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The role of dogs in the epidemiology of leptospirosis in Switzerland - Seroprevalence and urinary shedding of pathogenic leptospires

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Key words
Leptospirosis, dog, zoonosis, epidemiology, seroprevalence, urinary shedding

Aim of the study
The aims of this project were to: (i) Determine the seroprevalence of canine leptospirosis and the prevalence of urinary shedding of pathogenic leptospires in dogs not suspected to have leptospirosis in Switzerland; (ii) Determine the frequency, magnitude and duration of urinary shedding of pathogenic leptospires in dogs undergoing treatment for acute leptospirosis. (iii) Detect possible contamination of surface water by quantitative RT *lipL32* PCR in environmental samples.

Material and methods
Blood and urine samples from dogs not suspected to have leptospirosis were collected. Sampling was stratified to cover the whole of Switzerland. Serial urine samples were collected from dogs with a confirmed diagnosis of leptospirosis undergoing treatment at the veterinary hospital of the Vetsuisse Faculty Bern. Sera were tested for the presence of anti-leptospiral antibodies to a panel of 12 serovars using the microscopic agglutination test (MAT). The LipL32 gene, present only in pathogenic *Leptospira* was amplified via RT PCR from canine urine samples. Due to the low prevalence of urinary shedding, surface water samples were not analysed.

Results and significance
Of 377 sera, 55.7% (CI 0.51-0.61) showed a reciprocal MAT titre of 1:40 and 24.9% (CI 0.21-0.3) of ≥1:100 to at least one serovar. Seropositivity (MAT ≥1:100) was most common to serovar Australis (14.9%; CI 0.06-0.12), Bratislava (8.8%; CI 0.11-0.19), Copenhageni (6.5%; CI 0.04-0.1), Canicola (5.7%; CI 0.03-0.09), Grippotyphosa (4.5%; CI 0.03-0.07)), Pomona (4%; CI 0.02-0.06), Autumnalis (2.7%; CI 0.01.0.05) and Icterohaemorrhagiae (1.6%; CI 0.01-0.05). Seropositivity was inversely correlated with the time since last anti-leptospiral vaccination ($p<0.001$). In unvaccinated dogs (n=87) the overall prevalence of a MAT titre ≥100 was 17.2% (CI 0.01-0.27), The serovars which sera reacted with were Australis (9%; CI 0.04-0.17), Bratislava (8.0%; CI 0.03-0.16), Copenhageni (3.8%; CI 0.01-0.11), Grippotyphosa (3.4%; CI 0.01-0.1), Canicola (3.0%; CI 0.01-0.12), Pomona (2.3%; CI 0-0.08) and Autumnalis (2.3%; CI 0-0.06). Urine PCR was performed in 408 dogs, only one of which had a positive PCR result (0.25%; CI 0-0.01). None of the dogs with acute leptospirosis showed urinary shedding of *Leptospira* during or after antibiotic treatment.
These results suggest that anti-leptospiral vaccination leads to MAT seropositivity beyond the 16 weeks post vaccination reported in the literature. Results from unvaccinated dogs show that dogs in Switzerland are commonly exposed to pathogenic Leptospira spp. without developing signs of disease. However, based on our findings urinary shedding of pathogenic leptospires appears to be uncommon in healthy dogs and dogs during and after antibiotic treatment for leptospirosis.

Publications, posters and presentations

Delaude, A.; Rodriguez-Campos, S.; Dreyfus, A.; Francey, T.; Schweighauser, A.; Schuller S. (2016) The role of the dog in the epidemiology of leptospirosis in Switzerland – seroprevalence and urinary shedding of pathogenic leptospires. Oral abstract Annual Congress of the European College of Veterinary Internal Medicine, 8-10.9.2016, Gothenburg (SE)

Delaude, A. (2016) The role of the dog in the epidemiology of leptospirosis in Switzerland – seroprevalence and urinary shedding of pathogenic leptospires. Doctoral thesis, Vetsuisse Faculty Bern (CH) In preparation

Delaude, A.; Rodriguez-Campos, S.; Dreyfus, A.; Francey, T.; Schweighauser, A.; Schuller S. (2016) The role of the dog in the epidemiology of leptospirosis in Switzerland – seroprevalence and urinary shedding of pathogenic leptospires. *Zoonoses and Public Health*; Manuscript in preparation.

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