ZOONOTIC & VECTOR-BORNE
Public Health Newsletter

September 2012 Vol.8 No. 1

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 and 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, influenza and vector-borne diseases in New York City. Please visit our website for more information at www.nyc.gov/html/doh/html/zoo/zoo.shtml.

In this issue...

Contact Us!

Bureau of Communicable Disease 347-396-2600

Zoonotic, Influenza and Vector-Borne Disease Unit (ZIVDU)

Scott Harper, MD, MPH, *Director* 347-396-2673

Sally Slavinski, DVM, MPH, *Assistant Director* 347-396-2672

Brooke Bregman, ... 347-396-2617 *Research Scientist*

Asha Abdool, ... 347-396-2615 *Epidemiologist*

Veterinary Public Health Services 212-676-2483

Norma Torres, ...212-676-2118 *Director*

If you would prefer to receive this newsletter by email, please email aabdool@health.nyc.gov

Rabies News

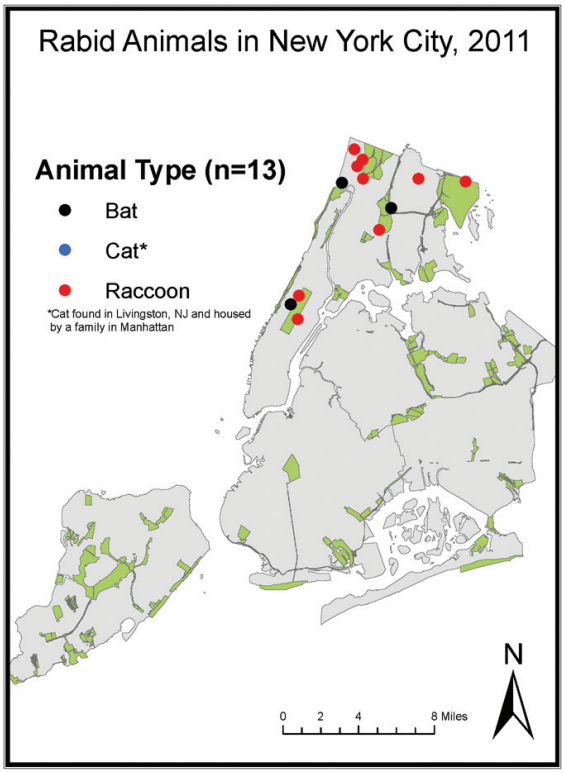
Animal Rabies Testing Summary

In 2011, 12 animals from New York City tested positive for rabies at the NYC Department of Health and Mental Hygiene's (DOHMH) Public Health Rabies Laboratory: 7 raccoons and 2 bats from the Bronx, and 2 raccoons and 1 bat from Manhattan. A kitten rescued in New Jersey and brought to a NYC veterinary hospital also tested positive for rabies.

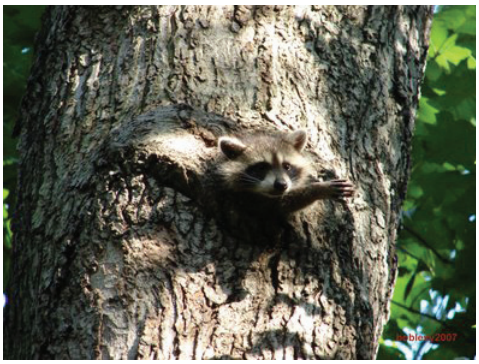
To date in 2012, two raccoons, one each from Staten Island and the Bronx, have tested positive for rabies. The rabid raccoon from Staten Island is the first reported since 2008 and is potentially concerning because two other rabies epizootics have previously occurred in the borough. The first, in 1992-1996, is believed to have disappeared due to a large outbreak of canine distemper among raccoons and the second occurred in 2006-2008.

The most recent raccoon rabies epizootic in NYC was detected in Central Park in 2009-2010. A trap, vaccinate, release (TVR) program was implemented in 2010, the third and final round of which was completed in December 2011. Approximately 500 raccoons were vaccinated against rabies, ear-tagged, and released in a successful effort to control the outbreak. The number of rabid raccoons reported from Manhattan dropped dramatically from 123 in 2010 to only two in 2011.

