NEW YORK CITY DEPARTMENT OF
HEALTH AND MENTAL HYGIENE
Ashwin Vasan, MD, PhD
Commissioner

2022 Veterinary Advisory #11

Summary of Canine Leptospirosis Surveillance in New York City, 2017-2021

- **An average of 24 canine leptospirosis cases per year were identified for 2017-2021; this was an increase from the previous 5-year span where the average was 17 cases per year.**
- **A total of 121 dogs were identified during this time period; most were hospitalized (n=94, 78%) and 43 (36%) died or were euthanized.**
- **Rats are the most common source of leptospirosis in dogs and people in NYC.**
- **Risk factors for infection include rodents in the environment and exposure to puddles of water.**
- **Leptospirosis transmission from dogs to humans is rare and has not been reported in NYC.**
- **Report dogs or other animals diagnosed with leptospirosis to the New York City (NYC) Department of Health and Mental Hygiene (Health Department).**
- **Client handouts are available in 13 languages and can be found on the NYC Health Department Leptospirosis webpage; or call 311 to order copies.**

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

December 2, 2022

Dear colleagues,

This advisory summarizes the most recent surveillance findings for 2017-2021. See our 2017 Veterinary Advisory #2 for the 2014-2016 summary. Leptospirosis is a zoonotic, multi-organ disease that affects humans, dogs, and other mammals. Leptospirosis is rarely seen in cats. It is caused by leptospires, spirochete bacteria that are shed in the urine of infected animals. There are multiple serovars of the bacteria, many of which have adapted to different animal reservoir or maintenance hosts, such as rats, raccoons, and cattle. In New York City (NYC), rats are the main source of canine and human infection.

Leptospira bacteria are usually transmitted through direct or indirect contact with infected urine. Leptospires shed by infected animals can contaminate and survive in fresh water and warm muddy or wet soil environments. The bacteria enter the body through a mucosal surface or an abrasion or cut on the skin following exposure to infected urine or contaminated water or soil. Generally, dogs and other animals that develop acute illness with leptospirosis are incidental hosts. Transmission from incidental hosts to humans or animals is rare.

The NYC Department of Health and Mental Hygiene (Health Department) conducts canine leptospirosis surveillance as a complement to human leptospirosis surveillance, and to help identify clusters and outbreaks of disease. The Health Department investigates reports submitted by veterinarians and positive laboratory reports from one commercial veterinary diagnostic laboratory.

Surveillance Results

Laboratory reports of *Leptospira* titers ≥ 1:800 by microscopic agglutination test (MAT) or positive polymerase chain reaction (PCR) and all reports (regardless of titers) from veterinarians are investigated by interviewing the veterinarian and dog owner. The Health Department canine leptospirosis case definition was developed for surveillance purposes only:

- Confirmed Case: Clinically compatible presentation and positive PCR or 4-fold change between acute and convalescent titers, taken approximately 2 weeks apart
- Probable Case: Clinically compatible presentation and single elevated titer or positive antibody test

During 2017-2021, 143 reports were received from the laboratory (n=118, 83%) or veterinarian (n=30, 21%), including 5 reported from both (4%). A total of 121 dogs met the case definition (61 confirmed, 60 probable). Among the remaining 22 reports, 1 investigation was incomplete and 21 were not classified as a case due to recent leptospirosis vaccination, incompatible symptoms, or residence outside NYC.

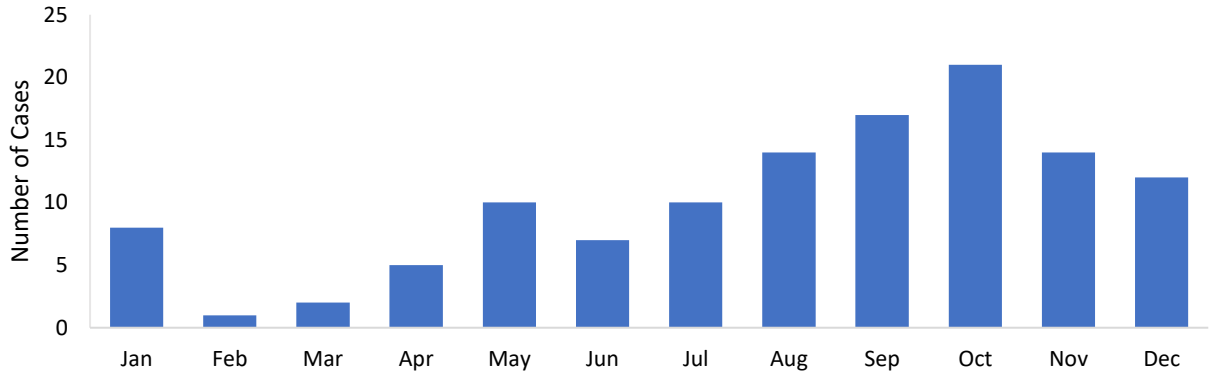
Most cases were dogs from Brooklyn (n=49, 41%), followed by Queens (n=28, 23%), and Manhattan (n=27, 22%) (Table 1). The median age was 5 years (range 10 weeks to 15 years) and the majority were male (61%) and neutered or spayed (69%). There was a general seasonal pattern, with most cases diagnosed between May and December (Graph 1).

