ZOONOTIC & VECTOR-BORNE
Public Health Newsletter

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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 and Vector-Borne Disease Unit (ZVDU) 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.**

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Dead Bird Cluster in Staten Island

On December 21st, 2007, the DOHMH received several reports describing a cluster of approximately 20-40 dead and dying grackles at a condominium complex in the Great Kills neighborhood of Staten Island. The birds were reportedly exhibiting acute onset of neurologic illness followed by rapid death. It was noted that there was construction occurring at a nearby city park. The New York Police Department, Fire Department of New York and the Department of Environmental Protection responded to the scene. Anecdotal reports of an ammonia-like odor in the area prompted air quality sampling which did not identify anything unusual.

The manner of death suggested they were poisoned. A sample of six birds was collected for testing. Both the Cornell Animal Health Diagnostic Center (AHDC) and the NYS Department of Environmental Conservation (DEC) Wildlife Pathology Unit (WPU) confirmed Avitrol® (**www.avitrol.com**) as the poison responsible for the grackle deaths. Avitrol® is a pesticide developed specifically for bird control. It is illegal for use in New York City. Conservation Officers from DEC conducted an investigation of the incident and were able to identify the culprit, a pest control company based in New Jersey.

A second cluster of six dead starlings was reported three days later at a location 1.7 miles from the initial cluster. There was no evidence of poisoning and electrocution was determined by WPU to be the cause of death. No additional related clusters have been reported since.

As with West Nile virus, animal events can be an early indicator of infectious disease threats to humans and animals may act as sentinels for infectious diseases and or environmental hazards. The DOHMH, in collaboration with other agencies, investigates reports of groups of dead birds if there are 10 or more birds of any type, or 3 or more waterfowl. When no obvious cause of death can be identified and the carcasses are in good condition, specimens are collected and sent to the NYS DEC

WPU Laboratory and Cornell's AHDC. Bird die offs that appear to be consistent with potential poisoning are investigated by DEC's Conservation Officers.

All bird die offs as well as die offs of other wildlife species are documented and tracked using a central database initiated and hosted by the DOHMH that is accessible to all NYC based agencies that deal with wildlife related issues. The database, termed AMMI for Animal Morbidity and Mortality Investigations, is used for identifying, tracking and sharing information on animal related health events. ■

Outbreaks of Illness Associated with Pet Food

Several pet food recalls were issued in 2007. The two most publicized involved *Salmonella* Schwarzengrund bacteria and wheat gluten contaminated with melamine. These recalls highlight the need for veterinarians to be aware of food-borne illness in pets, to remind owners of safe hygiene practices when handling pets and pet food, and to report any unusual clusters of illness and cases of reportable diseases in animals.

Wheat Gluten Contaminated with Melamine

The federal investigation into pet food manufactured with contaminated wheat gluten began in March 2007 when Menu Foods issued a voluntary recall of 60 million cans and pouches of its "cuts and gravy" style pet food. The recall was initiated following consumer complaints of vomiting and renal failure in cats and dogs, and 14 reported deaths, including nine cats that died during routine taste trials conducted by the company. Wheat gluten is a protein sometimes added to thicken pet food gravy. In addition to melamine, other contaminants, including cyanuric acid, ammelide and ammeline, were identified in the foods. The combination of the melamine and cyanuric

acid was likely the cause of illness in dogs and cats. "Separately, those two compounds are pretty harmless," said Wilson Rumbeiha, an associate professor at Michigan State University's (MSU) Diagnostic Center for Population and Animal Health. "But when combined, they form crystals which can block the kidneys. And, unfortunately, these crystals don't dissolve easily. They go away slowly, if at all, so there is the potential for chronic toxicity." While there were thousands of reports of potentially affected pets, an investigation done by MSU was able to identify 348 dogs and cats with nephrotoxicity linked to contaminated pet food. "Two-thirds of the animals affected were cats, but proportionally, more dogs died from it than cats," Rumbeiha said. This was likely only a fraction of the affected animals.

Menu Foods is based in Canada and its products are sold under a variety of name brands in the U.S., Canada, and Mexico. The recalled food was produced between December 2006 and March 2007 at a Kansas facility. The U.S. Food and Drug Administration (FDA) was notified and launched an investigation. The FDA received thousands of reports of illnesses from consumers and veterinarians across the country of illnesses potentially associated with the contaminated pet food. The melamine contaminated wheat gluten was traced back to ChemNutra, a distributor in Nevada, and ultimately to China. Melamine is normally used as a fertilizer and for industrial and commercial purposes, such as in plastics.