Raccoons are the primary reservoir for rabies in NYC, but they may occasionally transmit the virus to other animals, usually skunks. Historically, most rabid animals have been identified



Animal Rabies Testing Summary Map, NYC DOHMH



in the Bronx and Staten Island, with isolated reports of rabid raccoons in Queens. Smaller numbers of rabid bats, the primary vector of rabies in the U.S., have been found in all 5 boroughs. While dogs and cats are also susceptible to rabies, there have been no rabid dogs reported in NYC since 1954 and only 12 rabid cats, 10 of which were strays, since 1992 when raccoon rabies first arrived in NYC.

Updated rabies information, including the veterinary alert with complete 2011 animal rabies testing data, is available on our website at www.nyc.gov/health/rabies. ■

Human Rabies Cases in the U.S., 2011

The number of human deaths due to rabies in the United States has declined from more than 100 each year in the early 1900s to just one or two per year since the 1990s. This reduction can be explained by the use of rabies postexposure prophylaxis, which has proven nearly 100% successful, and animal control.

In 2011, there were five human deaths due to rabies and one possible survivor of rabies infection in the United States. Three of the five cases resulting in death were imported, while the other two were acquired in the U.S. Of the imported cases, one was a soldier who had been bitten by a puppy while serving in Afghanistan.[1] An investigation by the Department of Defense was unable to definitively determine why the soldier did not receive a complete course of rabies postexposure prophylaxis. At this time, soldiers are not given rabies preexposure vaccine before being deployed. The second imported case was a woman from Haiti who had been bitten by a dog and who fell ill several months later while visiting New Jersey.[2] The third imported case was in a Massachusetts resident who had been bitten by a dog while visiting Brazil. The two cases acquired in the U.S. were residents of

Rabies Cases—Continued on Page 4

Multistate Outbreaks of Salmonellosis Associated with Pet Turtles

Small turtles, as well as other reptiles and amphibians, are a well-known source of *Salmonella* infection, particularly in young children. To reduce the risk of salmonellosis, the sale and distribution of small turtles (< 4 in. carapace length) has been banned by the Food and Drug Administration (FDA) since 1975. However, these turtles are often still available illegally from street and fair vendors.

The Centers for Disease Control and Prevention (CDC) has investigated six overlapping, multistate outbreaks of salmonellosis associated with small turtles this year. As of August 8, 2012 a total of 168 people infected with six outbreak *Salmonella* strains have been reported from 30 states. Thirty-four people were hospitalized. Most cases occurred in children ten years old or younger (64%) and 27% of cases were one year or younger. Among cases that were interviewed, 72% reported exposure to turtles; 94% reported turtles less than four inches, and most were described as red-eared slider turtles. Among those reporting where the turtles were purchased, 39% were from street vendors and 15% from pet stores.

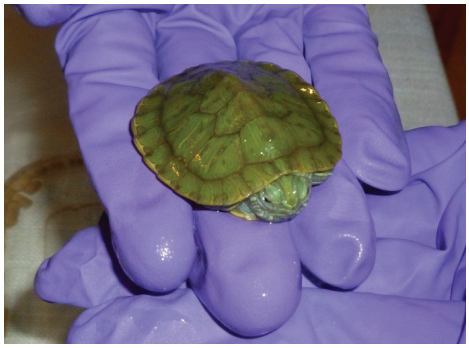


Photo: Cassandra Harrison, NYC DOHMH

Twenty cases were reported in NYC residents, associated with three outbreaks. In March 2012, DOHMH staff conducted field visits to collect environmental samples from the homes of two *S.* Sandiego cases. The first case was exposed to two turtles purchased from a dollar store five months prior. Both turtles were positive for *S.* Sandiego and samples from the aquarium were positive for both *S.* Sandiego and *S.* Pomona and matched the outbreak strains by pulsed-field gel electrophoresis (PFGE), suggesting a common source of infection for both strains. The owner of the second home had received a small turtle from a neighbor about six months prior and samples from the turtle and its habitat were positive for *S.* Sandiego with a PFGE pattern matching the outbreak strain.

Unfortunately, it is often exceedingly difficult to conduct traceback investigations in such cases to determine the source of the turtles and acquire evidence for criminal prosecution. Improved public education efforts are still needed. Educational posters developed by the CDC on how to prevent salmonellosis from animals are available for download in English, Spanish, and French at http://www.cdc.gov/healthypets/resources/posters.htm.

To Prevent Salmonellosis from Amphibians and Reptiles:

- Don't have a reptile or amphibian in households with children under five, elderly, or immunocompromised people.
- Always wash hands thoroughly with soap and water after handling reptiles or amphibians or their cages.
- Don't allow reptiles and amphibians to roam freely in the home, keep them away from food preparation areas, and wash any surfaces they come in contact with.

