

# ZOO NOTIC & VECTOR-BORNE

## Public Health Newsletter

Fall 2008

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The New York City Department of Health and Mental Hygiene publishes this newsletter to provide local animal health professionals with summaries of recent investigations by the Department, as well as important current events in the field of zoonotic and vector-borne diseases. The mission of the Zoonotic, Influenza and Vector-Borne Disease Unit (ZIVDU) is the detection, prevention and control of zoonotic and vectorborne diseases in New York City. Please visit our website at [www.nyc.gov/html/doh/html/zoo/zoo.shtml](http://www.nyc.gov/html/doh/html/zoo/zoo.shtml).

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## Update on Multistate Outbreak of *Salmonella* Infections Caused by Contaminated Dry Dog Food

An outbreak of salmonellosis associated with dry dog food was identified in 2007. The outbreak strain, identified as *Salmonella* Schwarzengrund, was responsible for 70 human cases in 19 states. An investigation revealed a pet food manufacturing plant in Pennsylvania as the likely source. Testing of the facility and unopened bags of dog food found the same strain. Two brands of dog food were recalled: Krasdale Gravy dry dog food and Red Flannel Large Breed Adult Formula. Although a specific source of contamination for the pet food was not identified, contamination of ingredients or the plant equipment could have occurred. Dry pet foods are usually heat treated. Afterwards they may be spray-coated with a taste enhancer, usually an animal fat, which could also serve as the source of contamination. On September 18th, the Food and Drug Administration (FDA) initiated a recall of both dog and cat food produced by this manufacturer. The recall notice is available on line at [www.fda.gov/oc/po/firmrecalls/marspetcare09\\_08.html](http://www.fda.gov/oc/po/firmrecalls/marspetcare09_08.html)

There have been several other *Salmonella* outbreaks in humans that were linked to pet treats, including pig ear pet treats, dried beef pet treats and pet treats made from beef or seafood. Investigations of two of these outbreaks revealed that pet treats purchased at retail stores are frequently contaminated with *Salmonella* organisms.<sup>1,2,3,4</sup> In one, 48 (51%) of 94 samples of pig ear pet treats were infected and in another, 65 (41%) of 158 samples of pig ear and other animal-derived pet treats were infected. Additionally, a pet vitamin was recalled in 2007 because of possible *Salmonella* contamination.



The FDA is responsible for regulating pet foods, treats, and supplements and can initiate a recall if *Salmonella* is present in these products. *Salmonella* contamination has not been identified in canned pet food, probably because the manufacturing process eliminates contamination. However, *Salmonella* contamination has been associated with raw pet food diets.

Veterinarians serve as a valuable resource for reminding pet owners of the potential risk for salmonellosis when handling dry pet food and pet treats. The following measures can help prevent *Salmonella* infections:

- Wash hands for at least 20 seconds with warm water and soap immediately after handling dry pet foods, pet treats, and pet supplements, and before preparing food and eating.
- Infants should be kept away from pet feeding areas.
- Children aged <5 years should not be allowed to touch or eat pet food, treats, or supplements.

Persons who suspect that contact with dry dog food has caused illness should consult their health-care providers. Most persons infected with *Salmonella* develop diarrhea, fever, and abdominal cramps 12–72 hours after infection, and *Salmonella* infection is usually diagnosed by culture of a stool sample. Illness typically lasts 4–7 days, and most persons recover without treatment. Infants, elderly persons, and persons with impaired immune systems are more likely than others to develop severe illness. ■

**FOOTNOTES:** 1 Clark C, Cunningham J, Ahmed R, et al. Characterization of *Salmonella* associated with pig ear dog treats in Canada. J Clin Microbiol 2001;39:3962–8.

2 Laboratory Centre for Disease Control, Public Health Agency of Canada. Human health risk from exposure to natural dog treats. Can Commun Dis Rep 2000;26:41–2.

3 Clark C, Cunningham J, Ahmed R, et al. Characterization of *Salmonella* associated with pig ear dog treats in Canada. J Clin Microbiol 2001;39:3962–8.

