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This newsletter was created to lend support to the One Health Initiative and is dedicated to enhancing the integration of animal, human, and environmental health for the benefit of all.

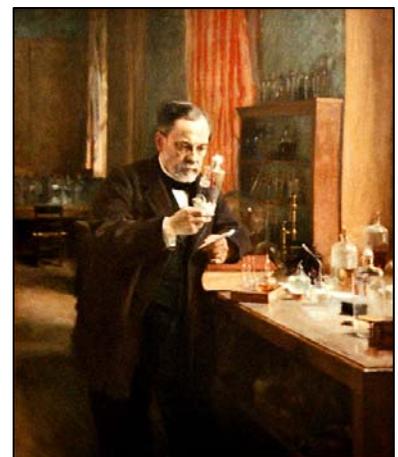
Louis Pasteur and One Health

Laura H. Kahn, MD, MPH, MPP

If Louis Pasteur were alive today, he would support “One Health.”

Although Pasteur began his career as a chemist, much of his career was devoted to studying the microbiological processes of life. For example, in Lille, France, his scientific activities focused on the local industrial interest: the fermentation of beet sugar into alcohol. He discovered that yeasts played a key role in fermentation.

After his success with understanding fermentation, he was asked to investigate why silkworms in the south of France were dying. After five years of intensive work, he discovered that two different diseases were killing them: pebrine (a disease caused by the microscopic parasite *Nosema bombycis*) and flacherie (a disease caused by infected or contaminated mulberry leaves). His discoveries provided additional proof of the role of microorganisms in causing disease.



Pasteur noticed small details that others missed, and he recognized the connection between microorganisms causing disease in silkworms, animals, and humans. One of his greatest challenges was convincing the medical establishment that germs caused disease. Although a number of physicians and researchers had previously identified microscopic organisms in dead humans and animals, they believed that the microorganisms were the *result* rather than the *cause* of disease. His well-executed experiments and power of persuasion eventually won over many physicians including Dr. Joseph Lister, a surgeon in Edinburgh, who applied Pasteur’s germ theory to surgery. Lister was the first to perform surgery under antiseptic conditions with spectacular results: the surgical mortality rate from post-operative wound infections plummeted.

It was Pasteur’s work with chickens and the bacteria that caused chicken cholera that led to one of his greatest scientific contributions—the application of vaccination to diseases other than smallpox. When he injected chickens with old liquid cholera broth, they briefly got sick, but they didn’t die. Subsequent injections with fresh cholera broth didn’t kill them either. Pasteur hypothesized that injecting weakened microbes to induce immunity against the virulent microbes could be applied on wide scale. He succeeded in applying this theory by preventing anthrax in animals and rabies in humans; he saved the life of a young boy who had been bitten by a rabid dog.

If Louis Pasteur were alive today, he would support "One Health."

The One Health Initiative recognizes that human and animal health are inextricably linked.



"One Health" is dedicated to promoting, improving and defending the health of all species.....

..... with the cooperation and collaboration of physicians, veterinarians and public health professionals.

Pasteur's accomplishments were cross-disciplinary and revolutionary. While his research initially began in chemistry, it eventually broadened to include microbiology and immunology. He recognized that disease processes were similar across many life forms including worms, animals, and humans. The "One Health" efforts burgeoning today continue the tradition set forth by past luminaries such as Louis Pasteur.

Dr. Laura H. Kahn is a member of the Research Staff in the Program on Science and Global Security at Princeton University's Woodrow Wilson School of Public and International Affairs.



The American Veterinary Medical Association's One Health Task Force

Carina Blackmore, DVM, PhD

Emerging infectious diseases, antibiotic resistance and concerns about the sustainability of Florida's water sources are all examples of challenges that span human, animal and environmental health. Recognizing this critical interdependence of human, animal and eco system health Dr. Roger K. Mahr, then president of the American Veterinary Medical Association (AVMA), told the 2006 AVMA House of Delegates, "We need our colleagues in human medicine, public health, and the environmental health sciences. Together, we can accomplish more in improving global health than we can alone, and we have the responsibility to do so." He proposed creating a One Health Initiative Task Force responsible for articulating a vision that enhances the integration of the three disciplines.

The establishment of a One Health Initiative Taskforce was approved by the AVMA Executive Board in May 2007 and the members were announced two months later at the AVMA Annual Convention in Washington DC. The 13 member task force is comprised of key leaders in public health, human medicine, environmental health, veterinary medicine, education, and industry. In addition, the AVMA, the American Medical Association (AMA), and the American Public Health Association (APHA) each have a representative that serves as a liaison to the Task Force. "A nucleus of the most visionary individuals was selected for their expertise and not necessarily as a representative of a specific group," Dr. Mahr said.