Most leptospirosis cases were hospitalized (n=94, 78%). Among 83 dogs with hospitalization dates available, the average hospital stay for dogs that survived was 4.5 days (range 1-11 days). Forty-three dogs (36%) died or were euthanized; the average length of hospitalization for fatal cases was 2.5 days (range 0-16 days), although not all dogs that died were hospitalized. Commonly reported signs of illness were anorexia (n=90, 74%), vomiting (n=82, 68%), lethargy (n=76, 63%), and icterus (n=59, 49%). Renal failure (n=98, 81%) and liver failure (n=86, 71%) were the most common complications.

Table 1. New York City Canine Leptospirosis Cases by Borough, 2017-2021

	2017	2018	2019	2020	2021	Total
Bronx	0	1	0	1	1	3
Brooklyn	14	11	10	8	6	49
Manhattan	4	6	5	6	6	27
Queens	2	5	10	7	4	28
Staten Island	3	8	0	0	1	12
NYC, Borough Unknown	1	1	0	0	0	2
Total	24	32	25	22	18	121

Graph 1. NYC Canine Leptospirosis Cases by Month of Diagnosis, 2017 - 2021



Exposures

Interviews with dog owners to ascertain exposures and risk factors for leptospirosis in the 4-12 days preceding illness onset were completed for 97 cases (80%). Partial exposure information was provided by the veterinarian for 1 case. Ninety-four dogs were definitely (n=85) or likely (n=9) exposed in NYC. Exposure analysis excluded 1 dog likely exposed in upstate New York and 3 cases where the likely exposure location could not be determined.

Among 94 dogs infected in NYC, owners reported seeing rodents (n=55, 59%), primarily rats, or other mammals (n=32, 34%) known to harbor leptospires in areas where the dog spent time (Table 2); 10 dogs had direct contact with a rat and 3 with a raccoon. Ten dogs (11%) were exposed solely to standing water and 31 to both animals and water (33%). The likely exposure location, based on where dogs were exposed or walked (if no reported exposures), was most often the home neighborhood (n=66, 70%), followed by a park (n=9, 10%), or could not be determined because the dog was exposed in both the neighborhood and a park or other location (n=18, 19%). In 2018, two dogs in the same household were diagnosed with leptospirosis 1 month apart from each other.

In January 2022, multiple media outlets reported a cluster of cases in the Williamsburg neighborhood of Brooklyn, however an exhaustive investigation by the Health Department identified a single case of canine leptospirosis and no evidence of any additional cases. A joint inspection of McCarren Park by the Health Department and NYC Department of Parks and Recreation found no increase in rat activity, however several rodent mitigation measures were implemented in and around the dog run.