4 CDC. Human salmonellosis associated with animal-derived pet treats—United States and Canada, 2005. MMWR 2006;55:702–5.

## West Nile Virus Update

West Nile virus has been detected in mosquitoes in all five boroughs. As of September 19th, 10 human cases of WNV have been reported; 4 in Queens, 3 in Brooklyn, 2 in Staten Island and 1 in the Bronx. The New York City Department of Health and Mental Hygiene (DOHMH) has applied aerial larvicide (*Bacillus thuringiensis* granules) in several marshes and other large natural mosquito-breeding areas, and targeted adulticide by truck (Anvil 10+10 ULV, a pyrethroid) in those neighborhoods with high levels of West Nile virus activity indicating a risk of transmission to humans. For up to date information on West Nile virus in New York City, including maps, see [www.nyc.gov/health/westnile](http://www.nyc.gov/health/westnile). Surveillance and control efforts will continue through the summer.

## Discontinuation of Dead Bird Surveillance

As of this year, the DOHMH has stopped taking reports of individual dead birds, as well as collecting and testing them for West Nile virus. Several years worth of data have shown this surveillance tool to have limited value as an early warning system for the virus. However, clusters of dead birds, 10 or more of any species, or 3 or more water birds, are still reportable to the DOHMH by calling 311 or calling the Bureau of Communicable Disease (BCD) directly at 212-788-9830 and may be investigated by the Zoonotic, Influenza and Vector Borne Disease Unit.



### WNV in Animals

While disease from WNV infection in dogs and cats is extremely rare<sup>1,2</sup> there are published reports of naturally occurring WNV illness in dogs<sup>3-5</sup> and mild illness in cats when experimentally inoculated.<sup>6</sup> In some cases, cats infected with WNV may show mild, non-specific symptoms such as slight fever and mild lethargy during the first week after infection. In the same study, cats became infected after consuming WNV infected mice although none of the cats became clinically ill. There is no specific treatment for WNV infection in dogs or cats. Treatment is supportive care.

Symptoms of WNV infection in horses include ataxia, knuckling, head tilt, muscle tremors, and recumbency with inability to rise. Fortunately, there are vaccines available to prevent illness but only for horses. In NYC, the following animals have tested positive for WNV since 1999: a harbor seal, equids, squirrels, bats, and a chipmunk. In 1999, one stray kitten (in New Jersey) was found with clinical neurologic disease attributed to WNV infection. Since clinical disease in mammals with the exception of horses due to WNV infection appears to be very rare, in animals with neurologic disease, it is important to consider more common causes, especially rabies virus, which is enzootic in NYC. Testing is available through most commercial diagnostic laboratories.

There is no indication that a person can get WNV from simply handling live or dead infected birds or other animals, although evidence suggests that persons with occupational exposure to birds have occasionally become infected with WNV. In 2002, two laboratory workers were infected with WNV via percutaneous inoculation.<sup>7</sup> That same year, turkey farm workers in Wisconsin were thought to have acquired WNV infections via percutaneous inoculation, fecal-oral, or respiratory routes; an investigation on the farm detected WNV in the feces of infected turkeys.<sup>8</sup> Persons should avoid barehanded contact when handling dead animals and use gloves or double plastic bags to submit birds for testing or disposal.

Regardless, veterinarians and their staff should use infection control precautions when caring for an animal suspected to have this or any viral infection. It is not advised to use insect repellents approved for

human use, such as DEET, for pets as these products are not approved for veterinary use because animals tend to ingest them by licking.

We are also asking your assistance in promptly reporting any suspected or confirmed cases of West Nile or any other arboviral infection in your patients to the NYC DOHMH by telephone to 212-788-9830 or 212-788-4160.

**Human Disease:** Most infections are asymptomatic. Approximately 20% of infected persons will develop West Nile fever; symptoms may include fever, headache, myalgia, fatigue, muscle weakness, and/or arthralgia. Less than 1% of infected persons may develop more severe neurologic symptoms such as confusion, lethargy, muscle weakness, ocular disturbances, movement disorders, severe headache, stiff neck or photophobia.

