



NEW YORK CITY DEPARTMENT OF  
HEALTH AND MENTAL HYGIENE  
Thomas Farley, MD, MPH  
Commissioner

## 2011 Veterinary Alert # 2

### Summary of Canine Leptospirosis Surveillance in New York City, 2009-2010

- In 2009 and 2010, 30 cases of canine leptospirosis were identified in NYC.
- The most common infecting serovars were *L. icterohaemorrhagiae*, *L. bratislava*, and *L. grippityphosa*.
- Risk factors for infection included seeing rodents, raccoons or other wildlife in the environment and exposure to puddles of water.
- Leptospirosis transmission from dogs to humans is rare and has not been reported in NYC.

*Please share with your colleagues in Veterinary Medicine and your staff*

April 28, 2011

The New York City (NYC) Department of Health and Mental Hygiene (DOHMH) conducts active laboratory and passive veterinary surveillance for canine leptospirosis as a complement to human leptospirosis surveillance, and to help identify clusters or outbreaks of disease. Although leptospirosis in animals has been reportable since 2004, it is not routinely reported by veterinarians. To enhance surveillance, in June 2006 the DOHMH began collecting all leptospirosis reports from one major veterinary diagnostic laboratory serving NYC veterinary practices. Surveillance summaries from 2006-2008 were included in previous issues of the Zoonotic and Vectorborne Public Health Newsletter (June 2009, Sept. 2008, June 2007), and are available at <http://www.nyc.gov/html/doh/html/zoo/zoo-pub.shtml>. The following is a summary of our most recent surveillance findings from 2009-2010.

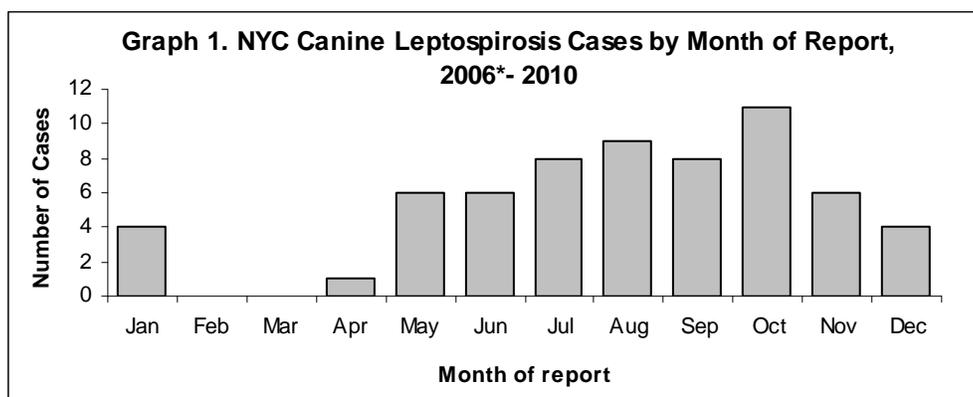
Laboratory reports with antibody titers  $\geq 1:800$  to any of the 7 *Leptospira* serovars on the test panel and all reports from veterinarians are investigated. The 1:800 titer cut-off for laboratory reports is used to help better identify true acute infections. The NYC DOHMH canine leptospirosis case definition was developed for surveillance purposes only and is not intended to be used to guide clinical management. A confirmed case is defined as having a clinically compatible presentation along with a fourfold change between acute and convalescent *Leptospira* titers, taken approximately 2 weeks apart, whereas a probable case has a single elevated titer. Clinical information is obtained from the veterinarian, and exposure information from the dog owner or veterinarian through telephone interviews.

#### Surveillance Results

In 2009-2010, a total of 45 reports were investigated: most (n=37, 82%) were received from the lab, including 6 that were also reported by a veterinarian. Seven reports originated from a veterinarian, and one was identified by the owner of another case during investigation. Thirty dogs met the case definition (7 confirmed and 23 probable). The 15 remaining reports were not classified as cases due to recent vaccination (n=6), other illness (n=2), incompatible lab results (n=6), or residence outside NYC (n=1). The majority of the 30 cases occurred in dogs residing in Manhattan (n=11) and Brooklyn (n=7) (see Table 1). As in previous years, there was a seasonal pattern, with most cases reported between May and November. In 2009-2010 cases peaked in October-November (see Graph 1).

