



2014 Veterinary Advisory #6

Summary of Canine Leptospirosis Surveillance in New York City, 2011-2013

- On average, 21 canine leptospirosis cases per year were identified in 2011-2013.
- 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.

December 11, 2014

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.

This advisory summarizes the most recent surveillance findings from 2011-2013. Summaries for 2006-2008 are available in the spring 2007, fall 2008, and spring 2009 issues of the Zoonotic and Vectorborne Public Health Newsletter: <http://www.nyc.gov/html/doh/html/diseases/zoo-pub.shtml#3>, and for 2009-2010 in the 2011 Veterinary Alert #2: <http://www.nyc.gov/html/doh/downloads/pdf/zoo/11vet02.pdf>.

Surveillance Results

Reports from veterinarians and positive laboratory reports of *Leptospira* are investigated by interviewing the veterinarian for clinical information, and dog owner for exposure information. Per the NYC canine leptospirosis case definition, developed for surveillance purposes only, a confirmed case has a clinically compatible presentation with a fourfold change between acute and convalescent titers, taken approximately 2 weeks apart, whereas a probable case has a single elevated titer.

In 2011-2013, 79 reports were investigated: most (n=63, 80%) were received from the laboratory. Veterinarians submitted 22 reports (28%), including 7 also reported by the laboratory, and one was identified by the owner of another case during investigation. Sixty-two dogs met the case definition (16 confirmed, 46 probable). The 17 remaining reports were not classified as cases due to recent vaccination (n=3), other illness (n=3), incompatible lab results (n=4), no symptoms (n=3), or residence outside NYC (n=4).

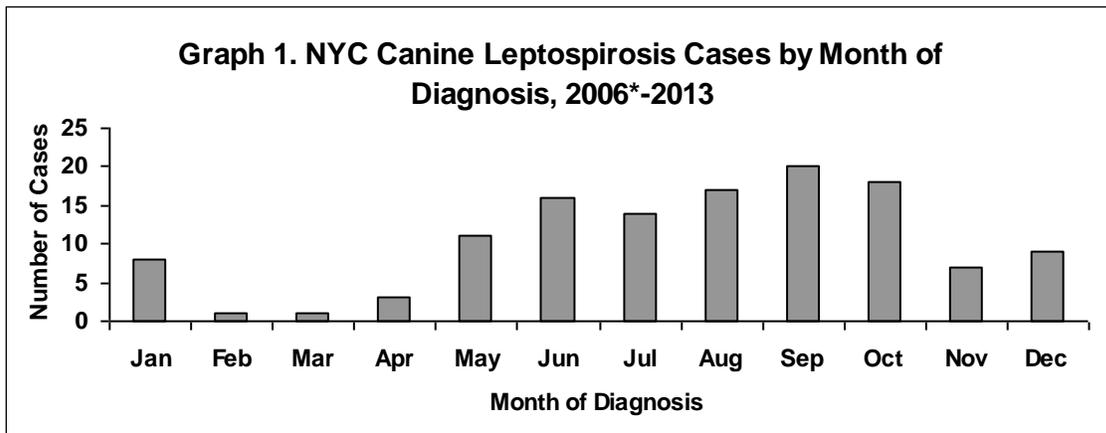
The majority of the 62 cases occurred in dogs living in Manhattan (n=29, 47%) and Brooklyn (n=17, 27%) (Table 1). There was an expected seasonal pattern, with most cases diagnosed between May and October (Graph 1). However, in 2011, cases peaked in December, possibly due to the mild winter. In 2012, 50% more cases were reported than the average of all previous years, half of which were diagnosed in August-September. Case characteristics included 61% male, 60% neutered or spayed, and 41% small-breed dogs (<20 lbs.). The most

commonly reported breeds were pit bulls (n=6, 10%), Chihuahuas (n=4, 7%), American Staffordshire terriers (n=3, 5%), and Shih Tzus (n=3, 5%). The median age of cases was 3 years, ranging from 3 months to 13 years.

Most leptospirosis cases were hospitalized (n=52, 84%): the average hospital stay for dogs treated and released was 7.1 days (range 1-21 days). Eleven dogs (18%) died or were euthanized: the average length of hospitalization for fatal cases was 2.6 days (range 1-7 days). The most commonly reported symptoms were vomiting (76%), anorexia (66%), icterus (44%), lethargy (48%), diarrhea (29%), and polyuria/polydipsia (24%). Renal (79%) and liver (63%) failure were the most common complications.

