

# ZOO NOTIC & VECTOR-BORNE

## Public Health Newsletter

Spring 2009

Vol.5 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, 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).

### Inside this issue...

Pet Food Recalls Associated with *Salmonella* Typhimurium in Peanut Butter Products

Canine Disease Surveillance

Rabies 2008 Summary

Puppy Importation

Pet Ownership and Immunocompromised Individuals

### Contact Us!

Bureau of Communicable Disease ..... 212-788-9830

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

Annie Fine MD, ..... 212-788-4388  
*Director*

Sally Slavinski, DVM, MPH,  
*Assistant Director* ..... 212-788-4160

Marilyn Campbell, ..... 212-788-4389  
*Research Scientist*

Brooke Bregman, ..... 212-788-4392  
*Research Scientist*

Asha Abdool, ..... 212-788-1947  
*Epidemiologist*

**Veterinary Public Health Services** ..... 212-676-2483

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

## Pet Food Recalls Associated with *Salmonella* Typhimurium in Peanut Butter Products



An ongoing investigation into the recent multi-state outbreak of *Salmonella* Typhimurium conducted by the Food and Drug Administration (FDA), Centers for Disease Control and Prevention (CDC), and state and local public health agencies has confirmed the source of the outbreak as peanut butter and peanut paste

produced by the Peanut Corporation of America (PCA) at its Georgia plant. The peanut butter was sold to institutions, such as schools and long-term care facilities, while the peanut paste was distributed to food companies to be used in various peanut butter-containing products, including dog and cat treats and bird food.

In January 2009, PCA voluntarily stopped production of all peanut butter and peanut paste produced at the Georgia plant and issued a recall of all peanuts and peanut products produced at the plant since January 2007. The massive recall includes several pet food products, particularly dog biscuits and treats. It is not known which of these products were distributed in NYC. The most up-to-date list of recalls is available on the FDA website at [www.accessdata.fda.gov/scripts/peanutbutterrecall/index.cfm](http://www.accessdata.fda.gov/scripts/peanutbutterrecall/index.cfm) or by calling the 24-hour CDC hotline at 1-800-CDC-INFO (1-800-232-4636).

In February, the first laboratory-confirmed case of outbreak-related *Salmonella* in a dog was reported from Oregon. *Salmonella* resembling the outbreak strain was also found in recalled peanut butter-flavored dog biscuits in the

household. At least three additional states have reported gastrointestinal illness consistent with *Salmonella* infection in dogs known to have consumed recalled peanut butter products. Pet owners may be at risk for *Salmonella* infections from handling contaminated pet products, contact with infected pets, or from cleaning up after infected pets. Clients should be advised that they can still touch and interact with pets with *Salmonella* infections but should take extra precautions to avoid coming in contact with pet feces or areas around the anus. Recalled products should not be consumed and disposed of in sealed trash bags to prevent other people and animals from becoming infected. Veterinarians in NYC may submit diarrhea (preferred) or vomitus samples of animals suspected to have come in contact with recalled products or with clinical signs consistent with salmonellosis to Cornell University's Animal Health Diagnostic Center for *Salmonella* culturing and pulsed-field gel electrophoresis (PFGE) testing. To report a case of laboratory-diagnosed case of salmonellosis in an animal, please contact Dr. Sally Slavinski at the DOHMH at 212-788-4160. ■

**References:** 1. U.S. Food and Drug Administration. Recall of Peanut-Containing Products: *Salmonella* Typhimurium. Feb 2 2009. Available at [www.fda.gov/oc/opacom/hottopics/salmonellatyp.html](http://www.fda.gov/oc/opacom/hottopics/salmonellatyp.html). Accessed Feb 17 2009.

2. Centers for Disease Control and Prevention. Questions and Answers Related to the *Salmonella* Typhimurium Outbreak and Pets. Feb 14 2009. Available at [www.cdc.gov/salmonella/typhimurium/salmonella\\_pets.html](http://www.cdc.gov/salmonella/typhimurium/salmonella_pets.html). Accessed Feb 17 2009.

3. Multistate Outbreak of *Salmonella* Infections Associated with Peanut Butter and Peanut-Butter Containing Products—United States, 2008-2009. *MMWR* 2009;58(04):85-90.