Some of the contaminated pet food was also used to make farm animal and fish feed and melamine was found in the urine of hogs from a hog farm in California. However, the FDA has determined there was little risk to humans who may have consumed animals given the tainted feed. Melamine is not known to accumulate in animals but is filtered out through the kidneys and urine. The FDA now samples rice protein concentrate as well as wheat gluten shipments from China.

Complete information on the FDA investigations and recalled products is available on the FDA website at www.fda.gov/oc/opacom/hottopics/petfood.html

Salmonella Schwarzengrund Outbreak

In August 2007, a multi-state outbreak of *Salmonella* serotype Schwarzengrund in humans was investigated by the Centers for Disease Control and Prevention (CDC) and several state health departments. The outbreak was ultimately linked to dry dog food produced by Mars Petcare at a facility in Pennsylvania (PA) which resulted in a voluntary recall. As of September 4th, 2007, 62 cases were reported from 18 states, mostly from PA. Although no illness was reported in pets, the outbreak strain of *S.* Schwarzengrund was found in fecal specimens from two dogs that ate the implicated food as well as from an environmental sample collected at the PA manufacturing facility and in two unopened bags of dog food. The complete investigation report can be found at www.cdc.gov/salmonella/schwarzengrund.html

Salmonella bacteria are ubiquitous in our food chain and environment. Infection is spread by ingesting the bacteria from contaminated food or water or via direct contact with infected people or animals. People with *Salmonella* infection may develop mild to severe diarrhea, fever, and abdominal cramps. According to Infectious Diseases of the Dog and Cat (C. Greene: *Infectious Diseases of the Dog and Cat,* edition 3, copyright 2006, Elsevier Inc.), *Salmonella* in healthy dogs and cats often results in a transient or asymptomatic infection. Cats may develop a chronic fever with anorexia and lethargy without diarrhea. In both dogs and cats, recovery from acute diarrhea is often seen within 3 to 4 weeks, although shedding may occur for up to 6 weeks. Septicemia is a rare but serious complication in both humans and animals. Pet owners can prevent *Salmonella* infections in people and pets by following basic hand hygiene techniques. Hands should be washed for at least 20 seconds with soap and running water after handling pets and pet food, after feeding pets, and especially after contact with feces. The FDA's list of Safe Handling Tips for Pet Foods and Treats can be found at www.fda.gov/consumer/updates/petfoodtips080307.html ■

NYC Rabies Update

In 2007 a total of 44 animals tested positive for rabies in NYC. There were 37 raccoons, 3 skunks, 3 cats and 1 groundhog. Surprisingly, no bats tested positive for rabies in 2007, although historically rabid bats have been found in all five boroughs. The rabies epizootic in Staten Island persisted, with 29 positive animals including 25 raccoons, 3 cats and 1 groundhog and in the Bronx which reported 14 positive animals (11 raccoons, 3 skunks). The DOHMH identified 2 persons who were exposed to a known rabid animal, compared to over 10 people in 2006. The single rabid raccoon found in Queens appears to be an isolated incident as there were no subsequent reports. Based on surveillance data, Queens, Manhattan and Brooklyn are free of raccoon rabies. 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.

To help control the Staten Island rabies epizootic, the DOHMH Veterinary Public Health Services along with Animal Care and Control conducted a free rabies vaccination program for cats on Staten Island from January to July of 2007. While only cats were invited, dogs were not turned away, resulting in a total of 1,151 animals vaccinated. Rabies data are available on the DOHMH website at www.nyc.gov/html/doh/html/cd/cdrab.shtml.

Table 3: Number of Rabid Animals in New York City by Species and Borough, 1992-2007

1992-2007	Bronx	Queens	Manhattan	SI	Brooklyn	Total
Raccoon	144	7	8	117	0	276
Skunk	33	0	0	2	0	35
Opossum	0	0	0	2	0	2
Bat	7	4	7	4	4	26
Dog	0	0	0	0	0	0
Cat	1	0	1	7	1	10
Groundhog	0	0	0	1	0	1
Coyote	1	0	0	0	0	1
Total	**186**	**11**	**16**	**133**	**5**	**351**