**TABLE 1. NYC Canine Leptospirosis Cases by Borough and Year, 2006\*-2010**

	2006	2007	2008	2009	2010	Total
<b>Bronx</b>	2	2	0	0	2	6
<b>Brooklyn</b>	2	4	6	4	3	18
<b>Manhattan</b>	4	6	2	5	6	23
<b>Queens</b>	1	3	0	4	1	10
<b>Staten Island</b>	0	1	0	4	1	6
<b>Total</b>	9	16	8	17	13	63



\*Reporting began June 2006

The majority of leptospirosis cases were hospitalized (n=24, 80%) and 7 (23%) dogs died or were euthanized. The most commonly reported signs and symptoms were anorexia (73%), vomiting (70%), icterus (40%), lethargy (33%), polyuria/polydipsia (27%), and diarrhea (17%) and the most common complications were renal failure (50%) and liver failure (23%).

### Exposure History

A standardized questionnaire was used to assess risk factors for exposure to potential sources of leptospirosis in the 4 - 12 day incubation period prior to illness onset, including travel outside NYC, exposure to water sources, and presence of *Leptospira* reservoir animal host species in the dog's environment. Travel outside NYC was considered a separate risk category since it cannot be definitively determined where the infection was acquired. Twenty (67%) dog owners were successfully interviewed, and the veterinarian was interviewed for the remaining 10 cases whose owners could not be contacted.

The majority of cases (n=23, 77%) did not travel and acquired their infection in NYC. Among the 7 cases that traveled, 5 went to Long Island and 2 to upstate NY. Three of the 7 cases that traveled had also spent considerable time in NYC so a locally acquired infection could not be ruled out. The remainder of the analysis focuses on the 23 non-travel cases known to have acquired their infection in NYC.

Exposure to environments potentially contaminated by animals that can harbor leptospires was the likely source of infection in over half of the NYC leptospirosis cases. Twelve (52%) dog owners observed rodents, raccoons, opossums, or other small mammals associated with *Leptospira* carriage near the home and/or where the dog was walked (see Table 2). No direct contact with wild animals was reported. Exposure to water, particularly puddles after extended rainy periods, was reported in 2 (9%) cases, and 5 (22%) cases had exposures to both animals and water. Exposure source could not be determined for 2 cases whose owners were not interviewed or for 2 stray dogs. Among the 17 cases associated with animal exposures, rodents (n=10, 59%) and raccoons (n=5, 29%) were the most commonly reported. Two cases had contact with dogs with similar symptoms: one was a probable leptospirosis case from the same household, and the other a

suspect case that tested negative. No clusters or outbreaks of leptospirosis were detected, although the 2 cases from the same household both had elevated titers to *L. grippityphosa* and were walked in their neighborhood in Staten Island and Clove Lakes Park.

**Table 2. NYC Leptospirosis Cases by Potential Exposure Source, 2009-2010**

Exposure Source	2009	2010	Total
Animal	7	5	12
Animal and Water	4	1	5
Water	2	0	2
Unknown	2	2	4
<b>Total</b>	<b>15</b>	<b>8</b>	<b>23</b>

### Leptospira Serovars

*Leptospira* serovars can help identify the animal reservoir host(s) responsible for infection and define the ecology of leptospirosis in NYC. Most cases had elevated titers to more than one serovar since cross-reactivity is common on the microscopic agglutination test (MAT), which is specific to the serogroup but not the serovar. Among cases for which a single serovar had the highest titer, the most common were *L. grippityphosa* (n=10, 44%), *L. icterohaemorrhagiae* (n=5, 22%), and *L. bratislava* (n=4, 17%).

To better assess whether exposures were consistent with the infecting serovar, the serovar(s) with the highest titer in any given dog was used to classify cases into 3 groups. Group 1 contained dogs with *L. icterohaemorrhagiae* and/or *L. bratislava*, as both serovars are associated with rodents. Group 2 consisted of dogs with *L. grippityphosa*, a serovar associated with raccoons, opossums and other small mammal hosts, and Group 3 included dogs with matching elevated titers to both *L. icterohaemorrhagiae*/*L. bratislava* and *L. grippityphosa*. One case infected with *L. autumnalis* was excluded from the serovar analysis.