## Canine Disease Surveillance

### Leptospirosis

The DOHMH has been conducting laboratory-based surveillance for canine leptospirosis since June 2006 to help determine the prevalence of the disease and identify outbreaks. Laboratory reports of dogs residing in NYC with antibody titers  $\geq 1:800$  to any of the *Leptospira* serovars on the test panel as well as reports of laboratory-diagnosed leptospirosis from veterinarians are investigated. Veterinarians are required by law to report leptospirosis upon diagnosis, as per the NYC Health Code. Dogs infected with leptospirosis can potentially transmit the disease to humans but such direct transmission has rarely been documented.

According to the NYC case definition, which was developed for surveillance purposes only and not intended for clinical guidance, a confirmed case of leptospirosis must have a clinically compatible presentation and demonstrate a fourfold change between acute and convalescent *Leptospira* titers, obtained at least two weeks apart. A probable case has clinically compatible symptoms and a single elevated *Leptospira* titer  $\geq 1:800$ . In 2008, the DOHMH conducted 24 canine leptospirosis investigations and identified one confirmed case and seven probable cases. One dog had traveled outside NYC prior to illness onset, while the others appear to have acquired their infections locally. Two dogs died or were euthanized due to infection.

One geographic cluster, consisting of three dogs, was identified in the Manhattan Beach/Sheepshead Bay area of

Brooklyn. The onset dates of illness were June 3rd, June 26th and September 23rd. One dog had extremely elevated titers for several *Leptospira* serovars, including *bratislava*, *grippityphosa*, *autumnalis*, and *pomona* and was euthanized due to leptospirosis complications. The other two dogs showed elevated titers mainly to *bratislava* and *grippityphosa*, but also *autumnalis* and *pomona*, the serovars associated with rodents, raccoons, skunks and opossums. None of the dogs had been vaccinated against leptospirosis.

Interviews with the dog owners did not identify a common source or clear risk factors for infection. Since none of the three dogs in the cluster had traveled outside NYC, the infections were likely locally acquired. Two dog owners mentioned seeing raccoons and opossums in the yard or in the general vicinity of the neighborhood. In July, a Veterinary Advisory was sent to veterinarians in the affected area and surrounding neighborhoods to generate awareness and help identify additional cases. Assistance with leptospirosis testing was also offered but no additional cases were identified. In 2007 another small cluster was detected around the same time of year, consisting of two dogs from Park Slope, Brooklyn, both of which were walked in Prospect Park. For more information on reporting leptospirosis, go to [www.nyc.gov/html/doh/html/zoo/zoo-reporting.shtml](http://www.nyc.gov/html/doh/html/zoo/zoo-reporting.shtml).

Canine Disease Surveillance—continued on page 2

## Rocky Mountain Spotted Fever

Human surveillance has shown that, unlike other tickborne diseases, Rocky Mountain spotted fever (RMSF) can be acquired locally within NYC. Tick surveillance has shown that the tick responsible for transmitting RMSF, *Dermacentor variabilis* (American dog tick) is abundant in all five boroughs. In June 2008, the DOHMH began investigating laboratory reports of dogs in NYC testing positive for RMSF. Laboratory reports of elevated serum antibody titers to *Rickettsia rickettsii*  $\geq 1:1024$  are indicative of

active infection. Interviews of both the veterinarian and owner are conducted to review the clinical presentation of the dog and determine where the infection was likely acquired. Since there is no national standard case definition for canine RMSF, the DOHMH developed a case definition for surveillance purposes only. It is not intended to serve as a clinical guide. In addition to having a clinically compatible presentation, a confirmed case must demonstrate a fourfold change between acute and convalescent titers obtained 2 to 3 weeks apart. A probable case has a single titer  $\geq 1:1024$  along with compatible symptoms.