Table 1. NYC Canine Leptospirosis Cases by Borough of Residence and Year, 2006*-2013

	2006	2007	2008	2009	2010	2011	2012	2013	Total
Bronx	2	2	0	0	2	2	2	2	12
Brooklyn	2	4	6	4	3	8	5	4	36
Manhattan	4	6	2	5	6	8	13	9	53
Queens	1	3	0	4	1	0	4	1	14
Staten Island	0	1	0	4	1	0	3	1	10
Total	9	16	8	17	13	18	27	17	125



*Reporting began June 2006

Exposures

Forty-nine (79%) dog owners were interviewed about their pet’s exposure to potential sources of leptospirosis in the 4-12 day incubation period prior to illness onset, including travel outside NYC, water sources, and *Leptospira* reservoir animal host species in the dog’s environment. The veterinarian provided partial exposure information for 5 cases (8%) whose owners could not be reached.

Among 54 dogs with a known travel history, the majority (n=43, 80%) did not travel and acquired their infection in NYC. Eight cases traveled outside NYC (to NY state [n=4], NJ, CT, and PA [n=1 each, 1 unknown]), and were classified as travel-associated since the location of infection could not be definitively determined. The remainder of the analysis focuses on the 43 cases that acquired their infections in NYC.

Most (n=35, 81%) of the leptospirosis cases acquired in NYC were exposed to environments potentially contaminated by animals that can harbor leptospire. Dog owners observed rats and/or mice (n=28, 65%), raccoons (n=7, 16%), opossums (n=4, 9%), and a skunk (2%) either at home or where their dog was walked (4 cases exposed to >1 animal type). Four of these cases had direct contact with rats. Exposure to standing water, mostly puddles after rain, was reported in 2 cases, and 13 cases were exposed to both animals and water (Table 2). Among the 6 cases with no identified exposures to water or animal reservoir hosts, one

reported a sick dog on the same apartment building floor, but this was not considered the likely source of leptospirosis infection. No clusters or outbreaks of leptospirosis were detected (see map).

Table 2. Locally Acquired NYC Canine Leptospirosis Cases by Exposure Source, 2011-2013

Exposure Source	2011	2012	2013	Total
Animal	8	9	5	22
Animal and Water	4	5	4	13
Water	1	0	1	2
Unknown	1	5	0	6
Total	14	19	10	43

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. bratislava* (n=9, 32%), *L. grippityphosa* (n=8, 29%), and *L. icterohaemorrhagiae* (n=5, 18%).

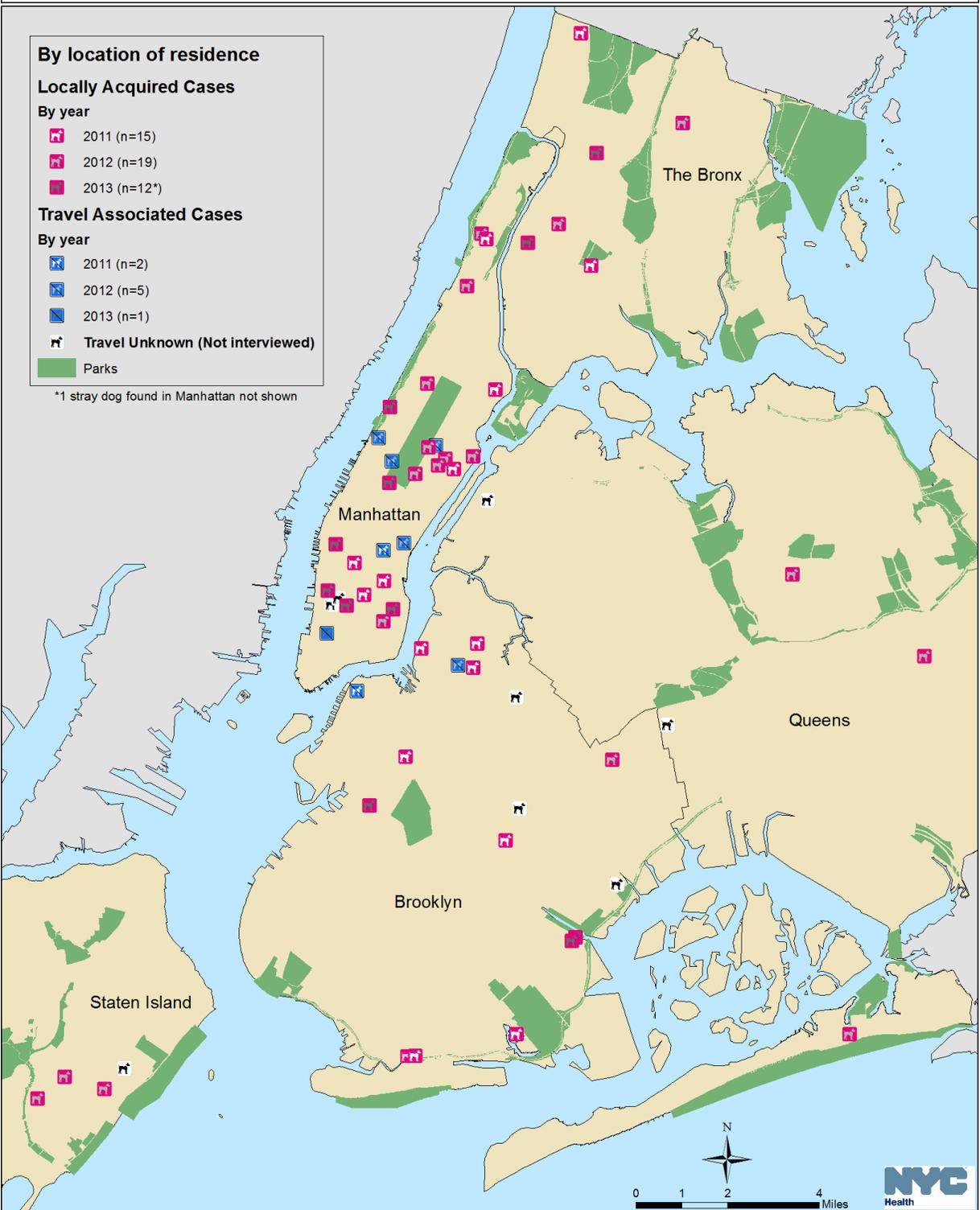
The majority of NYC-acquired leptospirosis cases had the highest titers to *L. icterohaemorrhagiae* and/or *L. bratislava* (n=23, 54%); both serovars are associated with rodents (Table 3). Less than half of the remaining cases (n=10, 23%) were infected with *L. grippityphosa*, which is associated with raccoons, skunks, and opossums. To better assess whether animal exposures were consistent with the infecting serovar, the serovar(s) with the highest titer or highest change in titers was used to classify cases into a serovar group based on the primary animal host(s) (Table 3). Two cases diagnosed by PCR were excluded. Most cases were exposed to the animal species associated with the primary serovar: 91% of the dogs in Group 1 were exposed to rodents, and 60% of the dogs in Group 2 were exposed to raccoons or other wildlife.