The members include: Dr. Larry Anderson, AMA, Dr. Carina Blackmore, State of Florida Department of Health, Dean Michael Blackwell, University of Tennessee, Dr. Lonnie King, Centers for Disease Control and Prevention (Chair), Dr. Beth Lautner, US Department of Agriculture, Animal and Plant Health Inspection Service, Dr. Leonard Marcus, Travelers' Health and Immunization Services, Mr. Travis Meyer, Student AMA, Dr. James Nave, Tropicana Animal Hospital, Dr. Thomas Monath, Kleiner Perkins Caufield and Byers, Mr. Joerg Ohle, Bayer Animal Health, Dr. Marguerite Pappaioanou, American Association of Veterinary Medical Colleges, Mr. Justin Sobota, Student AVMA (University of Florida), and Admiral William Stokes, U.S. Public Health Service. The liaisons include: Dr. Ronald Davis, AMA, Dr. Jay Glasser, APHA, and Dr. Roger Mahr, Immediate Past President AVMA.

The One Health Initiative Taskforce was established in May of 2007.



CDC announces successful eradication of canine rabies from the United States.....

The One Health Initiative Task Force is charged with:

1. Articulating a vision of One Health that will enhance the integration of animal, human, and environmental health for the mutual benefit of all.
2. Identifying areas where such integration exists and where it is needed.
3. Identifying potential barriers or challenges to such integration.
4. Identifying potential solutions to overcoming barriers or meeting challenges.
5. Preparing a comprehensive written report for the Executive Board detailing its findings and recommendations.

The Task Force met in Chicago on November 26-28, 2007. During this meeting the Task Force:

- Developed a working definition for “One Health;”
- Examined the scope of “One Health;”
- Addressed the first four points of the Task Force charge;
- Members each discussed their vision of One Health and its impact on global human and animal health and the environment;
- Discussed a unified approach of moving the One Health initiative forward;
- Discussed potential Communication Plan for the One Health Initiative

A brainstorming session provided numerous potential recommendations that members will study between now and **the next Task Force meeting, scheduled for January 31 – February 1, 2008.** The written report will be finalized and presented to the Executive Board in the spring of 2008.

Dr. Blackmore is the State Public Health Veterinarian and State Environmental Epidemiologist in the Division of Environmental Health at the Florida Department of Health.



Canine Rabies in the U.S.

Danielle Stanek, DVM and Carina Blackmore, DVM, PhD

The Center for Disease Control and Prevention (CDC) recently announced the successful eradication of canine rabies from the United States. This press release was made in conjunction with the first World Rabies Day and showcases the potential for control of the disease, particularly in the natural canid reservoir. However, in 2006 there was an 8.2% increase in animal rabies cases reported in the US and the disease still poses a threat to dogs and other domestic animals, as well as to the general public¹.

Rabies virus can infect and kill any mammal species. Specific virus strains or variants tend to circulate within a species, with occasional spill-out into other mammals. Very rarely a variant that has “spilled-out” into another species can maintain circulation in the new species.

Canine rabies in the United States has drastically declined as a result of mandatory vaccination laws and animal control policies implemented in the 1940's

But wildlife variants of the virus still pose a threat to domestic pets and people.



Raccoons have emerged as the predominant reservoir for the rabies virus in Florida.

and 1950's. Major canine variant circulation was eliminated by the late 1960's leaving wildlife as the primary rabies reservoirs in the U.S (Figure 1).