Of the three positive laboratory reports investigated in 2008, two were determined to be cases: one confirmed and one probable. Both cases likely acquired their infections outside NYC: one dog had traveled to Fire Island and the other to upstate New York in the month prior to illness onset. Although surveillance for RMSF is limited to reports collected from a single laboratory, the incidence among NYC dogs appears to be low. ■



## Puppy Importation

The importation of puppies into the United States fueled by a boom in Internet sales has been a growing problem since around 2003. People selling or buying puppies may find it less expensive to import puppies from other countries than to purchase them in the US. In addition, breeders overseas face fewer, if any, regulations. As a result, dog breeding operations that prioritize profit over the health and well-being of the dogs have increased. The inhumane conditions in which the dogs may be kept put their health at risk and the health and behavior problems that result may cause emotional and financial hardships for their new, often unsuspecting, owners.

The Centers for Disease Control and Prevention (CDC) does not require health certificates for dogs and cats entering the US although individual states may have separate entry requirements. However, dogs are subject to inspection at ports of entry and any animal that shows evidence of an infectious disease that can be transmitted to humans may be required to have a veterinary exam and possibly denied entry into the country. Although health regulations for animal imports have long been in place, they were not originally intended to regulate commercial imports and have been unable to adequately ensure the health of puppies coming into the US from other countries. CDC's Division of Global Migration and Quarantine is responsible for monitoring imported animals for infectious diseases that affect humans; this Division operates one of many US quarantine stations at the JFK airport.

The primary public health concern with dog importation is rabies. Federal law requires all dogs imported into the US to be currently vaccinated against rabies at least 30 days prior to entering the country. According to Federal Public Health Service Foreign Quarantine Regulations, unvaccinated dogs may still be imported if a Confinement Agreement (CDC Form 75.37) is completed. The Agreement states that puppies too young to be vaccinated upon arrival must be confined by the importer/owner until they are three months of age, vaccinated, then confined for an additional 30 days to allow adequate time for the production of rabies antibodies. The importer/owner must provide a contact address and is responsible for meeting the terms of the confinement agreement. Dogs cannot be sold or transferred during the confinement period. In our last newsletter issue (Fall 2008, Vol. 4 No. 1), we reported on an 11 month old mixed breed puppy imported from Iraq to Newark, New Jersey as part of the "Operation Baghdad Pup" project that initially appeared

healthy at the time of transport but went on to develop rabies after arriving in the US. Thirteen people were exposed to the rabid puppy, all of whom received rabies post-exposure prophylaxis, as well as 23 dogs and 1 cat. None of the animals had evidence of rabies vaccination and were therefore required to undergo a 6-month quarantine period. Without sufficient legislation and law enforcement, the introduction of rabies and other zoonotic diseases from imported animals remains a risk.

Previous investigations have shown that a large number of puppies under 3 months of age are being imported from rabies endemic countries in Europe and South America, and South Korea and are not being vaccinated against rabies before being sold to the public. The New York State Department of Agriculture and Markets requires pet dealers to be licensed and inspected while the US Department of Agriculture (USDA) oversees the licensing and inspections but many importers operate illegally without licenses. Furthermore, Internet sales of animals directly to the public are not currently subject to the Animal Welfare Act and therefore not required to be inspected by the USDA. However, a promising step to close this loophole occurred in September 2008 with the introduction of the Puppy Uniform Protection and Safety (PUPS) Act. The amendment, also known as Baby's Bill in honor of a rescued puppy mill dog, would require large, commercial breeders who sell dogs online to be licensed and regulated in the same manner as other animal wholesalers and that dogs used for breeding be removed from their cages for at least one hour of exercise daily.

Dogs of all breeds and ages are imported into the US but the most common imports into NY are purebred puppies, particularly toy and teacup size breeds and expensive breeds such as French and English bulldogs. In addition to being a rabies risk, illegally imported puppies are often in poor health and may harbor severe respiratory and parvovirus infections. Puppies allowed to remain with their mother for a longer period can be properly weaned and are often healthier and better able to withstand the stresses of long-distance transport.

Another important victory in the fight against illegal puppy importation was Congress' approval of an amendment to the Farm Bill in May 2008. The Bill now includes a provision which requires that all dogs imported for commercial purposes be healthy, have received all necessary vaccinations, and be at least 6 months old. Prior to this amendment, there were no additional regulations for dogs imported for commercial purposes aside from CDC's rabies vaccination requirement. However, "commercial" still needs to be clearly defined in legal terms before the Bill can be properly enforced. The fight continues but improved consumer awareness, stronger legislation, and the ongoing crackdown on illegal importers is making a difference. Last year, the number of shipments with deceased puppies arriving at JFK was reduced to zero.

