INTRODUCTION

Leptospirosis is a reemerging zoonotic disease of concern that threatens companion animal and human health. Spread through the urine of infected animals, Leptospira spp. can infect dogs in a variety of settings across the United States. It produces a wide spectrum of clinical illness, with the possibility of death. Canine leptospirosis cases appear to be increasing in number in the United States, yet information on the epidemiology of the disease is lacking.

Hypothesis: Test-positive prevalence of canine leptospirosis is significantly influenced by environmental and animal factors.

Objectives:
- Describe the recent temporal and spatial distribution of canine leptospirosis in the United States.
- Identify environmental, seasonal, dog- and human-level factors associated with canine leptospirosis.

RESULTS

- 18,727 test entries and 14 variables were explored in association with a positive test outcome: season, breed group, sex, mean regional temperature and precipitation by month, state percent inland and overall water, estimated state dog density, urban influence code, income, education, and percent of state population that fishes and hunts.

Risk factor analysis:
- Five variables were statistically significant in univariable models (Table 1).
- The final multivariable model contained 3 variables: female sex, dog age, and increased precipitation. Odds ratios and 95% confidence intervals were similar to univariable results (Table 1).

CONCLUSIONS

- This study utilized PCR test data (sensitivity: 92%, specificity: 99%).
- Previous studies have commonly utilized MAT test data, which is less sensitive (sensitivity: 22% – 67%) and vaccination can make MAT results difficult to interpret, thus our conclusions differ from previous studies.
- The Western, Midwest, and South-central regions have previously been identified as canine leptospirosis hot-spots. In the current study, over both years, test-positive prevalence was highest in the Midwest and south-central regions; interestingly, the Western region was not identified as a high test-positive prevalence area.
- As identified previously, increased precipitation and temperatures were both significant predictors for a positive canine leptospirosis PCR test.
- State-based prevalence varied between states and time (2015 vs. 2016). This illustrates how the distribution of cases can rapidly change over space and time.
- Only environmental and dog factors were implicated in the odds of a dog testing positive, aligning with our hypothesis. It is important to note that not all variables of interest were available for analysis due to limited information on each entry, and additional variables were limited to publicly available data.

Future Directions: Additional research is needed to investigate canine leptospirosis to identify modifiable risk factors (e.g., vaccination). Targeted education and prevention efforts at clients with dogs at risk are needed to decrease prevalence in the canine population and prevent possible transmission to humans. The spatial and temporal differences identified in this study can guide the location and timing of prevention campaigns.

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REFERENCES


FURTHER INFORMATION

The Ohio State University