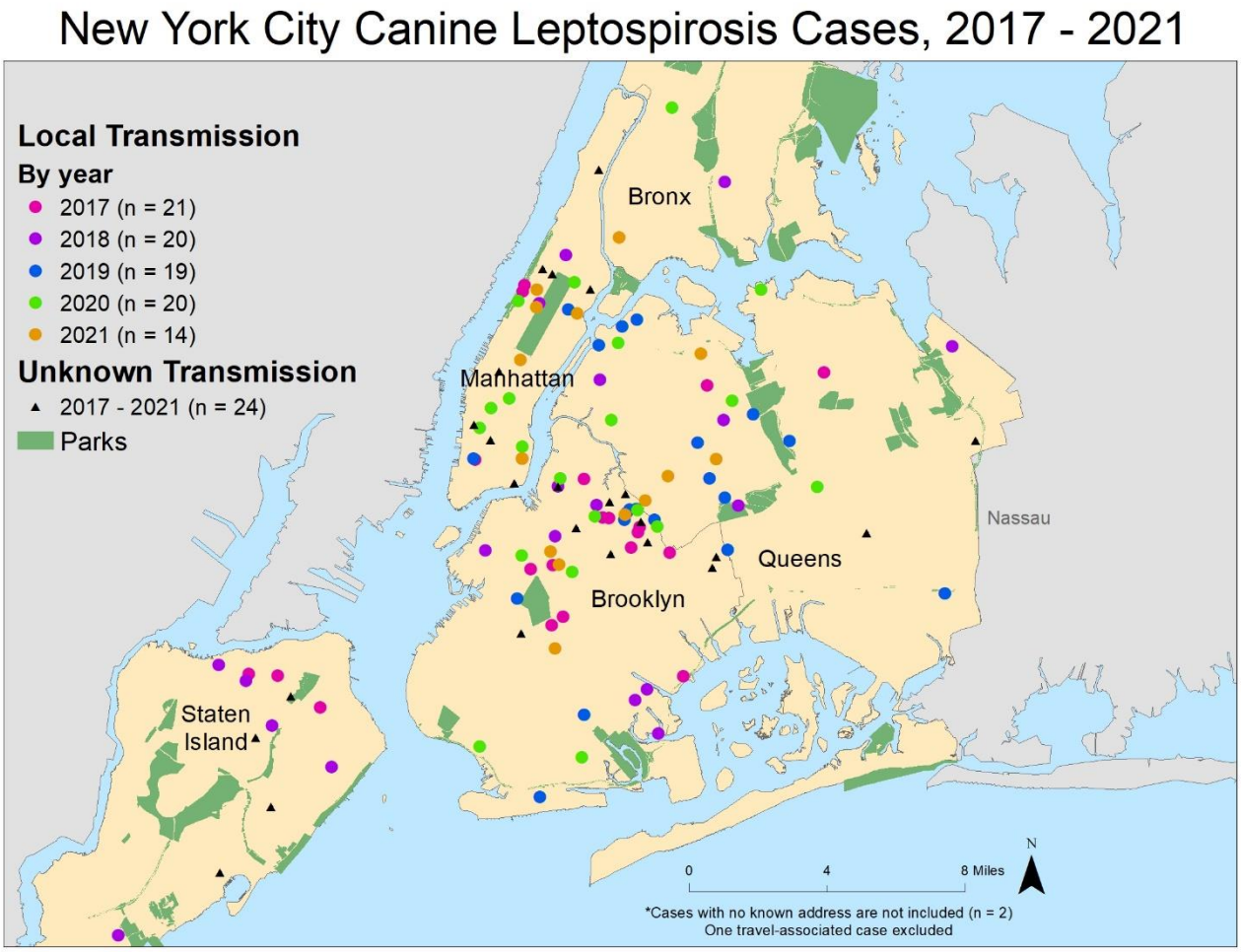
Table 2. Exposures* of New York City Locally Acquired Canine Leptospirosis Cases

Exposure	2017	2018	2019	2020	2021	Total
Rodent	14	10	9	14	8	55
Raccoon/Opossum/Skunk	7	10	8	3	1	29
Other Animal (Deer/Squirrel)	1	2	0	0	0	3
Dog	0	1	0	0	0	1
Standing water	13	9	5	6	8	41
No reported exposures	1	1	3	2	0	7

*11 exposed to >1 animal exposure group; 31 exposed to animal(s) and water

***Leptospira* Serovars**

Leptospira serovars can help identify the animal reservoir host(s) responsible for infection; however, cross-reactivity is common on the microscopic agglutination test (MAT), which is specific to the serogroup and not the serovar. Of the 94 cases that acquired their infections in NYC, only 53 (56%) had MAT performed. For most of these, the serovars with the highest titer or change in titers was *L. icterohaemorrhagiae* and/or *L. bratislava* (n=37, 70%), both of which are associated with rats; 25 of the dogs (68%) were in areas where rats were observed. Thirteen cases (25%) had the highest titer or change in titers to *L. grippotyphosa*, which is associated with raccoons, opossums, and skunks; 8 dogs (62%) were in areas with those animals.