**Control activities:** DOHMH will continue to reduce the number of potential mosquito-breeding sites and control mosquito larvae. Adulticiding activities are scheduled as needed in areas where surveillance indicates that the risk of transmission to humans is high. The pesticide product used by NYC DOHMH in adult mosquito spraying is called Anvil 10+10 ULV, a pyrethroid product specifically designed to kill adult mosquitoes. This product is used at a very low dosage rate, 0.0036 lbs/acre, and poses very little risk to humans and pets. We do recommend, however, that people and pets remain indoors during the applications.

**Prevention:** While small mammal pets do not appear to be at risk for clinical illness due to WN virus, pet birds (especially psittacines) and horses should be considered at equal risk as humans. We urge you to recommend precautionary measures to your clients including:

- Keep birds indoors, particularly at dawn and dusk.
- If pet birds are brought outdoors, provide a mosquito-proof enclosure using screens or mosquito netting.
- Vaccinate horses against WNV.
- Check all windows for intact screens.
- Reduce possible mosquito-breeding habitats (standing water) on the property, or report standing water by dialing 311 or visiting DOHMH website ([www.nyc.gov/health/wnv](http://www.nyc.gov/health/wnv)). ■

1. Serologic survey of cats and dogs during an epidemic of West Nile virus infection in humans. Kile JC, Panella NA, Komar N et al. J AM Vet Med Assoc. 2005 Apr 15;226(8):1349-53.
2. Exposure of domestic mammals to West Nile virus during an outbreak of human encephalitis, New York City, 1999. Komar N, Panella NA, Boyce E. Emerg Infect Dis. 2001 Jul-Aug;7(4):736-8.
3. West Nile virus encephalitis in a dog. Read RW, Rodriguez DB, Summers BA. Vet Pathol. 2005 Mar;42(2):219-22.
4. West Nile virus encephalitis and myocarditis in wolf and dog. Lichtensteiger CA, Heinz-Taheny K, Osborne TS, Novak RJ, Lewis BA, Firth ML. Emerg Infect Dis. 2003 Oct;9(10):1303-6.
5. Serological, reverse transcriptase-polymerase chain reaction, and immunohistochemical detection of West Nile virus in a clinically affected dog. Buckweitz S, Kleiboecker S, Marioni K, Ramos-Vara J, Rottinghaus A, Schwabenton B, Johnson G. J Vet Diagn Invest. 2003 Jul;15(4):324-9.
6. Experimental infection of cats and dogs with West Nile virus. Austgen LE, Bowen RA, Bunning ML, Davis BS, Mitchell CJ, Chang GJ. Emerg Infect Dis. 2004 Jan;10(1):82-6.
7. Laboratory-acquired West Nile virus infections—United States, 2002. MMWR Morb Mortal Wkly Rep. 2002 Dec 20;51(50):1133-5.
8. West Nile virus infection among turkey breeder farm workers—Wisconsin, 2002. MMWR Morb Mortal Wkly Rep. 2003

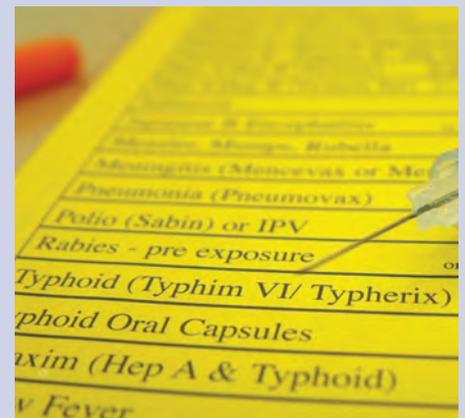
### NYC Rabies Update

To date in 2008, 14 animals have tested positive for rabies in NYC. This includes eight raccoons, five skunks and one kitten. The animals were all found in the Bronx (n=9) or Staten Island (n=4) except for one raccoon found in Queens near the Brooklyn border. This raccoon, as with three previous rabid raccoons found in Queens in 2006 and 2007, appears to be an isolated incident as there were no subsequent reports in Queens or the surrounding areas. Based on surveillance data, Manhattan and Brooklyn remain free of raccoon rabies.

