head tilt are more typically associated with classic WNV.

Leishmaniasis is a parasitic disease transmitted by the sand fly. It has been reported in the United States primarily among Foxhounds. Dogs typically present with the visceral form of the disease, which means the parasite has migrated to the vital organs.

Dr. Petersen said it is unclear how the disease spreads in the United States. A test was conducted on hundreds of sand flies, and none were infected. Humans who spend a great deal of time around infected dogs do not get sick. Anecdotal evidence suggests the disease may be transmitted through the blood, as Foxhounds developed it after a fight. It may be transmitted vertically, from bitch to pup, either through the placenta or in the mother's milk. If this were true, the pup's immune system would have difficulty recognizing the parasite as a parasite. This may explain why the antibody response in these dogs may take two to seven years to develop. The PCR test appears to be the most accurate means of diagnosis, although it can give false positive results.

Allopurinol is currently the main therapy for leishmaniasis; although there is no cure, treated dogs typically live two years after onset of the disease. Alternative experimental therapies are available as well.

The best way to protect against an infectious disease is to understand how it is spread and to take steps to prevent the spread among your animals, Dr. Petersen said. The proper use of disinfectant is important. In diseases spread through sexual contact or from bitch to pup, she advises against breeding.

### *Discussion*

A participant asked about the availability of a national database of infectious disease outbreaks so breeders would know whether they should continue to vaccinate against all diseases. She said that because there has not been a positive test for brucellosis in Rhode Island for many years, she has stopped testing for it in her dogs. She asked whether that is advisable, as long as the dogs are not taken outside the region. Dr. Petersen said that although a national database would provide valuable information, to her knowledge none exists at this time.

The same attendee noted the need for education among veterinarians and physicians regarding zoonotic diseases—those that can be transmitted between animals and humans—especially in the wake of Hurricane Katrina and the anticipated pandemic flu. Dr. Petersen agreed, and said the American Veterinary Medical Association and American Public Health Association are taking a strong stand and encouraging more outreach.

Another participant said she would not stop testing her breeding dogs, though she has not seen a case of brucellosis in a long time. She suggested all breeders and veterinarians continue to immunize dogs, especially rescue dogs, from infectious diseases, regardless of the incidence in their area.

A participant asked whether any other breed had developed leishmaniasis. No others have come up positive, Dr. Petersen said, apart from a small number of Beagles who may have been exposed accidentally to an infected Foxhound.

Another participant asked whether dogs, like humans, could develop brucellosis from cows. Dr. Petersen said the bovine strain does not cross over into dogs.