If you know of someone looking for a new pet, encourage adoption as the first option. Pets can be adopted through Animal Care and Control by calling 311, through the ASPCA, or other local animal shelters. Those seeking a pure breed should take time to research and find a reputable breeder. If you are made aware of an incident in which there has been a confinement violation or know of someone who is in violation of the New York State or USDA licensing requirements, contact Dr. William Huntley or Ana Marie Colon at the New York State Department of Agriculture and Markets at 518-457-3502. ■

- References:**
1. American Society for the Prevention of Cruelty to Animals. Fight Animal Cruelty. 2009. Available at [www.aspc.org/site/PageServer?pagename=cruelty\\_puppymills\\_laws](http://www.aspc.org/site/PageServer?pagename=cruelty_puppymills_laws). Accessed Jan 1 2009.
  2. Centers for Disease Control and Prevention Division of Global Migration and Quarantine. Bringing an Animal into the United States. Aug. 8, 2008. Available at [www.cdc.gov/print.do?url=http%3A/www.cdc.gov/nCIDod/dq/animal/dogs.htm](http://www.cdc.gov/print.do?url=http%3A/www.cdc.gov/nCIDod/dq/animal/dogs.htm). Accessed Jan 1 2009.
  3. Humane Society of the United States. Federal Lawmakers Introduce Bill to Crack Down on Abusive Puppy Mills. Sept. 19, 2008. Available at [www.hsus.org/press\\_and\\_publications/press\\_releases/federal\\_lawmakers\\_introduce\\_puppy\\_mill\\_legislation\\_091908.html](http://www.hsus.org/press_and_publications/press_releases/federal_lawmakers_introduce_puppy_mill_legislation_091908.html). Accessed Jan 1 2009.

## The One Health Initiative Task Force (OHITF)

On April 14, 2007, the AVMA Executive Board took official action to establish a One Health Initiative by approving a recommendation by then-president Dr. Roger K. Mahr to establish a One Health Initiative Task Force (OHITF). The purpose of the task force was to study the feasibility of a campaign to facilitate collaboration and cooperation among health science professions, academic institutions, governmental agencies, and industries to help with the assessment, treatment, and prevention of cross-species disease transmission and mutually prevalent, but non-transmitted, human and animal diseases, and medical conditions.

The vision and mission statements propose that the One Health Initiative is dedicated to improving the lives of all species—human and animal—through the integration of human medicine and veterinary medicine. Recognizing that human and animal health and mental health (via the human-animal bond phenomenon) are inextricably linked, One Health seeks to promote, improve, and defend the health and well-being of all species by enhancing cooperation and collaboration between physicians, veterinarians, and other scientific health professionals and by promoting strengths in leadership and management to achieve these goals.

More information can be found online at: [www.onehealthinitiative.com/taskForce.php](http://www.onehealthinitiative.com/taskForce.php)

As part of this initiative, the Florida Department of Health publishes a quarterly newsletter to lend support to and is dedicated to enhancing the integration of animal, human, and environmental health for the benefit of all. The following article was published in the Fall 2008 edition and can be found online at [www.doh.state.fl.us/Environment/medicine/One\\_Health/OHNLFall2008.pdf](http://www.doh.state.fl.us/Environment/medicine/One_Health/OHNLFall2008.pdf)



## Rabies 2008 Summary

In 2008, nineteen animals tested positive for rabies in NYC (see table), compared to 44 in both 2006 and 2007. The positive animals included 13 from the Bronx (4 raccoons, 7 skunks, 1 cat, and 1 bat), 1 bat in Brooklyn, 1 raccoon in Queens, and 4 raccoons from Staten Island. Staten Island saw a notable decline in rabid animals compared to 2006 (n=35) and 2007 (n=29). A single positive raccoon collected in Queens appears to be an isolated incident as heightened surveillance has not identified additional cases in that borough. City Island reported terrestrial rabies for the first time in 2008; 2 raccoons, 3 skunks, and a stray cat from City Island accounted for almost half of the positive animals from the Bronx (see map). Previously, most rabid animals from the Bronx had been found in the Riverdale area. On Long Island, the epizootic also appears to have slowed down based on surveillance conducted by health officials in Nassau and Suffolk counties and the New York State Department of Health.

