

# Effect of Reservoir Host and Climactic Conditions on Emerging Heartworm Disease



## Emerging Heartworm Disease: Part 2

This publication will explain how the effect of change in reservoir host, reservoir movement, and climactic events propagated the expansion of heartworm disease into non-endemic areas. The main premise is that changes in climactic conditions may have created environments in which the vector has increased survivability. Climatic and host changes have combined to expand the geographical area of heartworm disease.

### Reservoirs

Many people believe wildlife reservoirs are responsible for the spread of heartworm disease in the United States (Bowman and Atkins 2009). Raccoons, deer, bears, wolverines, and coyotes are wildlife reservoirs affected by heartworm disease.

In the Pacific west, the coyote has been used as a wildlife sentinel to monitor the spread of the disease. This is because coyotes do not have confound-



Figure 1. The relocation of domestic dogs and cats after Hurricane Katrina spread heartworms to previously unaffected areas of North America.



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ing factors (such as use of different preventives, veterinary criteria for testing, and travel) experienced by domestic dogs, yet they tend to parallel the pattern of prevalence of heartworm disease in domestic animals in an area (Sacks and Caswell-Chen 2003). A study in 2003 documented the spread of heartworm disease in coyotes from the Sierra Nevada foothills to central California (Sacks and Caswell-Chen 2003).

Domestic animals also can spread heartworms to new areas. After Hurricane Katrina, 1,958 dogs and 1,289 cats were relocated to different areas of the United States and Canada. Of the dogs relocated, 956 (48.8 percent) tested positive for heartworms. Seven of the 176 cats tested positive (Levy, et al. 2007). These 963 animals were relocated to other parts of North America. Many of the areas receiving these animals were considered non-endemic areas (Levy, et al. 2007).

## Climactic Conditions

Climatic conditions must be favorable for heartworm disease to spread into an area. Global warming and municipal expansion are two events that could be responsible for the spread of the disease.

As the effects of global warming create habitats conducive to the survival of mosquito populations, the geographic range of heartworms will continue to increase (Simon, et al. 2008). Climate modeling in Europe found a correlation between the increased incidence of heartworm cases and the changing of climate patterns (Genchi, et al. 2009). Weather patterns in the Gulf Coast region in 2001 and 2002 contributed to the change and increase of vectors of heartworm disease (Hampshire 2005).

Real estate development into less-populated and non-endemic areas moves families and their pets into new areas (Environmental Protection Agency 2009). Commercial and residential real estate development may create urban areas that are warmer than rural areas. According to the Environmental Protection Agency, this can increase nighttime temperatures in cities with populations of 1 million or more. Many mosquito vectors are nighttime feeders. This warming of nighttime temperatures allows them to stretch their geographical range to cooler climates for longer periods of time. (T. Nelson, Heartworm: An emerging disease climactic conditions, reservoir, competent vectors all contributing to disease spread 2010).

## Conclusion

Canine heartworm disease continues to cause significant morbidity and mortality to U.S. animals. Despite excellent preventive products, sensitive diagnostic testing, and effective adulticide therapies, the case numbers continue to escalate. Documentation shows heartworms are occurring more often and are spreading to different areas.

Please talk to your veterinarian for heartworm information and recommendations for your particular situation.

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