The kitten was a stray found in City Island in the Bronx and followed the finding of two rabid raccoons, also from City Island, in May, 2008. The kitten had been attacked by a raccoon on June 22nd. It was eventually placed in a veterinary hospital for a 6 month rabies quarantine. On July 12th it began to exhibit posterior paralysis. By July 13th it began to have seizures and was euthanized and submitted for rabies testing the following day. These findings suggest that epizootic transmission of rabies may be occurring on City Island. Veterinarians practicing near City Island should ensure that their clients are up-to-date for rabies vaccination, and educate pet owners regarding rabies prevention. Remember to consider rabies in the differential diagnosis for any patient with a history of exposure to a potentially rabid wild or feral animal, and/or if presenting with progressive neurologic disease.

In the areas surrounding NYC, the epizootic of raccoon rabies has slowed on Long Island. In 2008, only one animal, a bat, was found to have rabies in Nassau County and no rabid animals have been found in Suffolk County. Westchester County continues to see an enzootic of rabies with six raccoons, two skunks, and one bat found, to date, in 2008. Additionally, several raccoons from Long Island (both Nassau and Suffolk Counties) have tested positive for distemper. Clinical illness associated with distemper can resemble rabies, thus the cases were identified when several raccoons with neurological illness tested negative for rabies. Recently, a neurologically impaired raccoon was collected from Fort Totten in Queens. It tested negative for rabies, and will be tested for distemper.

We remind veterinarians to report any animal, owned or wild, which is suspected of having rabies and encourage clients to vaccinate their cats and dogs. Rabies data are updated and available on the DOHMH website at [www.nyc.gov/health/rabies](http://www.nyc.gov/health/rabies).



## Rabies Vaccine Shortage

Rabies vaccine available in the US is manufactured by two companies, Sanofi Pasteur (Imovax®) and Novartis (RabAvert®). Recently, there has been an interruption in the supply of rabies vaccine resulting in the temporary discontinuation of vaccine for pre-exposure use in order to maximize supplies for **postexposure** needs.

Starting in June 2007, Sanofi Pasteur began renovating its IMOVAX Rabies vaccine production facility. Prior to these renovations, Sanofi Pasteur established an inventory based on historical levels of sales and projected market demand. The facility is scheduled to be approved and operational by mid-to-late 2009. Until the facility is operational, Sanofi Pasteur has a finite amount of IMOVAX Rabies vaccine. After the renovations began, Novartis, the other supplier of rabies vaccine for the United States, was unable to meet projected rabies vaccine supplies.

Vaccine for postexposure prophylaxis can be ordered by physicians or hospitals directly from the company. However, vaccine is only available on a case-by-case basis.

For more information on rabies, the local epidemiology of rabies in NYC and guidance on the appropriate use of rabies biologics, refer to our website and the following documents the:

- [www.nyc.gov/health/rabies](http://www.nyc.gov/health/rabies)
- DOHMH's *City Health Information* bulletin on "Rabies in New York City and Human Rabies Prevention" available online at [www.nyc.gov/html/doh/downloads/pdf/chi/chi27-5.pdf](http://www.nyc.gov/html/doh/downloads/pdf/chi/chi27-5.pdf)
- National guidelines for rabies prevention, Human Rabies Prevention — United States, 2008 Recommendations of the Advisory Committee on Immunization Practices (ACIP), also available online at: [www.nyc.gov/html/doh/downloads/pdf/cd/acip-mmwr-2008.pdf](http://www.nyc.gov/html/doh/downloads/pdf/cd/acip-mmwr-2008.pdf).

BCD is available for consultation on rabies preexposure and postexposure prophylaxis by calling 212-788-9830 during regular business hours. After hours and on weekends call the NYC Poison Control Center at 212-764-7667. Updates on rabies vaccine availability will be posted on the CDC's website at [www.cdc.gov/rabies](http://www.cdc.gov/rabies).