Animal Disease Reporting

Veterinarians are in a key position to help detect unusual illness in pets and potential disease outbreaks. As a reminder, certain animal diseases are reportable by law to the NYC DOHMH. Also, any "outbreak of any disease or condition in birds or animals, of known or unknown etiology, which may pose a danger to public health" should be reported immediately. Diseases reportable upon diagnosis are psittacosis, leptospirosis, and arboviral encephalitides. Suspect cases of anthrax, brucellosis, glanders, Q fever, tularemia, monkeypox, and rabies are also reportable. Please go to our website for more details on animal disease reporting at www.nyc.gov/html/doh/html/zoo/zoo-reporting.shtml

Other 2007 Rabies News

On September 7th, 2007, the first World Rabies Day was held. The initiative was started by the nonprofit organization, Alliance for Rabies Control, to help raise awareness about the impact of human and animal rabies. Despite being preventable, rabies is responsible for approximately 55,000 human deaths worldwide each year. Most deaths occur in Asia and Africa, where access to health care and preventive measures is limited. The Centers for Disease Control and Prevention (CDC) hosted a symposium and the day was marked with events in over 74 countries, including educational outreach programs, conferences, museum and zoo exhibits, and vaccination campaigns.

On the same day, the CDC declared the U.S. free of canine rabies, based on national rabies surveillance data. Elimination of the rabies variant found in dogs is largely due to dog vaccination, licensing programs and stray dog control. While this is considered an important public health success, it does not impact current rabies vaccination practices. The risk of rabies transmission from wildlife to domestic animals and humans remains and continued prevention and control efforts are needed both locally and globally. In the U.S., several rabies variants persist including the bat, raccoon, skunk, fox and coyote variants. Along the Atlantic coast the raccoon and bat variants are present. In October 2007, a few noteworthy rabies incidents occurred, highlighting the important role human and animal health care professionals play in preventing rabies in the U.S. and the need to remain vigilant about the risk of rabies.

Rabid Goat in New Jersey

On October 12th, 2007, the Bernard's Township Health Department of New Jersey reported rabies in a 6-month old goat from the River Bend/Hay Honey Farm. The goat had repeatedly escaped from a pen and mingled with over 300 people who attended Harvest Festival 2007, an invitation-only event held on September 29th. The farm's manager had consulted a veterinarian when the goat would not eat. The goat was evaluated and submitted to the NJ Department of Health where it tested positive for rabies. Public health officials contacted people who visited the farm between September 26th and October 6th and advised those who may have had an exposure to seek immediate medical treatment. According to the manager, some goats and cows kept in close quarters with the rabid goat were quarantined by the New Jersey Department of Agriculture but none of the other animals on the farm became sick. Although goats are susceptible to rabies, they are rarely diagnosed with the disease and currently, there is no licensed rabies vaccine for goats.

Rabid Dog in New Jersey

On October 17th, 2007, a dog from Sussex County, New Jersey tested positive for rabies at the NJ State Health Laboratory. The dog had been previously vaccinated against rabies but the vaccination had expired in 2006 and was not updated by the owners. The dog was allowed to roam free and had been observed fighting with feral cats in July but no bite wounds were seen. The dog's symptoms began on October 13th with agitation and vomiting, eating inanimate objects such as twine and a metal bowl, and then paralysis and death two days later at the owner's home. All the family members received rabies post exposure prophylaxis.

Although the U.S. is now free of the canine-rabies variant, dogs may still contract other rabies variants from other animals, such as bats and raccoons. This incident emphasizes the need for owners to keep their pets' rabies vaccinations up to date. According to NYC law, if a pet (cat or dog) is exposed to a potentially rabid animal and is not up to date for rabies vaccine, it must either be vaccinated and kept in a veterinary facility for six months at the owner's expense, or euthanized. Pets with current rabies vaccinations exposed to a rabid animal must be revaccinated and then observed in the owner's home for 45 days.

Rabies Death in Minnesota

On October 23rd, 2007, the Minnesota Department of Health reported a case of human rabies, the first case in MN in 7 years and the fifth since 1900. The patient, a 46-year old man, was exposed to a bat in a cabin in mid-August. He removed the bat with his bare hand and threw it outside after it had flown through the door of a screened porch and landed on a screen. The man had felt a "needle-prick" but did not think he had been bitten because there were no bite marks and no blood. No medical treatment was sought. Thirty-three days after the exposure, the patient developed weakness and numbness on the finger and thumb of his hand, which progressed to his arms and legs. Ten days after symptom onset, the patient was hospitalized. However, rabies was not considered as a diagnosis until the sixteenth day of hospitalization and family members only recalled the bat exposure shortly before specimens were sent for rabies testing. The patient was taken off life support 2 days later. Public health officials conducted an outreach and education program among health care workers at two hospitals as well as the patient's family members to identify who should receive rabies postexposure prophylaxis (PEP). This tragic case could have been prevented if the exposure had been recognized and PEP had been administered. Bat exposures are especially concerning since bats have tiny teeth and their bite marks may not be evident. Minnesota public health officials noted that news of this death led to more people in MN seeking the vaccine after having contact with bats.