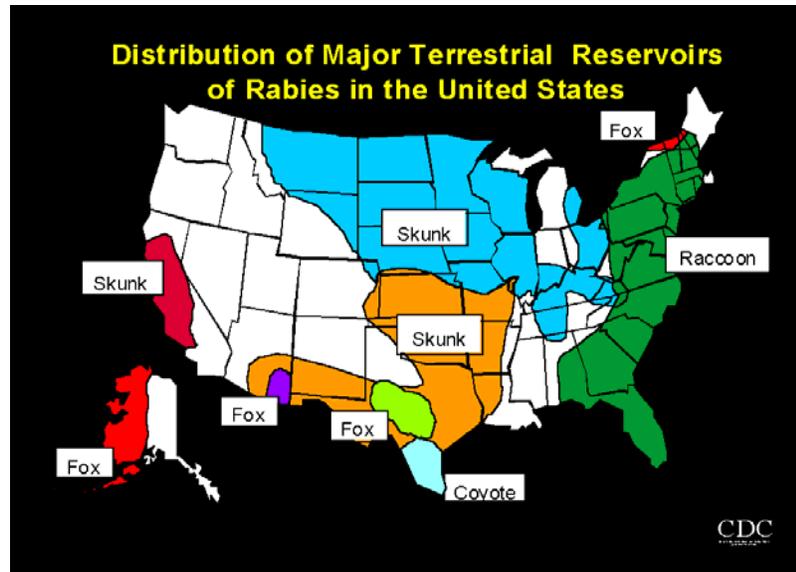


Figure 1

However Mexico continues to have significant canine rabies cases and has circulating canine variants. One of these variants spilled over into coyotes and unvaccinated dogs in Texas and was a growing problem until an oral rabies animal bait (ORAB) program directed at coyotes was implemented in 1995. In addition, the U.S. and Mexico worked together to control canine rabies in bordering states of Mexico. In 2004 there was only one case of this canine variant identified. Since that time there have been no additional cases and incidence of a canid variant circulating in grey foxes in Texas and the southwest have been reduced. Strengthened wildlife translocation laws have made the chances of reintroduction of the Mexican canine variant less likely.

In Florida, rabies historically circulated in dogs². That changed in the late 1940's as local ordinances mandated canine rabies vaccination and consistent animal control practices. In 1953, rabies was first identified in bats in the U.S. when a bat that attacked a child in the Tampa Bay area tested positive for the virus. At the same time rabies was identified in increasing numbers of raccoons in Florida, initially in the Brevard County area and then spreading throughout the state. In 1956, Florida rabies cases in wildlife surpassed cases in domestic animals. Since that time, raccoons have emerged as the predominant reservoir for the virus. On average, three dogs are confirmed infected with raccoon rabies each year in the state.

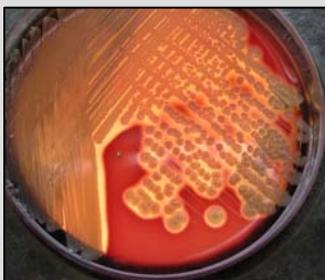
All five of the Florida state laboratories provide rabies testing. In addition, the Bureau of Laboratories-Jacksonville has been typing all terrestrial animal rabies cases for the state since 1998. The data indicate that terrestrial animal cases, including domestic animals, are infected with raccoon variants A or B, with most cases being type A. Type B cases are consistently found in west central Florida. Non-terrestrial or bat variant typing must be performed at CDC but generally bats are infected with bat rabies variants that tend to be species specific.

Though the Mexican canine variant of the rabies virus appears to be eradicated in the U.S., the raccoon, bat, skunk, fox, and mongoose (Puerto Rico) variants are still present.

Rabies vaccination of domestic animals remains key to protecting humans and pets against infection by this nearly uniformly fatal disease.



Humans are believed to be the natural reservoir for MRSA, with spill-over into pets and livestock.



Staphylococcus aureus

The 6,940 rabid animals identified in 2006 serve as a reminder of the importance of domestic animal vaccination. Human exposures are closely related to rabies infections in domesticated animals, and domestic animals may be infected with any circulating virus variant. Rabies vaccination of dogs, cats and ferrets is required by law in the state of Florida. As long as the virus remains endemic in our native wildlife, rabies vaccination of domestic animals remains key to protecting humans and domestic animals against infection by this nearly uniformly fatal disease.

References

¹ Blanton, J.D., C.A. Halon & C.E. Rupprecht. 2007. Rabies Surveillance in the United States during 2006. JAVMA. 231(4):540-556.

² Burrige, M.J., L.A. Sawyer & W.J. Bigler. 1986. Rabies: a historical profile in *Rabies in Florida*. Health Program Office, Department of Health and Rehabilitative Services, State of Florida. p 1-6.

Dr. Stanek is a medical epidemiologist in the Division of Environmental Health. Dr. Blackmore is the State Public Health Veterinarian and State Environmental Epidemiologist, also in the Division of Environmental Health.



MRSA in Pets

Danielle Stanek, DVM & Carina Blackmore DVM, PhD

Methicillin-resistant *Staphylococcus aureus* (MRSA) has been prominently featured in the news following the death of a Virginia high school student from community acquired Methicillin Resistant *Staphylococcus aureus*, and the release of the October 17, 2007 issue of *Journal of the American Medical Association* featuring a MRSA epidemiologic study : “Invasive Methicillin-Resistant *Staphylococcus aureus* Infections in the United States” and an associated editorial “Antimicrobial Resistance: It’s Not Just for Hospitals”.

