



2023 Veterinary Advisory #11 2022 Summary of Canine Leptospirosis Surveillance in New York City (NYC)

- **20 cases of canine leptospirosis were reported for year 2022;**
 - **Brooklyn had the highest number of cases (6), followed by Manhattan (5).**
 - **Most cases were reported in June of 2022; historically, most cases are reported from August to October.**
- **Rats are the most common source of leptospirosis in dogs and people in NYC.**
- **Transmission of disease from dogs to humans has not been reported in NYC.**
- **Report animals with leptospirosis to the NYC Department of Health and Mental Hygiene (Health Department).**

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

December 20, 2023

Dear colleagues,

This advisory summarizes the 2022 surveillance findings for canine leptospirosis in NYC. See our previous [2022 Veterinary Advisory #11 Canine Leptospirosis Surveillance Summary 2017-2021](#).

The Health Department conducts canine leptospirosis surveillance as a complement to human leptospirosis surveillance and to identify clusters of disease. Animal disease reports submitted by veterinarians and positive laboratory results from a commercial veterinary diagnostic laboratory are investigated. Case definitions* created by the Health Department for surveillance purposes only are used to identify and count cases (see appendix).

Surveillance Results

In 2022, 28 canine leptospirosis reports were received from a laboratory (n=18; 64%) or a veterinarian (n=7; 25%), including 3 reported from both (11%). A total of 20 dogs met the case definition (6 confirmed; 14 probable). This is a slight increase from the previous year (2021; n=18) and the first increase following several years of declining cases (see Figure A1). Among the remaining 8 cases, 7 did not meet the case definition and 1 investigation was unresolved.

In January 2022, multiple media outlets reported a cluster of cases in the Williamsburg neighborhood of Brooklyn. A thorough investigation by the Health Department identified only a single case of canine leptospirosis linked with the neighborhood. A joint inspection of McCarren Park by the Health Department and Department of Parks and Recreation found minor rat activity; however, several rodent mitigation measures were implemented in and around the dog run.

Cases were reported year-round with most diagnosed in June (n=4; 20%). The majority of dogs were from Brooklyn (n=6; 30%) and Manhattan (n=5, 25%) (see Table A1). The median age was 6 years (range 14 weeks to 16 years), and most were male (n=13; 65%) and neutered/spayed (n=12; 60%). Most dogs had never received a *Leptospira* vaccine (n=12; 60%); five (25%) dogs were reported as ever receiving at least one vaccine, and the remaining three (15%) had unknown vaccine history.

At the time of investigation four dogs (20%) had died or were euthanized; three of these dogs had never been vaccinated, and the fourth dog had unknown vaccine history. Most dogs were hospitalized (n=15; 75%), and the average hospital stay for dogs that survived was 5.2 days (range 1 to 12 days).

Commonly reported signs of illness were anorexia and vomiting (n=14; 70%) followed by lethargy (n=10, 50%). Common clinical conditions were renal and liver failure (n=14; 70%) and icterus (n=6; 30%) (see Table A2).

Exposures

Exposures and risk factors for leptospirosis that occurred in the 4 to 12 days preceding illness onset were ascertained by interviewing dog owners. Sixteen (80%) owner interviews were completed, which found that 15 dogs were exposed in NYC (definitely n=14; likely n=1). One dog was likely exposed outside of New York.

Among 15 dogs exposed in NYC, 12 (80%) owners reported seeing rodents, primarily rats, and five (33%) reported other wild animals (raccoons, opossums, deer, squirrel, and cat) in areas where the dog spent time (see Table A3). Only one reported their dog having direct contact with a rat. Four dogs were exposed to both animals and standing waters (27%). The likely exposure location (based on where dogs were likely exposed to animals or standing water) were most often the home neighborhood (yard or within 0.5 miles of home; n=11, 73%) or a park (n=3, 20%). Two dogs in the same household were reported with leptospirosis within one week of each other.

***Leptospira* serovars**

Microagglutination testing (MAT) is performed by some veterinary diagnostic laboratories. MAT results include titers to several *Leptospira* serovars. Serovar titers may help discern which animal reservoir host(s) was the source of infection. While extensive cross-reactivity often limits interpretability on an individual basis, aggregating serovar results across cases can help identify the most common reservoirs. Since starting surveillance in 2006, most dogs had high serovar titers associated with rats (*Icterohaemorrhagiae* and *Bratislava*).