Multi-state Investigation of Potential Rabies Exposure at a Softball Tournament

On July 24th, 2007, a kitten present during the South Atlantic Summer Showdown softball tournament was diagnosed with rabies by the North Carolina State Public Health Laboratory. The tournament included 60 girls' softball teams from four states. State Health Departments in South Carolina, North Carolina, Georgia and Tennessee worked with the Centers for Disease Control and Prevention (CDC) to investigate potential exposures to the rabid kitten.

On July 14th, a coach had discovered a healthy kitten in a garbage can located behind a dugout. The kitten was rescued and brought to several games during the tournament. It was handled by a multitude of participants and eventually brought home by the coach. It became sick and was euthanized on Sunday July 15th and held for cremation. Rabies was not suspected, but a mother of one of the players pursued rabies testing as she had been bitten while trying to feed the kitten at the tournament. The kitten was submitted to the NC Public Health Laboratory and tested positive for rabies on July 20th.

Of the approximately 60 teams participating in the tournament, 38 had participants who reported a potential exposure to the kitten. Rabies postexposure prophylaxis (PEP) was recommended for a total of 27 persons. Exposures included contact with the kitten's saliva through a bite, oral or nasal mucosa, or a scratch. No reports of human rabies or adverse reactions to PEP were reported. ■

Pet-Related Infections

Rabinowitz PM, Gordon Z, Odofin L. Am Fam Physician. Pet-related infections. 2007 Nov 1;76(9):1314-22.

The authors describe the more commonly referenced zoonotic infections associated with pets. Examples include toxoplasmosis, ringworm, campylobacteriosis and salmonellosis. The article is brief and is not able to provide much context to describe the incidence of infections in the human population or the true risks for infection. For example, while toxoplasmosis has historically been associated with cats, most infections in the US are due to eating undercooked meat.* The authors also emphasize the important role that both veterinarians and physicians play in informing pet owners about preventive measures such as routine veterinary care, hand hygiene, proper pet waste disposal, and treatment of infected animals to help prevent zoonotic disease transmission to pet owners.

This article is available for free online at:
www.aafp.org/afp/20071101/1314.html

*MMWR: Preventing Congenital Toxoplasmosis. March 31, 2000 / 49(RR02);57–75 online at www.cdc.gov/mmwr/preview/mmwrhtml/rr4902a5.htm

Summary of West Nile Virus Activity in 2007

West Nile virus activity was found in all five boroughs during 2007. Table 1 summarizes New York City's mosquito, bird and human surveillance data for the 2007 season.

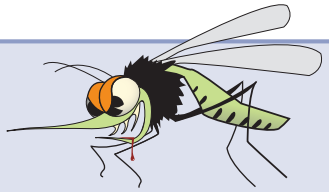

Table 1. 2007 WNV Positive Results Summary for New York City

WNV Positive Results as of 11/15/07	NYC	Bronx	Brooklyn	Manhattan	Queens	Staten Island
Birds	**30**	6	5	0	10	9
Horses	**0**	0	0	0	0	0
Non-Horse Mammal‡	**0**	0	0	0	0	0
Mosquito Pools	**174**	36	5	5	96	32
Human Cases						
West Nile Neuroinvasive Disease	**13**	2	4	0	6	1
West Nile Fever	**5**	0	3	1	1	0

A total of 30 dead birds, found between July 18th and October 17th, were found to be infected with WN virus. Among these the most common species were house sparrow (7), American crow (6), blue jay (4), common grackle (2) and red-tailed hawk (2 each).

Mosquito surveillance identified 174 mosquito pools collected between July 18 and October 10 that tested positive for WN virus.