Currently data are lacking regarding the duration and degree of MRSA colonization of animals and it is unknown whether animals are an important primary source for MRSA infections.ⁱ Based on current knowledge DEFRA in the UK advises: “Companion animals carrying or infected with MRSA could be regarded as equivalent in risk to human carriers or patients infected with the organism. The advice from HPA (UK’s CDC) regarding human carriers or infected patients is that MRSA does not pose a risk to hospital staff (unless they are suffering from a debilitating disease) or family members of an affected patient or their close social or work contacts.”ⁱⁱ

The Florida State Public Health Veterinarian concurs that based on current information, pets with clinical MRSA infections or whom are carrying MRSA do not pose a significant health risk for healthy individuals when managed as recommended by the BSAVA

(<http://www.bsava.com/resources/msa/mrsaguidelines/>). Scrupulous hand hygiene and maintenance of a clean, hygienic environment are critical for the

The primary mode of transmission is direct contact, particularly via the hands.



Maintaining excellent hand hygiene and a clean environment are key to preventing the spread of MRSA in pets and people.

*American Red Cross begins screening blood donations for *Trypanosoma cruzi*, the parasite that causes Chagas disease.*

owner and the practitioner. Most common environmental disinfectants such as Lysol and Pine-Sol will inactivate MRSA. Prudent use of antibiotics is also emphasized for the practitioner.

Humans are believed to be the natural reservoir for MRSA, with spill-over into pets and livestock.ⁱⁱⁱ Studies suggest that carrier or clinically ill “spill-over” animals can act as a reservoir and transmit MRSA to other animals and people. Such animals, as well as potential human carriers in the home, should be taken into consideration if a person or another animal in the household has a serious debilitating medical condition or is identified as having a clinical MRSA infection.

Guidance to prevent human to human spread of MRSA in the community setting is provided at the Center for Disease Control and Prevention (CDC) website: http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca_public.html. Prevention focuses on the primary mode of transmission, direct contact particularly via the hands, and infection control practices center around hand washing, good hygiene and barrier protection. Recommendations for managing MRSA in pets have a similar focus and are outlined by the British Small Animal Veterinary Association (BSAVA). This guideline was developed with guidance from the UK federal health (HPA) and agricultural (DEFRA) agencies^{iv}. Establishing good infection control procedures and remembering to always maintain excellent hand hygiene and a clean environment to prevent MRSA and other potentially serious infections protects pets, owners and your staff.

ⁱ Center for Food Security and Public Health, College of Veterinary Medicine Iowa State University and OIE. May 15, 2006. Methicillin Resistant *Staphylococcus aureus*.

ⁱⁱ Defra. 1 March 2007. Zoonoses: Methicillin-Resistant *Staphylococcus aureus* (MRSA) in Animals. <http://www.defra.gov.uk/animalh/diseases/zoonoses/mrsa.htm>

ⁱⁱⁱ Weese, J.S., H. Dick, B.M. Willey, A. McGeer, B.N. Kreiswirth, B. Innis, D.E. Low. 2006. Suspected transmission of methicillin-resistant *Staphylococcus aureus* between domestic pets and humans in veterinary clinics and in the household. *Veterinary Microbiology*. 115:148-155.

^{iv} MRSA-Practice Guidelines. October, 2007. BSAVA. <http://www.bsava.com/resources/msa/mrsaguidelines/>



Issues surrounding the detection of *Trypanosoma cruzi* infections in Florida

**Rebecca Shultz, MPH; Danielle Stanek, DVM;
Carina Blackmore, DVM, PhD**

In January 2007, American Red Cross blood banks in the United States began screening blood donations for *Trypanosoma cruzi*, the parasite that causes American trypanosomiasis or Chagas disease. Primarily transmitted by insects from the subfamily Triatominae, *T. cruzi* infection is prevalent in Mexico and many Central and South American countries. Vector-borne transmission occurs when infected triatome bugs defecate after feeding. Infected fecal droplets can enter the bite wound, or migrate to mucosal membranes and cause an infection. Transmission can also occur via blood transfusion or organ transplant, from mother to child, and rarely through ingestion of contaminated food or drink.