Looking at results for 109 dogs that acquired their infections in NYC from 2017 to 2022, 61 (56%) had at least one MAT performed (n=8 in 2022). The highest titers were seen with the serovars *Icterohaemorrhagiae* (n=32) and *Bratislava* (n=18). Eleven dogs had elevated titers to both. Most of these dogs (74%) had spent time in areas where rodents were observed. Fifteen dogs had titers highest for *Grippityphosa*, which is associated with meso-mammals (e.g., raccoons, opossums, and skunks); six (40%) of these dogs were in areas where meso-mammals were observed.

Human Leptospirosis Surveillance

A small number of people are diagnosed each year with leptospirosis and reported to the Health Department, but this number has been increasing, with 13 reported in 2022. Routine MAT testing of human specimens has revealed Icterohaemorrhagiae as the likely serovar for most human infections. This supports the epidemiologic investigations which find most cases had a risk factor which exposed them to an environment with a rat infestation.

Surveillance conclusions

Canine leptospirosis surveillance is limited by the ability of dog owners to pursue veterinary care and is driven by veterinary reporting. Despite the limitations, canine surveillance findings, similar to human surveillance, continues to show that leptospirosis occurs in all boroughs of NYC and that most infections are associated with rats. While the 20 cases in 2022 is lower than the 32 cases reported in 2018, it is the first increase in cases since that year.

Leptospira bacteria are fragile and can die within minutes of exposure to dry heat or freezing temperatures; increased case numbers of leptospirosis tend to occur in warm, moist conditions. The cold winters of NYC likely limit the extent to which *Leptospira* can survive in the environment, suggesting that most cases of leptospirosis during this time are due to contact with an area or water source recently contaminated by an animal actively shedding the bacteria. Excessive rain and unseasonably warm temperatures due to climate change is expected to support the persistence of leptospires in the NYC environment which may lead to an increase in cases in the future.

Zoonotic risk of leptospirosis

Generally, dogs in NYC with acute leptospirosis are found to be infected with serovars other than Canicola (a serovar where dogs are thought to be the reservoir host) and deemed incidental hosts. Transmission of leptospires from incidental hosts to humans or other animals is rare. Direct transmission of leptospirosis from dogs to humans has been infrequently documented in literature, and during 17 years of surveillance in NYC, dogs have not been identified as a source of human infection. Canicola has only been detected on a few occasions and is not thought to be common in NYC.

Prevention and control

Rats are the most common source of leptospirosis in NYC. The best way to prevent leptospirosis is to avoid contact with rats and places where rats may have urinated. If you cannot avoid these areas, or if you are cleaning areas where rats have been, wear rubber gloves, especially if you have cuts or sores on your hands or arms and wash your hands with soap and warm water afterwards. Find more information in the [Lower Your Risk of Leptospirosis](#) document.

For more information about rats in NYC, visit the [NYC DOHMH Rats](#) webpage (or visit nyc.gov/health and search "Rats").

Encourage dog owners to vaccinate their pet against leptospirosis. While leptospirosis vaccines do not protect against all serovars 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.

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; Stephanea Roeser, 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, email zivdu@health.nyc.gov

Report animal diseases to the NYC Department of Health and Mental Hygiene:

- 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), mpox, 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.

Appendix

*Laboratory reports of *Leptospira* titers $\geq 1:800$ by microscopic agglutination test (MAT), positive polymerase chain reaction (PCR), positive enzyme-linked immunosorbent assay (ELISA), and all reports from veterinarians (regardless of titers) are investigated by interviewing the veterinarian and dog owner. The Health Department canine leptospirosis case definition includes:

- **Confirmed Case:** Clinically compatible presentation and positive urine or blood PCR or fourfold change between acute and convalescent titers, taken approximately 2 weeks apart.
- **Probable Case:** Clinically compatible presentation and single elevated agglutination titer or positive antibody test (ELISA).

Figure A1.