Table 3. Serovar Group and Exposures of Locally Acquired NYC Canine Leptospirosis Cases, 2011-2013

Serovar Group (Serovar(s) with highest titer)	Exposure				Total
	Rodents	Raccoons or other wildlife	Rodents and raccoons/other wildlife	No animal exposures	
Group 1 <i>L. icterohaemorrhagiae</i> and/or <i>L. bratislava</i> (Rodents)	20	0	1	2	23
Group 2 <i>L. grippityphosa</i> (Raccoons, skunks, opossums)	0	3	3	4	10
Group 3 <i>L. icterohaemorrhagiae</i> and/or <i>L. bratislava</i> and <i>L. grippityphosa</i>	1	1	0	0	2
Group 4 Other (4 <i>L. pomona</i> , 1 <i>L. autumnalis</i> , 1 <i>L. canicola</i>)	3	1	0	2	6
Total	24	5	4	8	41*

*Two cases diagnosed by PCR excluded from serovar analysis

New York City Canine Leptospirosis Cases, 2011-2013



Conclusions

Surveillance for canine leptospirosis is limited, in that reports are collected only from one lab, and asymptomatic cases are not captured. However, based on our findings, leptospirosis appears to be uncommon in NYC dogs. *Leptospira* bacteria die within minutes of exposure to dry environments, and outbreaks of leptospirosis tend to occur only in warm, moist environments. The cold winters of NYC likely limit the extent

to which leptospire 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 leptospire. 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. Other possible routes of transmission include swallowing contaminated water, direct contact with urine or tissues of infected animals, or inhalation of aerosolized contaminated fluids.

Human Leptospirosis Surveillance

Human leptospirosis is rarely diagnosed in NYC, with only 2-3 cases reported annually. During the three years described in this report, 3 cases were reported in 2011, 2 cases in 2012, and 3 in 2013. The serotype was available for 5 cases, all of which were positive for *L. icterohaemorrhagiae*; rodent exposures were identified for 3 of these cases, as is commonly seen among human cases. 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 data, 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, vomit, or blood, and wash hands whenever there is any question of contact with these fluids. Use protective equipment or clothing, such as gloves and face shields, and minimize contact with urine, vomit, 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.

Leptospirosis fact sheets are available on the NYC DOHMH website for veterinarians and dog owners:

http://www.nyc.gov/html/doh/downloads/pdf/zoo/lepto_providers.pdf

http://www.nyc.gov/html/doh/downloads/pdf/zoo/lepto_owners.pdf

Reportable Animal Diseases

As a reminder, the following diseases are reportable to DOHMH. Please use the Animal Disease Reporting Form, available at <http://www.nyc.gov/html/doh/downloads/pdf/zoo/zoo-disease-report-form.pdf>.

Upon laboratory diagnosis: leptospirosis, 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: 347-396-2600 Fax: 347-396-2753

As always, we appreciate your partnership and cooperation.

Sincerely,

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