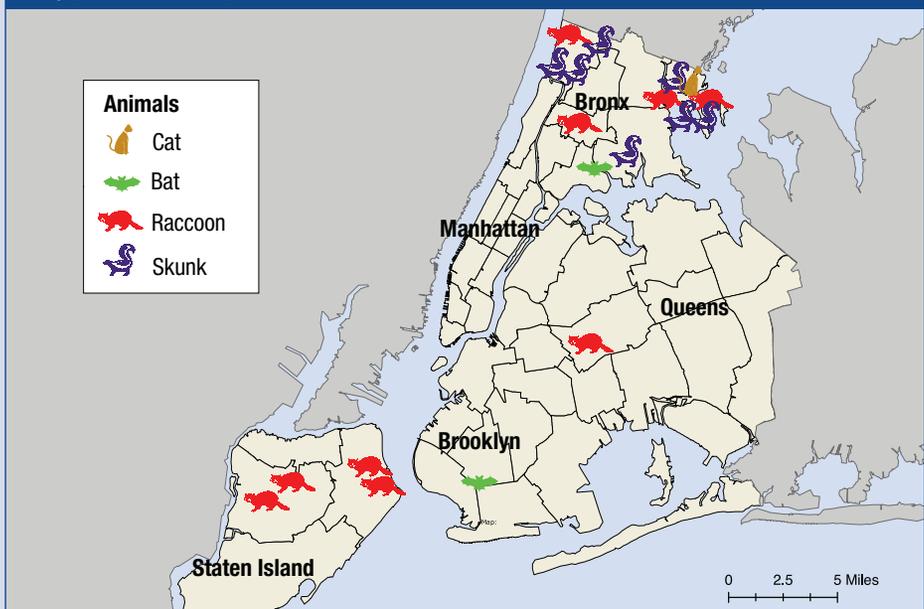
We remind veterinarians to report any animal, owned or wild, which is suspected of having rabies and encourage clients to vaccinate their cats and dogs. For more information about rabies in NYC visit [www.nyc.gov/health/rabies](http://www.nyc.gov/health/rabies).



## Animal Rabies in New York City

January 1, 2008 - December 31, 2008

The City of New York  
Department of Health and Mental Hygiene



### Animals Testing Positive for Rabies in NYC 2008

	Bronx	Brooklyn	Manhattan	Queens	Staten Island	TOTAL
Raccoon	4	0	0	1	4	9
Skunk	7	0	0	0	0	7
Bat	1	1	0	0	0	2
Cat	1	0	0	0	0	1
Dog	0	0	0	0	0	0
<b>TOTAL</b>	<b>13</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>4</b>	<b>19</b>

## Pet Ownership and Immunocompromised Individuals

The following article is a chapter from the soon to be released book *Human-Animal Medicine: Clinical Guide to Toxic, Zoonotic and Other Shared Health Risks*, Elsevier (Spring 2009)

### Immunocompromised Individuals

Lisa Conti, DVM, MPH, Dipl ACVPM  
Peter M. Rabinowitz, MD, MPH

#### 1. Introduction

Available evidence continues to suggest that the psychosocial support value of companion animals — particularly for the elderly or infirm —<sup>1,2,3</sup> outweighs the risk of acquiring a serious infection from such animals. Nevertheless, issues regarding hygiene and common sense practices must be addressed to support a healthy human-animal bond, especially among immunocompromised people or pets.