Reference:

Centers for Disease Control and Prevention. Five Multistate Outbreaks of Human *Salmonella* Infections Linked to Small Turtles; 2012. Available at http://www.cdc.gov/salmonella/small-turtles-03-12/index.html. Accessed August 13, 2012.

Occupational Phosphine Gas Poisoning at Veterinary Hospitals from Dogs that Ingested Zinc Phosphide – Michigan, Iowa, and Washington, 2006-2011

Reprinted from Centers for Disease Control and Prevention. MMWR 2012; 61(16): 286-288.

Zinc phosphide (Zn_3P_2) is a readily available rodenticide that, on contact with stomach acid and water, produces phosphine (PH_3), a highly toxic gas. Household pets that ingest Zn_3P_2 often will regurgitate, releasing PH_3 into the air. Veterinary hospital staff members treating such animals can be poisoned from PH_3 exposure. During 2006–2011, CDC's National Institute for Occupational Safety and Health (NIOSH) received reports of PH_3 poisonings at four different veterinary hospitals: two in Michigan, one in Iowa, and one in Washington. Each of the four veterinary hospitals had treated a dog that ingested Zn_3P_2. Among hospital workers, eight poisoning victims were identified, all of whom experienced transient symptoms related to PH_3 inhalation. All four dogs recovered fully. Exposure of veterinary staff members to PH_3 can be minimized by following phosphine product precautions developed by the American Veterinary Medical Association (AVMA).[1] Exposure of pets, pet owners, and veterinary staff members to PH_3 can be minimized by proper storage, handling, and use of Zn_3P_2 and by using alternative methods for gopher and mole control, such as snap traps.

In 2006 and 2008, the Michigan Department of Community Health contacted NIOSH regarding two separate events of PH_3 poisoning among veterinary staff members. In 2011, the Washington State Department of Health and the Iowa Department of Public Health each notified NIOSH of events causing cases of occupational PH_3 poisoning. A poisoning case was defined as two or more acute adverse health effects consistent with PH_3 toxicity in a person exposed to PH_3 generated from Zn_3P_2. Cases were categorized by certainty of exposure, reported health effects, and consistency of health effects with known toxicology of the chemical.[2,3] Eight poisoning cases were identified from the four events reported, and all poisonings were determined to be low severity.* NIOSH sought additional cases from various sources, including the SENSOR-Pesticides listserv and aggregated database, the AVMA members-only website, and participants in an October 2011 zoonotic diseases telephone conference call. No additional events or cases were identified.

Case Reports

Event A. On May 3, 2006, a 70-pound (32-kg) dog that had consumed rodenticide containing Zn_3P_2† was brought into a veterinary hospital in Michigan. Vomiting was induced in the examination room using hydrogen peroxide, and two hospital workers were poisoned. The first worker was a female technical assistant, aged 53 years, with no noted comorbidities, who experienced shortness of breath, difficulty breathing, headache, and nausea. The second worker was a female office manager, aged 61 years, with a history of diabetes and congestive heart failure. She developed shortness of breath, difficulty breathing, headache, and lightheadedness. The state poison control center advised both victims to ventilate the room and move to fresh air. No other medical care was received. Both recovered completely and lost no time from work.

Four other exposed staff members experienced only one symptom each (i.e., chest tightness, chest pain, or headache). All six workers had been exposed by entering the examination room or a nearby area. Decontamination was conducted by disposing of the vomitus in an outdoor trash container and ventilating the room. All symptoms abated as soon as fresh air was circulated in the examination room and other areas of the veterinary hospital.

Event B. On March 10, 2007, a convulsing dog, breed and weight unknown, was brought into an Iowa veterinary hospital after consuming an unknown brand of mole pellets containing Zn_3P_2. The dog had been sedated for lavage when it emitted PH_3, and one female staff member, aged 20 years, was poisoned. After the exposure, she reported dizziness and headache but did not receive medical care. She was back at work the next day with a slight headache. One other staff member experienced only eye irritation and did not meet the case definition for poisoning.

The veterinary hospital was evacuated, and the city fire department's hazardous materials team was called for decontamination. The veterinarian notified the state poison control center the same day, and the poison control center notified the Iowa Department of Public Health.