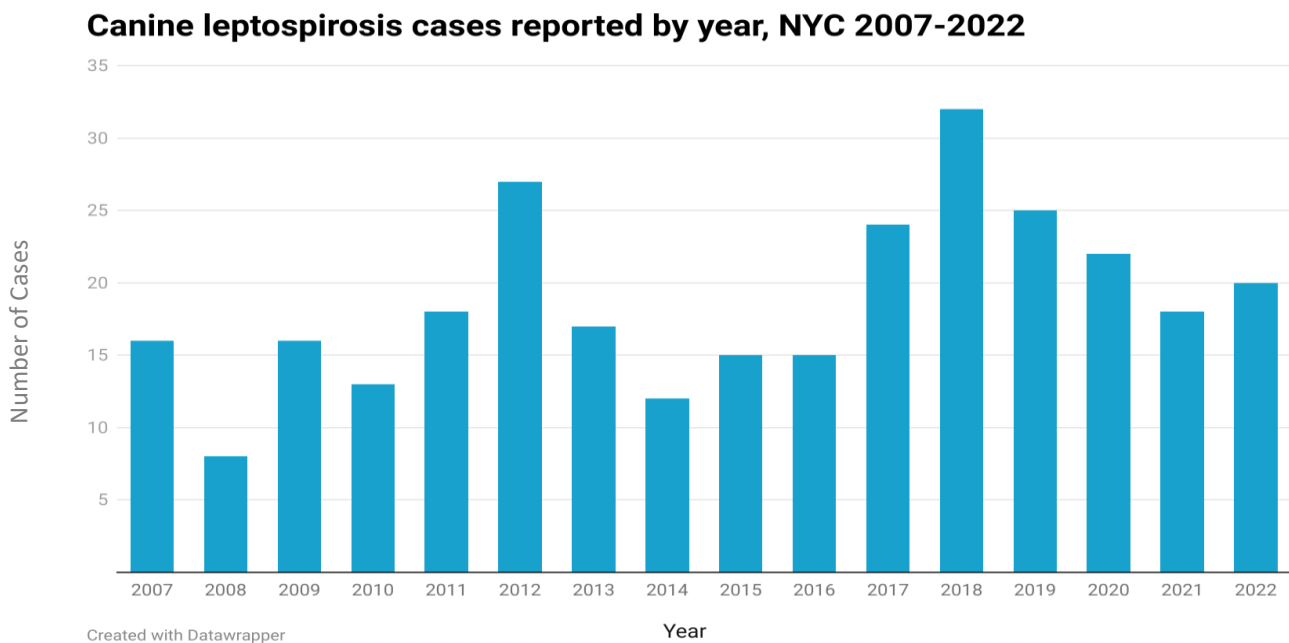


Table A1. Summary of surveillance findings

2022 Canine Leptospirosis Cases (N=20) (6 Confirmed and 14 Probable)	
Borough	
Bronx	2 (10%)
Brooklyn	6 (30%)
Manhattan	5 (25%)
Queens	4 (20%)
Staten Island	3 (15%)
History of vaccination	
Yes	5 (25%)
No	12 (60%)
Unknown	3 (15%)
Hospitalized at least 1 night	
Yes	15 (75%)
No	5 (25%)
Mean length of hospital stay among survivors (n=15):	
Time	5.2 days
Final Disposition	
Alive	16 (80%)
Dead	4 (20%)

Table A2. Summary of affected organs and clinical presentations

Organ system	Percent (N=20)	Clinical presentation	Percent (N=20)
Renal disease	70%	Vomiting	70%
Hepatic disease	70%	Anorexia	70%
Pulmonary, hemorrhage (coagulopathy), and ocular (uveitis) diseases	0%	Lethargy	50%
		Icterus	30%
		PU/PD	20%
		Weakness	15%
		Fever, chills, weight loss, coughing, diarrhea, dehydration	0-5%

Table A3. Reported exposures in areas dog was walked, by dog owners of locally acquired canine leptospirosis

Exposures	Home neighborhood	Park	Unknown
Rodent	10	2	0
Raccoon/Opossum/Skunk	3	2	0
Other animal (deer, squirrel, cat)	3	0	0
Dog	1	0	0
Standing water	4	0	0
No reported exposures	0	1	1