Most leptospirosis cases had reported exposures to the animal species associated with the infecting serovar: 73% of the dogs in Group 1 were exposed to rodents, and 50% of the dogs in Group 2 were exposed to raccoons or other wildlife, including opossums, squirrels, and skunks (see Table 3). Exposure to an animal was defined as observation of the animal in the living and/or recreational areas of the dog during the incubation period. Comparison of Serovar Groups 1 and 2 vs. rodent and raccoon exposure supported a statistically significant association between serovar group and animal exposure (p=0.03,  $\alpha=0.05$ , Fisher's exact test).

**Table 3. Serovar Group and Exposures of NYC Canine Leptospirosis Cases, 2009-2010**

Serovar Group (Serovar(s) with highest titer)	Exposure				Total
	Rodents	Raccoons or other wildlife*	Water only	Unknown	
<b>Group 1</b> <i>L. icterohaemorrhagiae</i> and/or <i>L. bratislava</i> (Rodents)	8**	1	1	1	11
<b>Group 2</b> <i>L. grippityphosa</i> (Raccoons or other wildlife*)	2**	5***	0	3	10
<b>Group 3</b> Both	0	1*	0	0	1
<b>Total</b>	<b>10</b>	<b>7</b>	<b>1</b>	<b>4</b>	<b>22</b>

\*Other wildlife includes opossums, skunks, and squirrels

\*\*1 case also had water exposure; \*\*\*2 cases also had water exposure

### Conclusions

Surveillance for canine leptospirosis is limited in that reports are collected from only a single lab, and asymptomatic cases are not captured. Based on our findings, leptospirosis appears to be rare in NYC dogs.

*Leptospira* bacteria die within minutes of exposure to dry environments. As such, outbreaks of leptospirosis tend to occur only in warm, moist environments. The cold winters of NYC likely limit the extent to which leptospires can survive in the environment, suggesting that most cases of leptospirosis are due to contact with an area or water source recently contaminated by an animal that is actively shedding leptospires. Infection most commonly occurs through contact with open wounds or mucous membranes with water, moist soil or vegetation contaminated by the urine of infected animals. Swallowing contaminated water, direct contact with urine or tissues of infected animals, or inhalation of aerosolized contaminated fluids are other possible routes of transmission.

### **Human Leptospirosis Surveillance**

Human leptospirosis is rarely diagnosed in NYC, with 0-3 cases reported annually. Three cases were reported in both 2009 and in 2010. *L. icterohaemorrhagiae* is most commonly identified as the infecting serovar among human cases, and often patients report having seen rodents. Although infected dogs theoretically pose a risk of transmission to people through contact with their urine, such direct transmission has been infrequently documented in the literature, and based on the past 10 years of surveillance, infected dogs have not been identified as a source of human infection in NYC.

### **Prevention**

If you are treating an animal you suspect may have leptospirosis, limit the number of staff members who have direct contact with the animal, its urine or its bedding. Post infection control signs for staff, remind owners to use appropriate caution when handling the dog's urine, and wash hands whenever there is any question of urine contact. Use protective equipment or clothing, such as gloves and face shields, and minimize contact with urine, blood and contaminated materials to help prevent transmission. Contaminated porous and non-porous surfaces should be cleaned with routine disinfectants, soaps, or other household cleaning products. The *Leptospira* bacterium is susceptible to even low concentrations of these products.

### **Reportable Animal Diseases**

As a reminder, in addition to leptospirosis, the following diseases are reportable to DOHMH. Please use the Animal Disease Reporting Form, available at <http://www.nyc.gov/html/doh/html/zoo/zoo-reporting.shtml>.

Upon laboratory diagnosis: psittacosis, Rocky Mountain spotted fever, salmonellosis, tuberculosis, arboviral encephalitides

Upon suspicion: anthrax, brucellosis, rabies, tularemia, Q fever, glanders, monkeypox, plague, SARS (severe acute respiratory syndrome), novel influenza (with pandemic potential)

Contact: Bureau of Communicable Disease      Phone: 212-788-9830, 347-396-2600      Fax: 212-788-4268

As always, we appreciate your partnership and cooperation.

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