Gas Poisoning—Continued on Page 3

Photo: http://dachshundlove.blogspot.com/2009/01/dachshunds-on-pins-and-needles.html

Gas Poisoning—Continued from Page 2

Event C. On August 21, 2008, a 62-pound (28-kg) dog was brought into a Michigan veterinary hospital after ingesting three Zn_3P_2 pellets.[§] A female veterinarian aged 42 years with a history of multiple sclerosis induced the dog to vomit in a poorly ventilated room. She experienced multiple poisoning symptoms, including respiratory pain, headache, dizziness, chest pain, sore throat, and nausea. Fifteen hours after exposure, she visited a hospital emergency department and was admitted overnight for observation. She later reported that complete symptom resolution took approximately 2.5 weeks.

Three other workers also were poisoned. A female aged 30 years with a history of asthma had been next to the dog during treatment and developed dizziness, cough, and pain on deep breathing. Her symptoms persisted for two days. Two other female workers, aged 30–39 years, experienced headache and dizziness after working with the dog. All four women promptly called the state poison control center for advice and did not miss work. Two other staff members experienced only headaches; their symptoms did not meet the case definition.

Later the same day, firefighters used a handheld 4-gas monitoring device to detect whether hazardous levels of oxygen, carbon monoxide, hydrogen sulfide, or combustible gases were present in the veterinary hospital. No hazards were found; however, the device was not designed to measure PH_3. The Michigan Department of Community Health notified AVMA of both the 2006 and 2008 events and published a fact sheet for veterinarians and pet owners.

Event D. On July 8, 2011, a female dachshund, weight unknown, was playing outdoors when she vomited behind some bushes and collapsed. Her owners rushed the limp dog to a Washington veterinary hospital. She was unresponsive and had diarrhea, a weak pulse, pinpoint pupils, and a temperature of 107°F (41.7°C). Subsequently, the semicomatose dog vomited onto paper towels. The owners initially reported no exposure of the dog to Zn_3P_2; however, later the same day, the owners brought in a package of gray pellets,[**] recalling that the product had been applied in their yard two weeks earlier.

A female veterinary technician, aged 34 years, who sniffed the dog's vomitus on the paper towels to determine whether it smelled like food, immediately developed abdominal pain and nausea. The gastrointestinal symptoms persisted for only 20 minutes, and she did not seek medical care. Suspecting Zn_3P_2 toxicity, the veterinarian (who, along with other staff members, had experienced no symptoms) retrieved the vomitus about 20 minutes after it was put in the trash, placed it in a plastic bag, sealed it, froze it, and sent it to the Washington State Department of Health.

The victim reported the event to the state poison control center three hours after exposure. The Washington State Department of Health sent the frozen vomitus to the State Department of Labor and Industries' Industrial Hygiene laboratory for energy dispersive radiographic analysis to qualitatively assess for phosphorus and zinc. Phosphorus was detected but not zinc (limit of detection for zinc was 0.1%). However, when zinc was measured using inductively coupled plasma spectrometry testing, it was detected at 0.003%. The Washington State Department of Health subsequently published an account of the event, including AVMA's precautions, in a Washington veterinary association newsletter[4].

Editorial Note

Zn_3P_2 a dark gray, crystalline, inorganic rodenticide, is highly toxic when ingested as a result of stomach production of PH_3, a colorless, flammable, toxic gas.[5] The amount of stomach acid is directly correlated with the quantity of PH_3 produced.[6] Workers at risk for PH_3 poisoning include veterinary and clinical staff members treating animal and human patients who ingest Zn_3P_2.[1,7] In humans, inhalation of high concentrations of PH_3 can be fatal[8] because PH_3 inhibits oxidative phosphorylation and causes lipid peroxidation damage to cells and tissues.[9] Damage to the pulmonary, nervous, hepatic, renal, and cardiovascular systems can occur; however, for nonfatal inhalation of PH_3, symptoms usually resolve within 30 days and rarely cause any long-term disabilities.[10] Because no specific antidote has been identified, persons with PH_3 poisoning are managed with supportive care. Currently, no data have been published regarding the carcinogenic or reproductive effects of PH_3 in humans.[5] Aluminum, calcium, and magnesium phosphide, which are fumigants and not rodenticides, also exhibit their toxicity through the release of PH_3.

Photo: http://pestweb.com/products/aef61df/zp-rodent-bait-ag

The findings in this report are subject to at least two limitations. First, acute poisoning from Zn_3P_2 products might be underreported. Because symptoms might only last a few hours and can resolve without medical treatment, victims might never associate symptoms with poisoning. In addition, cases in victims who do not seek medical care or advice from poison control centers are not recorded by surveillance. Also, cases are only identified if Zn_3P_2 or PH_3 are listed as responsible for the poisoning. In a veterinary setting, the substance ingested by an animal often is not readily determined. Second, for this report, seven persons who had only one symptom did not meet the poisoning case definition.