There were 18 human cases of WN virus identified this season (13 cases of WN neuroinvasive disease and 5 cases of WN fever). Onset dates of cases were between August 1st and October 23rd. Additional information regarding WN virus can be found on our website at **www.nyc.gov/health/wnv**

Outbreak of Cutaneous Larva Migrans at a Children's Camp, Miami, Florida, 2006

In 2006, an outbreak of cutaneous larva migrans (CLM) was identified at a large Florida day camp for children aged 2–15 years. CLM is typically caused by larvae of the dog or cat hookworm, genus *Ancylostoma*. It is characterized by raised, reddened creeping tracks which result from the larvae burrowing through the skin; therefore, cutaneous infections usually resolve spontaneously within weeks or months.

A total of 22 infected persons were identified including 18 children and 4 staff. The median age of affected campers was 4 years (range: 2–6 years). Lesions were noted primarily on the buttocks (68.2%) and the feet (45.5%). Patients were treated with thiabendazole, mebendazole, albendazole, or ivermectin.

Several potential sources of infection were considered and included sand boxes on the camp playground, a general beach area frequented by dogs, and pets at home. The investigation identified the sandbox as the likely source of infection. Feral cats had reportedly been seen on site and feces had been found in the sand boxes. No feces were available for testing, nor were specimens collected from the feral cats.

Children aged 2–6 years were allowed access to the area of the playground in which the sandbox was located for an hour each day while wearing bathing suits. Fourteen (63.7%) of the 22 who became ill did not wear shoes while sitting in the sandbox. Four (18.2%) of the persons reported seeing cats near the sandbox.

In response, sand in the sandbox was removed and replaced and two feral cats were removed from the premises. The local health department recommended that the sandbox be covered with a tarp when not in use to prevent fecal contamination and to change the sand regularly in accordance with American Academy of Pediatrics and American Public Health Association standards. Administrators also were advised to report stray animals to animal control for removal and to inspect the sandbox daily and remove feces to reduce the number of potentially infective larvae; larvae typically do not emerge from their eggs before 24 hours after deposition. After the interventions were implemented on July 26th, three additional cases were reported through September 2nd; however, these persons might have been exposed before the interventions were in place.

Outbreak of Cutaneous Larva Migrans at a Children's Camp – Miami, Florida, 2006. MMWR December 14, 2007 / 56(49); 1285–1287

Additional information available at **www.cdc.gov/ncidod/dpd/parasites/hookworm/factsht_hookworm.htm** and **www.cdc.gov/ncidod/dpd/women.htm** ■

Cluster of Neurological Illness in Pork Processing Plant Workers

In December 2007, the Minnesota Department of Health (MDH) reported a cluster of neurological illness consistent with a progressive inflammatory neuropathy among workers at pork processing plant. To date, 12 cases have been identified. Symptoms ranged from a gradually progressive, symmetric weakness and numbness to a complete acute paralysis. Two patients were hospitalized and one required an extended stay with rehabilitation. There have not been any reported fatalities.

Affected and unaffected workers were interviewed about work history, medical history, potential exposures, and other topics. Clinical specimens, including throat swabs and blood, were collected. To date, extensive testing has not identified any viral or bacterial pathogens. Exposure to a chemical toxin in the plant was also ruled out as the cause of illness.

A case control study conducted by the MDH and the Centers for Disease Control and Prevention found that the 12 affected workers were more likely to have worked in an area where pig heads were processed, and more likely to have removed brain and muscle tissue.[1] The process by which pig brains were removed involved using a machine that liquefies the brain for easy removal using pressurized air. None of the cases had any associations outside the workplace to suggest a community exposure and there has been no evidence of any infectious risk to the general public or the food supply.

Two additional pork plants in Indiana and Nebraska were found to use a similar device to remove pig brains. Further investigation identified additional workers at the Indiana plant with comparable illnesses, but none in Nebraska. Officials are trying to determine if there are any similarities to the Minnesota cluster, including the potential role of the procedure to remove the brains. The use of compressed air has been shown to result in the production of small droplets and potentially aerosolized brain tissue which could have been inhaled by the workers. Although the role of this procedure in causing human illness is not yet known, pork processing plants in Minnesota, Indiana, and Nebraska have voluntarily stopped using the technique out of caution. A summary of the investigation is available on line at **www.cdc.gov/mmwr/preview/mmwrhtml/mm57e131a1.htm**

1. Investigation of Progressive Inflammatory Neuropathy Among Swine Slaughterhouse Workers – Minnesota, 2007–2008. MMWR, January 31, 2008 / 57 (Early Release);1–3