## Rabid Dogs Imported from Iraq

The New Jersey Department Health and Senior Services (NJHSS) sent out the following Public Health Advisory in June 2008 regarding a rabid dog that had been imported from Iraq along with 23 other dogs and 2 cats. The animals had been distributed to 16 States, after arriving at Newark Liberty Airport. None were sent to New York City or State.

**Subject:** Rabid Dog Imported from Iraq Along with Others Distributed to 16 States, Newark Liberty Airport

Date: 6/24/2008; 17:00:49

Message#: 100849-6-24-2008-PHAD

A dog imported on June 5, 2008 from Iraq to the Newark Liberty Airport, New Jersey (NJ) with 23 other dogs and 2 cats was diagnosed with rabies, with onset 3 days following arrival. The animals were imported through "Operation Baghdad Pup," a project coordinated by SPCA International of Washington D.C. The animals were housed in an empty warehouse building on the Newark Liberty Airport grounds for approximately 5 days before being redistributed by airplane to soldiers (or their families) living throughout the U.S. All the animals were bathed and groomed and were examined by veterinarians and provided preventive care on June 5th and 6th. One of the 2 imported cats developed neurologic signs, was euthanized but tested negative for rabies at New Jersey Public Health and Environmental Laboratories (PHEL). The cat was ill at the time of transport and had a bite wound of unknown origin on its tail.

The dog which became rabid was an 11 month old, spaniel/Labrador mix that had been cared for by a soldier for 7-9 months in Iraq. There were no known bites or exposures to suspect rabid while the dog was under the care of the soldier. The dog was healthy when departing from Iraq and did not display clinical signs of rabies during the initial veterinary examinations upon arrival in NJ. On June 8th, volunteers noticed that the dog was wobbly, showed a change in personality, and had diarrhea. The dog was admitted to a Bergen County, NJ veterinary hospital the following day. On admission to the hospital, the dog had a temperature of 103.5° F and a tense abdomen, vocalized strangely, acted confused and was 'snappy'. Laboratory testing was negative for parvovirus and distemper virus, and ultrasound, blood counts, and serum chemistries were unremarkable. The dog gradually became weaker, totally

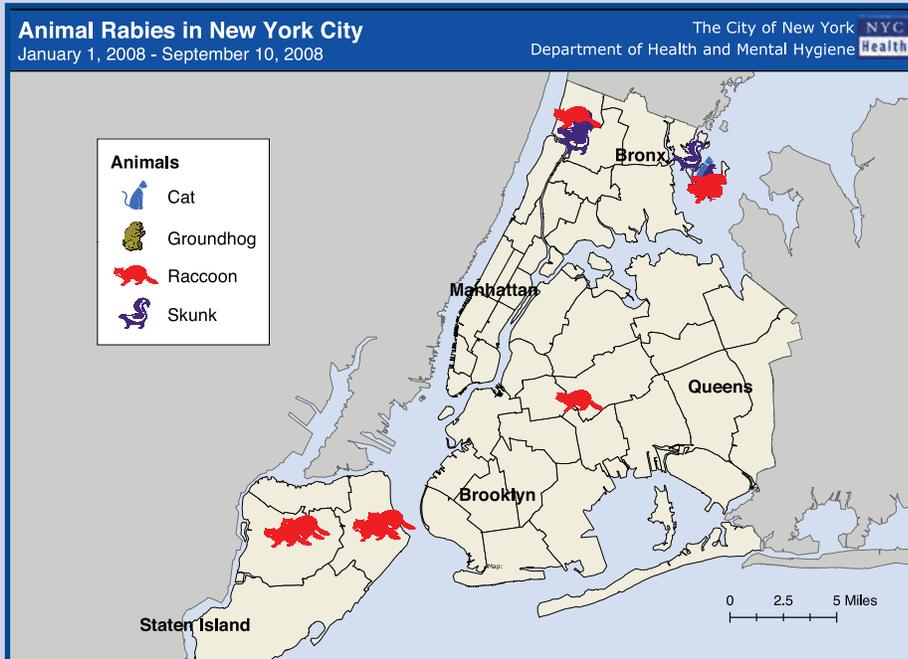
## Veterinary Alerts

So far in 2008, ZIVDU has sent Veterinary Alerts on a) tularemia in Gateway National Park, b) a rabid kitten on City Island and to a limited group, c) leptospirosis in Brooklyn. If you have not received these, and are interested in joining the distribution list please send an e-mail with your fax number to Asha Abdool at [aabdool@health.nyc.gov](mailto:aabdool@health.nyc.gov). Copies are available on our website at [www.nyc.gov/html/doh/html/zoo/zoo-pub.shtml](http://www.nyc.gov/html/doh/html/zoo/zoo-pub.shtml)