The Zn_3P_2 products implicated in three of the four events currently are available for consumer purchase. Although the product labels specified that the pellets should be placed underground in burrows or tunnels, whether the product was applied correctly is unknown. Moreover, even with correct application, dogs might be exposed while digging in treated areas with their paws or by consuming poisoned prey.[5] The labels also advise veterinarians to induce vomiting using hydrogen peroxide, but they do not advise that vomiting be induced outdoors.

After the Zn_3P_2 poisoning events in Michigan, AVMA posted precautions for veterinarians and pet owners to prevent PH_3 inhalation.[1] These include remaining upwind and above the poisoned animal if vomiting occurs outdoors (PH_3 is heavier than air) and evacuating the room if vomiting occurs indoors. Veterinarians who induce vomiting in animals that have ingested Zn_3P_2 should do so outdoors. This precaution is not mentioned currently on Zn_3P_2 product labels. Moreover, the risk for Zn_3P_2 toxicity to pets, their owners, and veterinary hospital staff members can be reduced by using alternative methods of gopher and mole control, such as snap traps. ■

References:

1. American Veterinary Medical Association. Phosphine product precautions. Washington, DC: American Veterinary Medical Association; 2011. Available at http://www.avma.org/public_health/phosphine_gas/default.asp. Accessed April 20, 2012.

2. Calvert GM, Mehler LN, Alsop J, De Vries AL, Besbelli N. Surveillance of pesticide-related illness and injury in humans. In: Krieger R, Doull J, Hodgson E, et al, eds. Hayes' handbook of pesticide toxicology. 3rd ed. Boston, MA: Academic Press; 2010:1313–69.

3. CDC. Case definition for acute pesticide-related illness and injury cases reportable to the national public health surveillance system. Cincinnati, OH: US Department of Health and Human Services, CDC, National Institute for Occupational Safety and Health; 2005. Available at http://www.cdc.gov/niosh/topics/pesticides/pdfs/casedef2003_revapr2005.pdf. Accessed April 20, 2012.

4. Washington State Veterinary Medical Association. Exposure to zinc phosphide sickens Washington technician—what you should know. Snoqualmie, WA: Washington State Veterinary Medical Association; 2011. Available at http://wsvma.org/displaycommon.cfm?an=1&subarticlenbr=457#exposuresick. Accessed April 20, 2012.

5. National Pesticide Information Center. Zinc phosphide/phosphine technical fact sheet. Corvallis, OR: National Pesticide Information Center; 2010. Available at http://npic.orst.edu/factsheets/znptech.pdf. Accessed April 20, 2012.

6. Guale FG, Stair EL, Johnson BW, Edwards WC, Haliburton JC. Laboratory diagnosis of zinc phosphide poisoning. Vet Hum Toxicol 1994;36:517–9.

7. Stephenson JB. Zinc phosphide poisoning. Arch Environ Health 1967;15:83–8.

8. Popp W, Mentfewitz J, Götz R, Voshaar T. Phosphine poisoning in a German office. Lancet 2002;359:1574.

9. Proudfoot AT. Aluminium and zinc phosphide poisoning. Clin Toxicol (Phila) 2009;47:89–100.

10. Brautbar N, Howard J. Phosphine toxicity: report of two cases and review of the literature. Toxicol Ind Health 2002;18:71–5.

* Severity of poisoning cases can be categorized into four groups, using standardized criteria for state-based surveillance programs: low, moderate, high, and death. In low-severity cases, the poisoning usually resolves without treatment and <3 days are lost from work. Additional information is available at http://www.cdc.gov/niosh/topics/pesticides/pdfs/pest-sevindexv6.pdf

† Sweeney's Poison Peanuts Mole and Gopher Bait II, U.S. Environmental Protection Agency (EPA) registration no. 149-16.

§ Dexol Gopher Killer Pellets 2, EPA registration no. 192-205. Available at http://www.michigan.gov/documents/mdch/zinc_phosphide_316718_7.pdf.