A large proportion of American households include pets<sup>4</sup>, and millions of people in this country are living with a less than robust immune system. Immunosuppression can result from a number of etiologies, either, rarely, from a primary/genetic malfunction, or, commonly, as a result of a secondary or acquired factor such as human immunodeficiency virus (HIV) in people or feline leukemia virus (FeLV) in cats, or immunosuppressive chemotherapy. In general, defects in humoral immunity (B cell lines) can lead to increased susceptibility to bacterial infections; cell-mediated immunity (T cell lines) defects to viral, fungal or protozoal infections, and defects of phagocytosis or the complement system to disseminated infections. Pet ownership among immunocompromised persons is common. For example, studies of patients with HIV infec-

tion have reported rates of pet ownership similar to that of the general population with about half owning or living with pets.<sup>5</sup> In addition, on a global level, the HIV/AIDS pandemic has created large populations of individuals with compromised immune systems, many of whom may also be exposed to zoonotic diseases.<sup>6,7</sup> Human and veterinary clinicians are quite likely to encounter situations where they may provide appropriate guidance for reducing animal sources of infectious diseases for humans and vice versa, by educating themselves and staff to provide the best available information.

**Table 1: Etiologies of inability to mount an effective immune response (immunocompromised state)** is available at: [www.doh.state.fl.us/Environment/community/One\\_Health/Immuno\\_Table1\\_Fall2008.pdf](http://www.doh.state.fl.us/Environment/community/One_Health/Immuno_Table1_Fall2008.pdf)

#### 2. Impact of human immunodeficiency states on animal-human disease transmission.

There are at least three possible effects of human immunodeficiency on animal-human disease transmission:

1. An immunocompromised host is more susceptible to infection with opportunistic disease.
2. An immunocompromised host may transmit opportunistic disease to others.
3. A disease may be more severe in an immunocompromised host. (An example is toxoplasmosis, which causes asymptomatic or mild disease in most immunocompetent patients, but can cause severe and even fatal systemic disease in immunocompromised individuals.)

The knowledge level among immunocompromised persons and their health care providers about the risk of

acquiring infections from pets could be increased with an appropriate educational strategy. In one study in which over 400 AIDS patients were interviewed — half of whom owned pets — only about 10 percent who were living with pets were given any information about zoonotic diseases from their health care provider and one-quarter of this information was incorrect or misunderstood (e.g., “fleas can give you rabies,” “cats can give you AIDS”).<sup>11</sup> Because pet ownership is as common (and understanding of zoonoses as likely uncommon) among persons living with AIDS as in the general population, human health care providers must be prepared to discuss with immunocompromised patients the risks of living with pets. Overly conservative approaches, including physician recommendations for their patients to relinquish pets have largely been unheeded as owners often have strong bonds with their animals.<sup>12</sup> Armed with complete and accurate information, patients and their care providers can weigh these risks against the often substantial benefits of love, touch, social support, and companionship that accrue to pet owners. Zoonotic disease prevention is a shared responsibility among human and veterinary and public health professionals. Improving communication among these persons will enhance zoonotic disease prevention.<sup>13</sup>

#### 3. Human Health Setting

Pet-owning human health practitioners must be vigilant regarding nosocomial zoonoses, particularly if they are working with immunocompromised patients. In one situation, a common yeast pathogen of canine otitis externa was introduced into a neonatal intensive care unit by a dog-owning health care worker, causing colonization in infants, some with serious infection.<sup>14,15</sup> In another

case, a cat on a geriatric ward was the likely suspect of staphylococcal infections.<sup>16</sup>