recumbent, and continued to vocalize and show agitation, despite being heavily sedated. He was euthanized on June 11, 2008.

Tissue specimens from this dog were received by the New Jersey PHEL on June 16, 2008 and found positive for rabies on a direct fluorescent antibody assay on June 18, 2008. A sample was sent to CDC and was confirmed as positive on June 20.

An investigation by the New Jersey Department Health and Senior Services (NJHSS), with assistance from the Bergen County Health Department, and CDC, is ongoing to identify persons and animals that may have been exposed to this dog during its infectious period of May 28, 2008 to June 11, 2008. No bite exposures to humans or the other animals in the shipment have been identified, but several individuals (e.g., volunteers, veterinarians, veterinary technicians, groomers) and the involved soldier have been identified as potentially exposed to the saliva of the animal and have begun rabies post exposure prophylaxis. Animals were kept primarily in separate crates, but there are reports that they were allowed to interact when they were walked or exercised.



SPCS International has been cooperating fully with NJDHSS and CDC in the investigation of this event, to identify persons and animals known or suspected to have been exposed to the rabid dog.

On Friday June 20th New Jersey health authorities began notifying public health officials in all 16 states receiving the other dogs and cat from this shipment of this situation. As of June 23rd, CDC is following up with public health officials in all states to confirm that the animals have been located according to the records provided by the SPCA. Owners of these dogs will be required to present their dog to a licensed accredited veterinarian for a rabies vaccine booster and quarantine their animal for 6 months in a suitable environment as required by each state law. ■

## Tick-Borne Disease Surveillance in Dogs

In December 2007, the DOHMH began tracking laboratory reports of certain tick-borne diseases in dogs in NYC. Human surveillance data indicate that Rocky Mountain Spotted Fever (RMSF) may be locally acquired in all five boroughs in NYC, unlike anaplasmosis, ehrlichiosis, and Lyme disease, which are strongly associated with travel to areas outside NYC endemic for tick-borne diseases.

Beginning in 2008, the DOHMH will investigate laboratory reports of dogs with elevated titers to RMSF. Interviews will be conducted with the treating

veterinarian and pet owner to provide an estimate of the prevalence of RMSF in NYC dogs and to help determine if dogs are being infected by ticks in NYC.



## Leptospirosis Surveillance in NYC Dogs

In June 2006, the DOHMH began collecting laboratory reports for dogs testing positive for leptospirosis. Laboratory reports are reviewed and investigated if any of the antibody titers for the seven *Leptospira* serovars included on the panel are  $\geq 1:800$  by serum agglutination. Currently, there is no national standard case definition for leptospirosis in dogs. The NYC DOHMH developed a case definition which is used solely to include or exclude cases for surveillance purposes; it is not intended to provide clinical guidance. If you suspect leptospirosis in any dog based on clinical presentation and supportive laboratory work, it should be treated accordingly.

According to the working DOHMH case definition, a **confirmed** case of leptospirosis includes a clinically compatible presentation along with; 1. Isolation of *Leptospira* from a clinical specimen, 2. A fourfold or greater increase in *Leptospira* agglutination titer between acute and convalescent phase serum specimens obtained  $\geq 2$  weeks apart, OR 3. Demonstration of *Leptospira* in a clinical specimen by immunofluorescence.

A probable case is a clinically compatible presentation along with a single *Leptospira* agglutination titer of  $\geq 1:800$ .

In 2006, there were 2 confirmed cases and 7 probable cases. Most of the cases were reported from Manhattan and *Leptospira icterohaemorrhagiae* and *L. bratislava* were the predominant serovars.