** Force's Mole RID, EPA registration no. 12455-30-814.

Campylobacteriosis Associated with Sheep Castration in Wyoming

Photo: http://old-photos.blogspot.com/2011/01/working-sheep.html

Campylobacter infections in people are commonly foodborne but may be transmitted from farm animals, cats, and dogs. In June 2011, two sheep ranchers were reported to the Wyoming Department of Health with *Campylobacter jejuni* enteritis. Both had diarrhea and one also had cramps, fever, nausea and vomiting. One patient was hospitalized for one day. Earlier that month, both patients were involved in a multiday event to castrate and dock the tails of 1600 lambs and had used their teeth to castrate some of the lambs. They were the only two workers known to have used this method, an older practice that is apparently sometimes still used. During the event, a few lambs reportedly had mild diarrheal illness. The patients did not share food or water and neither reported eating poultry or unpasteurized dairy, common sources of *C. jejuni* infection.[1]

Pulsed-field gel electrophoresis (PFGE) analysis of stool specimens showed the same pattern, which was not previously reported from Wyoming and rare among all specimens reported to CDC. Two out of five fecal samples collected during a site visit in October 2011 were positive for *C. jejuni* and one had the same PFGE pattern as isolates from the two patients. This PFGE pattern was not previously associated with animal exposure and these are the first reported *C. jejuni* cases associated with exposure during lamb castration. Prevention recommendations to ranch owners and workers were to use standardized, age-specific lamb castration techniques and wash hands after animal contact.[1]

Reference:

1. Centers for Disease Control and Prevention. Notes from the Field: Campylobacter jejuni infections associated with sheep castration – Wyoming, 2011. MMWR 2011; 60(48):1654. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6048a4.htm.

Rabies Cases in the U.S., 2011

Continued from Page 1

South Carolina and Massachusetts, both of whom had been bitten by a bat.

There was a sixth reported case of rabies in a young girl from California, but she recovered from her infection.[3] The child developed an illness consistent with rabies after contact with stray cats, but the diagnostic testing performed (IFA) was unable to identify the infecting virus variant. She was treated using a protocol previously developed by Dr. Willoughby of the Medical College of Wisconsin that had been used to successfully treat the first known survivor of rabies. ■

References:

1. Centers for Disease Control and Prevention (CDC). Imported human rabies in a U.S. Army soldier – New York, 2011. MMWR 2012; 61(17): 302-305. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6117a2.htm.

2. CDC. Imported human rabies – New Jersey, 2011. MMWR 2012; 60(51): 1734-1736. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6051a2.htm.

3. CDC. Recovery of a patient from clinical rabies – California, 2011. MMWR 2012; 61(04): 61-65. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6104a1.htm.

Animal Disease Reporting

The following animal diseases are reportable by law in NYC:

- *If diagnosed:* leptospirosis, psittacosis, Rocky Mountain spotted fever, salmonellosis, tuberculosis, and arboviral encephalitides
- *If suspected:* anthrax, brucellosis, glanders, monkeypox, plague, Q fever, rabies, tularemia, severe acute respiratory syndrome (SARS), and novel influenza virus with pandemic potential
- Any outbreak of a disease or condition that may pose a danger to public health

To report animal diseases to the Department of Health and Mental Hygiene:

- Call the Bureau of Communicable Disease at 347-396-2600 during business hours. For urgent matters after business hours, call the Poison Control Center at 212-764-7667 (212-POISONS).
- Complete an Animal Disease Case Report Form, available at http://www.nyc.gov/html/doh/downloads/pdf/zoo/zoo-disease-report-form.pdf, and fax to 347-396-2753 or mail to Zoonotic, Influenza and Vector-Borne Disease Unit, Bureau of Communicable Disease, 42-09 28th Street, Box 22A, Long Island City, NY 11101.

To report animal bites:

- Call the Animal Bite Unit at 212-676-2483 during business hours or submit an Animal Bite Report Form online, available at www.nyc.gov/html/doh/html/vet/vetegp.shtml.
- For animal rabies testing and other issues related to animal bites, call the Office of Veterinary Public Health Services at 212-676-2115.

Dog Bite Prevention brochure covers, NYC DOHMH

Dog Bite Prevention

Although the canine variant of dog rabies has been eliminated from the U.S. and there has not been a rabid dog in NYC since 1954, dog bites, especially in young boys, continue to be the primary reason for the administration of rabies postexposure prophylaxis (PEP) in NYC. As part of an initiative to help reduce the number of dog bite incidents and the related unnecessary PEP treatments, the NYC DOHMH has developed two educational brochures: "Be Safe Around Dogs: An Activity Book for Children" and "Be a Responsible Dog Owner." Copies of these brochures are available in English and Spanish and can be ordered by calling 311 or downloaded from our website at http://www.nyc.gov/html/doh/html/dangerous_dogs/home.shtml.