The re-emergence of canine leptospirosis in Ontario

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Leptospirosis concepts

- A zoonotic disease caused by the spirochete *Leptospira*
- Home is kidney, often shed in urine for life in maintenance hosts
Serovars and maintenance hosts of pathogenic leptospires in Canada

<table>
<thead>
<tr>
<th>Serovar</th>
<th>Maintenance host</th>
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</thead>
<tbody>
<tr>
<td>bratislava</td>
<td>Pigs (horses, dogs)</td>
</tr>
<tr>
<td>canicola</td>
<td>Dogs</td>
</tr>
<tr>
<td>grippotyphosa</td>
<td><strong>Raccoons, skunks, voles</strong></td>
</tr>
<tr>
<td>hardjo</td>
<td>Cattle, sheep</td>
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<tr>
<td>icterohaemorrhagiae</td>
<td></td>
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<tr>
<td>pomona</td>
<td>Pigs, <strong>skunks</strong>, cattle, raccoons?</td>
</tr>
</tbody>
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Leptospirosis: epidemiology

- Contact with maintenance (reservoir) host or its urine causes infection in incidental hosts
- Leptospires are fastidious
- Survive optimally where wet and moderate temperatures (fall), about 6 weeks
Number of serologically positive and negative canine leptospira cases, year 2000, AHL
Historical background: leptospirosis in dogs

- Maintenance host of canicola
- Infections in children in 1970s
- No longer reported in United States or Canada
- Icterohaemorrhagiae, incidental infection, rat derived, rare disease
- Controlled by routine vaccination
Annual prevalence of leptospirosis/100,000 dogs at 22 veterinary teaching hospitals in USA and Canada
Leptospirosis in dogs: emergence of the new serovars

• Increasing reports since 1990 of grippotyphosa, pomona in United States and Canada
• Dramatic increase in eastern Canada
Annual submission of serum samples to AHL for canine leptospirosis, positive and negative for the MAT, 1998 to 2006

Alton et al (2009)
It’s an urban-suburban disease of dogs
Why has leptospirosis in dogs increased?
Why has leptospirosis in dogs increased?

- Increase in infection in wildlife vectors (raccoons, skunks) in urban, suburban areas
- Climatic factors (impact on vector, survival)
- Awareness by vets
Raccoon populations

100 raccoons per square kilometer
suburban Toronto
Global Climate Change

[Map showing surface temperature anomaly (°C)].
Northern Mocking Bird: Toronto Christmas Bird Count
Awareness by vets?

Regression line showing linear increase in the proportion of positive tested dogs, Cochran-Armitage trend test

Genuine increase, not just “awareness”

Alton et al., 2009
Canine leptospirosis

- Typically acute renal failure
- Sometimes hepatitis
- Other, various
Brown, K. et al. CMAJ 2008;178:399-401
Human infections

• Anecdotally 6-8 infections acquired from dogs in Ontario and Quebec in last few years
• Have involved DVMs, AHTs, and owners
• Some very delayed diagnosis
Disease in humans

- “Biphase”: acute phase, immune phase
- Most mild or subclinical
- Recognized cases: acute onset fever, chills, severe headache, myalgia, abdominal pain, conjunctival suffusion
Disease in humans

- Aseptic meningitis $\leq 25\%$
- Severe: generally similar to dogs, more emphasis on endotoxic, vascular damage effect
- Chronic: uveitis, persistent headaches, chronic hepatitis
Current state of canine leptospirosis?

- Appears to be leveling off or declining
- Effect of vaccination with “new” serovars?
- Work to be done on seroprevalence, shedding by dogs, vectors, human exposure, public education
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