Human Leptospirosis Surveillance

The number of people diagnosed each year with leptospirosis in NYC is small but has been increasing. From 2017-2021, the median number of cases per year doubled to 6 compared to 3 cases per year from 2012-2016. A similar increase in canine cases was not seen. Among the 42 cases of human leptospirosis from 2017 through2021 (Table 3), 5 were associated with travel to countries with tropical climates. Of 37 locally acquired infections, most are believed to be associated with rats. Serotype data available for 20 cases revealed the highest titers were for *L. icterohaemorrhagiae.*

Table 3. Human Leptospirosis Cases, 2017-2021

2017	2018	2019	2020	2021	Total
5	9	6	5	17	42

Conclusions about surveillance results

Both canine and human surveillance findings show that leptospirosis occurs in all boroughs of NYC and most infections are associated with rats. The average of 24 canine cases per year in 2017-2021 increased from an average of 17 cases in 2012-2016. This may be a true increase, or possibly attributable to an increase in the use of PCR as a diagnostic tool. PCR reports increased from 15 during 2012-2016 to 59 from 2017-2021. Although fewer MAT tests were received since 2017, the number and proportion of dogs with rodent-associated serovars was similar in both time periods. The percent of hospitalized and fatal canine cases in 2017-2021 was also similar to the previous 5-year period (2012-2016).

Surveillance for canine leptospirosis is limited in that reports are collected only from one lab, and otherwise relies on reports from veterinarians. However, based on our findings, leptospirosis appears to be uncommon in NYC dogs. *Leptospira* bacteria are fragile and can die within minutes in dry heat or freezing temperatures; 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 actively shedding leptospires.

Zoonotic risk of leptospirosis

Although infected dogs pose a risk to people through contact with the dog's urine, such direct transmission has been infrequently documented in the literature and, based on the past 16 years of surveillance data, infected dogs have not been identified as a source of human infection in NYC. Generally, dogs and other animals that develop acute illness with leptospirosis are incidental hosts. Transmission from incidental hosts to humans or animals is rare.

To prevent transmission, people should avoid direct, unprotected exposure to animal fluids and avoid waters that may be contaminated with animal urine. For more information on rat prevention and control, visit the NYC DOHMH Rats webpage (or visit nyc.gov/health and search "Rats").

Prevention and Control

Encourage dog owners to vaccinate their pet against leptospirosis. While leptospirosis vaccines do not protect against all strains of *Leptospira* bacteria, it can reduce the risk of infection.

Veterinarians and animal handlers are at increased risk of infection. To help prevent transmission if you are treating an animal with suspected leptospirosis:

- Isolate infected animals in areas separate from non-infected animals.
- Limit the number of staff members who have direct contact with the animal, its urine, or its bedding.
- Use personal protective equipment, such as gloves, masks, and face shields, and minimize contact with animal urine, vomit, blood, and contaminated materials.
- Post visible infection control signs for staff.

- Clean contaminated porous and non-porous surfaces with routine disinfectants or sanitizing agents.
- Remind owners to use caution when handling animal urine, vomit, or blood, and to wash their hands after doing so.

A leptospirosis fact sheet for veterinarians, and a separate fact sheet for dog owners (in 13 languages), are available on the Health Department's Leptospirosis webpage (or visit nyc.gov/health and search "Leptospirosis"); call 311 to order copies.

Veterinarians who report positive results of leptospirosis to the Health Department as required by the NYC Health Code improve our ability to investigate and address cases and exposures. Please report animal diseases using our secure web-based reporting platform, by phone at 347-396-2600, or fax an Animal Disease Case Report Form to 347-396-2753 to the Bureau of Communicable Disease. Visit the Health Department's Animal Disease Reporting webpage to learn more.

As always, we appreciate your continued collaboration with our efforts to monitor public health issues in New York City.

Sincerely,

Asha Abdool, MPH; Renee King, MPH; Kevin Lovingood, MPH; Ryan MacDonald, MPH; Marc Paladini MPH, Christina Ng, MPH; Sally Slavinski, DVM, MPH, DACVPM

Zoonotic and Vector-borne Disease
Bureau of Communicable Disease
ZIVDU@health.nyc.gov
347-396-2600

Visit our webpage for information and resources for veterinarians: Zoonotic and Vector-borne Diseases: Information for Providers

If you do not receive these alerts via email and would like to be added to the distribution list, please email zivdu@health.nyc.gov

Report animal diseases to the NYC Department of Health.

- Submit online through a secure web-based reporting platform
- Call 347-396-2600
- Fax the Animal Disease Case Report form to 347-396-2753

Report upon suspicion: Anthrax, brucellosis, glanders, influenza (novel with pandemic potential), monkeypox, plague, Q fever, rabies, SARS, tularemia
Report upon laboratory diagnosis: Arboviral encephalitides, leptospirosis, psittacosis, Rocky Mountain spotted fever, salmonellosis, tuberculosis
Report within 24 hours any outbreak or suspected outbreak of any disease, condition, or syndrome, of known or unknown etiology, which may pose a danger to public health.