#### 4. General Guidelines for the Prevention of Zoonotic Disease in Immunocompromised Patients

##### Guidance from Both Human Health and Veterinary Providers

- Hand and food hygiene is vital. Pets are not likely the most common source of zoonotic disease infection. More likely, contact with raw or undercooked meat, or from an environmental infectious source are implicated in transmission. Unequivocally, immunocompromised individuals should avoid raw meat and eggs, and unpasteurized dairy products. For example, while cats are the definitive host for *Toxoplasma gondii*, it is undercooked meat (<165°F) and inadequately washed, contaminated fruits and vegetables that are likely the source for infection. (Links to United States Department of Agriculture [USDA] food safety fact sheets [www.fsis.usda.gov/Factsheets/Keep\\_Food\\_Safe\\_Food\\_Safety\\_Basics/index.asp](http://www.fsis.usda.gov/Factsheets/Keep_Food_Safe_Food_Safety_Basics/index.asp) and [www.fsis.usda.gov/Fact-sheets/At\\_Risk\\_&\\_Underserved\\_Fact\\_Sheets/index.asp](http://www.fsis.usda.gov/Fact-sheets/At_Risk_&_Underserved_Fact_Sheets/index.asp))
- Serologic or fecal evaluation of healthy cats for toxoplasma infection is not recommended. Oocysts are shed transiently and are easily missed and serologic evaluation does not predict cats shedding oocysts. Instead, prevention of transmission of toxoplasma directly from cats should focus on the husbandry recommendations stated below.
- Pets should not be given prophylactic antibiotics without clinical signs of infection (e.g., salmonella carriage in reptiles cannot be eliminated. Use of antibiotics for this purpose has been unsuccessful and may favor development of antibiotic resistant bacteria).<sup>17</sup>
- Any bite or wound from an animal should be flushed with copious amounts of soap and water, and a health care provider contacted for wound management, including assessment for appropriate antibiotics, tetanus and possible rabies post exposure prophylaxis.
- Review guidance to reducing exposure to selected opportunistic diseases among persons with HIV ([www.cdc.gov/mmwr/preview/mmwrhtml/rr5108a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5108a1.htm)).
- Encourage questions about healthy living with pets.
- Pet vaccines, including live attenuated strains, should be recommended as they are not thought to cause a human health hazard.<sup>18</sup>

##### Occupational or Recreational Risk Reduction

- Avoid contact with wild animals to reduce the risk of enteric disease such as acquiring cryptosporidium from wild birds
- NEVER touch the feces of any animal
- Avoid farm animals and petting zoos to decrease exposure to *E. coli* in ruminants, *Bordetella bronchiseptica* in swine, and salmonella in chicks and ducks, for example.
- Occupational health providers working with high risk workers such as veterinarians, veterinary staff, zookeepers and pet shop workers should counsel immunocompromised workers about the risk of occupational zoonotic disease infection, and consider work restrictions to reduce risk for workers with significant impairment of immunity.

##### Animal Selection Recommendations for Immunocompromised Persons

- Select healthy, well mannered, dogs or cats 6 months or older to decrease the likelihood of exposure to enteric diseases and *Bartonella* from kittens.
- Avoid petting or handling free-roaming animals; when selecting a pet, choose one with a documented veterinary health history and current vaccinations.

- Avoid exotic or wild animals to reduce the likelihood of exposure to emerging infections (i.e., monkeypox in rodents) and known diseases such as herpes B infection from macaque monkeys and salmonella from reptiles.
- Cockatoos, like pigeons, may shed *Cryptococcus* in their feces, and transmission of this infection was documented from a cockatoo to its owner who was chronically immunocompromised because of a renal transplant.<sup>19</sup> Therefore, some authors have recommended that immunocompromised patients not own cockatoos.<sup>20</sup>
- A fatal outbreak of lymphochoriomeningitis virus (LCMV) in solid organ transplant recipients was traced back to a pet hamster acquired by the organ donor 17 days before organ donation. The prevalence of this virus in rodent populations has led to recommendations that immunocompromised individuals (as well as pregnant women) should avoid owning pet rodents or having contact with wild or pet rodents.<sup>21</sup>
- Have a veterinarian conduct a physical examination and fecal analysis on the new pet

##### Animal Husbandry Guidance for Immunocompromised Persons

- Seek veterinary care early in the course of clinical disease of pets to limit chances for zoonotic disease exposure.
- Keep pets indoors or on leashed walks to decrease the likelihood of engagement with other animals.
- Because of occasional cases of *Bordetella bronchiseptica* among immunocompromised persons,<sup>22</sup> avoid exposing dogs or owners to situations in which dogs are congregated such as boarding kennels, grooming parlors, off leash dog parks, or dog shows.
- Do not allow pets to hunt or scavenge or eat feces to reduce the likelihood of exposure to enteric infections.
- Do not feed pets raw meat or egg diets or provide unpasteurized dairy products to limit exposure to enteric infections.
- Do not allow your pet to drink from the toilet.
- Keep animals and litter boxes out of food preparation areas.
- Avoid exposure to pet's urine, feces, saliva (don't allow your pet to lick your face or open lesions).
- Have a non-immunocompromised household member remove pets' solid waste and dispose daily by flushing down a toilet, discarding in the garbage or in a compost area (not to be spread on fruits or vegetables).
- Avoid animals with diarrhea; have an immunocompetent household member clean soiled areas in the house of organic debris, followed by a 1:10 household bleach solution.
- Avoid rough play with the pet that could result in being bitten or scratched, keep pet's nails trimmed short.
- Remove and dispose of bird cage linings daily and use "wet" cleaning for the cage and utensils on a weekly basis. Wear gloves when handling items that are contaminated with bird droppings.
- Have an assistant clean the fish tank, or wear disposable gloves during such activities, washing hands thoroughly with running water and soap afterwards.
- If assistance is required to care for your pet, contact local volunteer groups who may be willing to provide exercise, food or foster care (e.g., during hospitalization).

