Pennsylvania Game Commission Wildlife Disease Reference Library

Anaplasmosis

Cause

Anaplasmosis is a tick-borne disease of blood cells caused by bacteria in the group *Anaplasma*. Anaplasmosis was originally believed to infect only ruminants (cattle, sheep, goats, deer, elk, bison, antelopes etc). Following recent reclassification, some former members of the *Ehrlichia* group that infect humans, dogs, and horses, are now considered to be part of the group called *Anaplasma*.

Significance

Anaplasmosis in humans, known as human granulocytic anaplasmosis (HGA), can potentially cause serious illness though it is rarely fatal. People can acquire the disease from the bite of a tick carrying the bacteria, and from blood transfusions or organ transplants. Hunters and meat processors have acquired the disease while butchering white-tailed deer, so it is important for those processing meat from these species to wear gloves while preparing carcasses. People should also wear long pants and long sleeves when outside in potential tick habitats. Ticks should be promptly removed if found on people or pets. Domestic animals can introduce ticks to their owners and can themselves become infected with anaplasmosis. Tick bite prevention is key to protecting humans and domestic animals from this disease.

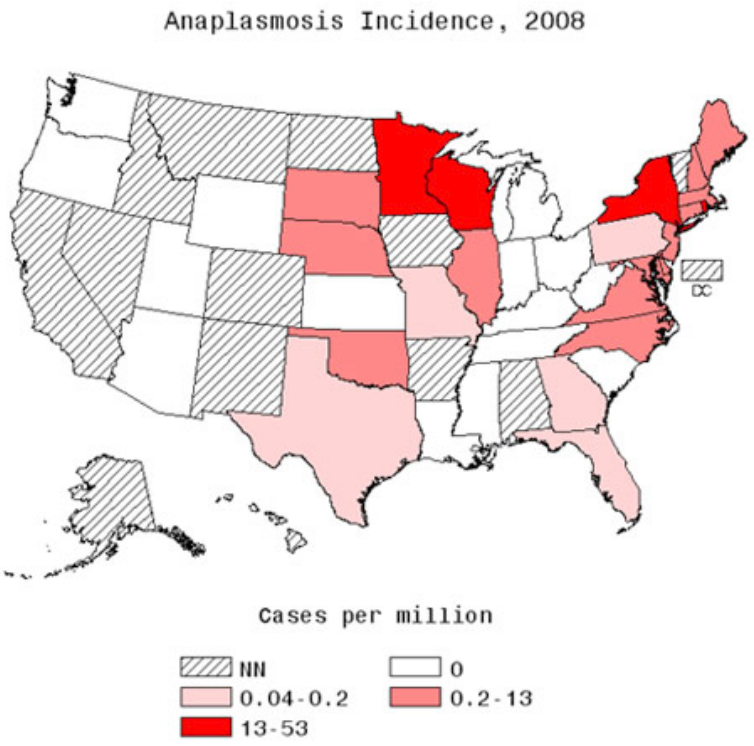
Species Affected

Wild ruminants known to be infected with anaplasmosis include white-tailed deer, black -tailed deer, mule deer, elk, bison, pronghorn antelope, bighorn sheep, and many exotic species. Domestic ruminants such as cattle, sheep, and goats are also susceptible to this disease. Non-ruminant wildlife species infected include, but are probably not limited to, rodents, coyotes, fishers, and mountain lions. Humans, dogs, and horses can also be infected.

Distribution

Some species of *Anaplasma* are distributed worldwide. In the United States, human cases of anaplasmosis are most common in the upper Midwest and Northeast regions of the country with occasional cases in California. In the Midwest and Northeast, including Pennsylvania, the tick most responsible for transmission of the bacteria is the blacklegged tick, also known as the deer tick. The disease is also reported sporadically

in humans in other parts of the country. In Pennsylvania up to a third of ticks in some locations can harbor infection with a combination of this bacteria, and *Ehrlichia*, or the bacteria of Lyme Disease at the same time. Cases of this disease in wildlife have not been detected to date.



Incidence of human cases (per million population) of anaplasmosis for the United States in 2008. Courtesy of www.cdc.gov

Transmission

The most important mode of transmission for anaplasmosis is through the bite of a tick carrying the bacteria. Biting flies can also transmit the bacteria, but they are less efficient vectors because the organism does not survive very long on the mouthparts of flies. Ticks, however, ingest the bacteria when they feed on the blood of infected animals and the bacteria can survive and reproduce within the tick making it much more efficient at transmitting *Anaplasma*. The bacteria may be transmitted by way of blood contaminated needles or surgical equipment, in blood transfusions, and organ transplants.

Clinical Signs

Anaplasma bacteria infect red and white blood cells, so a major clinical sign is anemia. Animals that are acutely infected may have a loss of coordination, shortness of breath, fever, and a rapid pulse. The urine may be brown and the spleen is often enlarged. Animals may also become chronically infected and show less severe clinical signs. Younger animals appear to be less susceptible to this disease than adults. These clinical signs are often observed in domestic ruminants, though rarely in wildlife. Deer are commonly infected with *Anaplasma*. There have been two reports of giraffes with fatal anaplasmosis infections. Bighorn sheep also seem to be more susceptible to clinical illness than other wild ruminants.

Diagnosis

Several laboratory tests are used to diagnose anaplasmosis. Special stains are used to observe the bacteria within blood cells under a microscope.

Treatment

Antibiotics are used to treat anaplasmosis in domestic animals and captive wildlife species, but this treatment is not feasible for free-ranging wildlife. Tick and fly control

can also be used as a preventative measure in captive species, but is not currently a reasonable option for wildlife.

Management

Anaplasmosis can be a problem in domestic cattle and sheep, and wildlife species carrying the bacteria without showing signs of illness may act as a reservoir for this disease. Elimination of anaplasmosis from wildlife is probably not feasible. The best method to prevent infection of domestic animals and humans is vigilant tick control.

Suggested Reading

Anaplasmosis. 2011. The Merck Veterinary Manual. <http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/10401.htm&word=anaplasmosis>.

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Foley, J., N. C. Nieto, J. Madigan, and J. Sykes. 2008. Possible differential host tropism in *Anaplasma phagocytophilum* strains in the western United States. Animal Biodiversity and Emerging Diseases: Annals of the New York Academy of Sciences 1149: 94-97.

Jessup, D. A., W. L. Goff, D. Stiller, M. N. Oliver, V. C. Bleich, and W. M. Boyce. 1993 A retrospective serologic survey for *Anaplasma* spp. infection in three bighorn sheep (*Ovis canadensis*) populations in California. Journal of Wildlife Diseases 29: 547-554.