In 2007, 28 reports were investigated. Of these, nine were determined not to be leptospirosis because of recent vaccination, old infection, or diagnoses with another illness. Two additional cases were excluded because a convalescent specimen did not result in a fourfold change in titer. Among the remaining 17 cases that met the case definition, 13 were classified as probable and 4 as confirmed cases of leptospirosis. Because of cross reactivity, most reports had elevated titers for more than one serovar. For those cases in which multiple serovars had matching elevated titers, they were included in the predominant serovar count. Among confirmed or probable cases, *Leptospira icterohaemorrhagiae* was the predominant serovar (n=8) followed by *L. bratislava* (n=6) and *L. grippityphosa* (n=5). It is important to note that serological testing by MAT is specific only to the serogroup, and not the

serovar. Therefore the panel serovar with the highest titer cannot always predict the actual infecting serovar. All five boroughs had cases; Manhattan (6), Brooklyn (5), Queens (3), Bronx (2) and Staten Island (1). More than half of the cases occurred between May and September. In only one instance was there a common link identified among two cases. Two dogs from Brooklyn likely acquired these infections while in or around Prospect Park in Brooklyn. One dog was recently acquired and had only visited the Park, and another was walked primarily in the Park. No other cases were identified that could be linked. Most of the other cases reported potential sources of exposures included contact with rodents. *Leptospira icterohaemorrhagiae* is associated with rodents and raccoons, *L. bratislava* with rodents and swine, and *L. grippityphosa* with raccoons, skunks, opossums and voles.

Leptospire die within minutes of exposure to dry environments. As such, outbreaks of leptospirosis tend to only occur in warm, moist environments. The cold winters of New York City likely limit the extent to which leptospire can survive in the environment, suggesting that most cases of leptospirosis are due to direct contact with an infected animal. Exposure most commonly occurs through contact with open wounds or mucous membranes with water, moist soil or vegetation contaminated by 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. Infected dogs theoretically pose a risk of transmission to their owners through contact with their urine, although such direct transmission has been infrequently documented. 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 signs for staff and remind owners to use appropriate caution when handling the dog's urine, and wash hands whenever there is any question that there was urine contact. Using protective equipment or clothing, such as gloves, face shields, and minimizing contact with urine, blood or contaminated will help prevent potential transmission. We will continue to investigate reports of canine leptospirosis and analyze the data to look for patterns of disease for which prevention measures can be put in place.

## Animal Disease Reporting

REMINDER – Please remember, the following animal diseases are **required** to be reported to the DOHMH:

- Upon suspicion, CALL the DOHMH: anthrax, brucellosis, glanders, plague, Q fever, tularemia, monkeypox and rabies, or "an outbreak of any disease or condition in birds or animals, of known or unknown etiology, which may pose a danger to public health."
- Upon diagnosis, report by telephone, mail, or fax: psittacosis, leptospirosis, and arboviral encephalitides.

To report to the Department of Health and Mental Hygiene:

1. Call the Bureau of Communicable Disease at 212-788-9830 during regular business hours, and for urgent matters after regular business hours call the Poison Control Center at 212-764-7667.
2. Complete an Animal Disease Report Form (available online at [www.nyc.gov/html/doh/downloads/pdf/zoo/zoo-disease-report-form.pdf](http://www.nyc.gov/html/doh/downloads/pdf/zoo/zoo-disease-report-form.pdf) and fax to 212-788-4268 or mail to Zoonotic and Vector Borne Disease Unit, Bureau of Communicable Disease, 125 Worth St., Box 22A, New York, NY 10013.

The New York City Department of Health and Mental Hygiene's Zoonotic and Vector-Borne Public Health Newsletter provides summaries of zoonotic disease investigations undertaken by the Department along with current events. The mission of the *Zoonotic, Influenza and Vector-Borne Disease Unit* (ZIVDU) is the prevention and control of zoonotic and vectorborne diseases in New York City. Please visit our website at [www.nyc.gov/html/doh/html/zoo/zoo.shtml](http://www.nyc.gov/html/doh/html/zoo/zoo.shtml)