##### 5. U.S. Public Health Service Guidelines for HIV positive individuals:

While any zoonotic disease that occurs in immunocompetent individuals can also affect immunocompromised patients, the U.S. Public Health Service has highlighted a number of animal-agents that pose a significant risk to

HIV-infected persons. These include causes of enteritis, (especially campylobacter, salmonella, and cryptosporidium), and *Bartonella*, toxoplasma, histoplasma, and *Mycobacterium marinum*. The evidence-based recommendations of the U.S. Public Health Service and the Infectious Diseases Society of America are listed in Table 2.

**Table 2: Guidelines for Preventing Opportunistic Infections among HIV-Infected Persons** can be found at: [www.doh.state.fl.us/Environment/community/One\\_Health/Immuno\\_Table2\\_Fall2008.pdf](http://www.doh.state.fl.us/Environment/community/One_Health/Immuno_Table2_Fall2008.pdf)

While these guidelines recommend that human health care providers perform such counseling, surveys of physicians have indicated that many feel that veterinarians are best equipped to provide such counseling and should therefore be involved in patient education of immunocompromised individuals.<sup>23</sup> Some authorities have stated that veterinarians are more qualified than physicians to advise pet owners and persons in high risk professions about zoonotic risks.<sup>24</sup>

##### 6. Public Health Role of the Veterinarian: Safer Pet Ownership for Immunocompromised Persons and Care of Immunocompromised Pets

In the veterinary setting, pet owners may be more willing to request information regarding safer pet ownership for immunocompromised persons if there are, for example, posters and handouts encouraging such client education, or information in practice newsletters. Veterinarians can address general high risk humans during general discussions about zoonotic disease diagnosis, control and prevention. Veterinarians should also emphasize among their staff the need for strict confidentiality regarding any personal information an animal owner happens to disclose about their own medical status (it is not recommended, for example, to document human medical information in the veterinary record).

##### Care for Pets of Immunocompromised Owners

- Gonadectomize the pet Provide strict adherence to strategic deworming protocols and maintenance of appropriate vaccinations.
- Be prepared to discuss end of life planning for the pet's continued care ([www.hsus.org/pets/pet\\_care/guidelines\\_for\\_finding\\_a\\_responsible\\_home\\_for\\_a\\_pet.html](http://www.hsus.org/pets/pet_care/guidelines_for_finding_a_responsible_home_for_a_pet.html))

##### Care for Immunodeficient animals

- Do not administer modified live virus vaccines
- Manage secondary and opportunistic infections
- Provide supportive care

##### Guidance for owners of immunodeficient animals

- Animals with primary immunodeficiency disorders should not be bred
- Cats with FIV or FeLV can spread the viruses to other cats typically via bite wounds or close contact (FeLV). Therefore, separate household contacts that are FIV/FeLV negative. (All cats with unknown FIV/FeLV status presenting with a bite wound should be tested for these viruses at the time of presentation and again 60 days later.)
- Keep these animals indoors, do not allow pets to hunt or scavenge, consume raw meat or egg diets, or unpasteurized dairy products.
- Wash hands before and after handling the pet.
- Provide appropriate endo- and ectoparasite control
- Avoid exposure to other ill animals

*Dr. Lisa Conti is the Director of the Division of Environmental Health at the Florida Department of Health. Dr. Peter Rabinowitz is an Associate Professor of Medicine at Yale Occupational and Environmental Medicine Program, Yale University School of Medicine.* ■