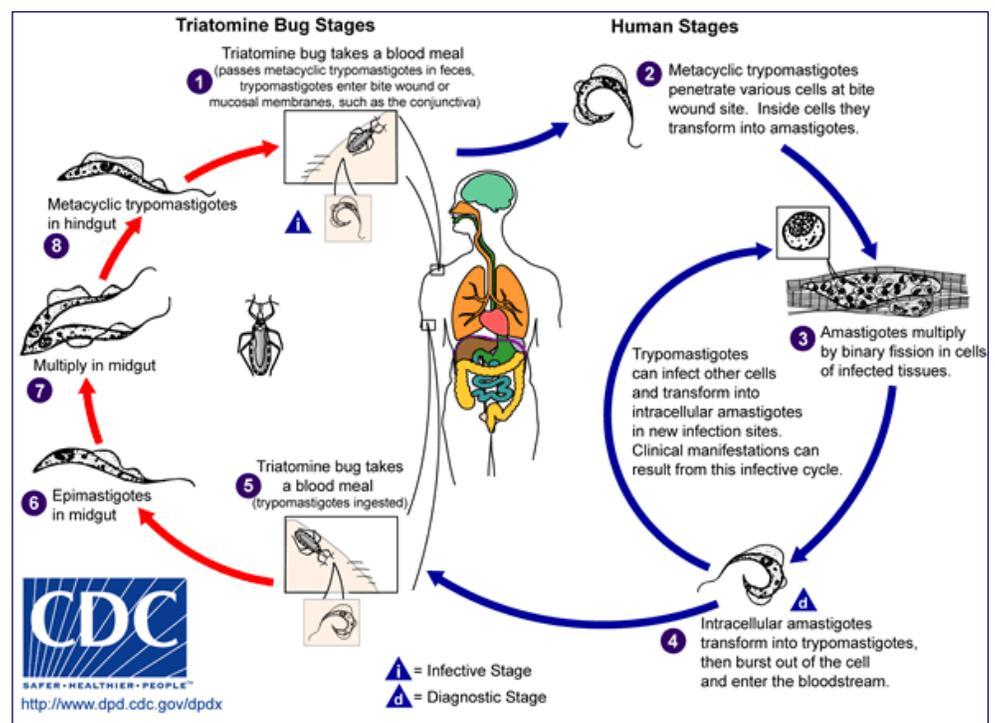


Trypanosoma cruzi
trypomastigote in a thin blood smear stained with Giemsa. (CDC DPD Parasite Image Library)

There is currently no evidence of autochthonous transmission in Florida, but studies have shown the presence of both infected Triatome bugs and infected reservoirs (raccoons, opossums) in the State.



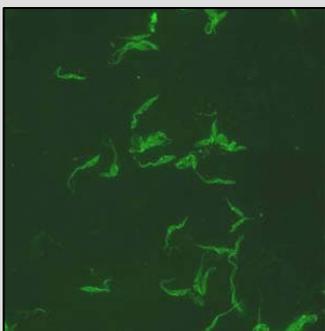
Individuals in the acute phase of the disease (up to 8 weeks after infection) are often asymptomatic, but when symptoms are present they can include fever, fatigue, body aches, headache, rash, loss of appetite, diarrhea, and vomiting. During the chronic phase, many people remain asymptomatic and are referred to as having the indeterminate form of Chagas disease. Roughly 30% of chronically infected individuals will develop severe cardiac and/or gastrointestinal complications. For this reason, it is important to identify and evaluate infected individuals for treatment. Current treatment for Chagas disease in the United States consists of either nifurtimox or benznidazole, both available only through CDC under investigational new drug protocols. Baseline evaluation for treatment includes physical exam and 12-lead electrocardiogram (ECG) with 30-second lead II rhythm strip. If any abnormalities are detected, more comprehensive evaluation is necessary¹. Treatment is recommended for all cases of disease in those 18 years of age or younger, and for those between age 19 and 50 years without advanced heart disease. Therapy is considered optional for those over 50 years of age. Because of potential side effects, individuals receiving treatment must be monitored by a physician. Questions on case evaluation and management, as well as requests for drugs and information on dosage regimen can be directed to the CDC Division of Parasitic Diseases Public Inquiries line at (770) 488-7775.



The initiation of blood screening for *T. cruzi* has resulted in the detection of numerous infections in Florida. As of November 14, 2007, 52 infections have been confirmed statewide. The majority of these are in Latin American immigrants residing in south Florida. There is currently no evidence of autochthonous transmission in Florida, though studies have demonstrated the presence of both infected Triatome bugs and infected reservoirs (raccoons, opossums) in the State. There are several reasons for the minimal risk of human infection in the United States, including better housing conditions and less efficient vectors. Several reports of atypical exposure histories have been obtained.



Triatoma infestans
(CDC Public Health Image Library)



A positive IFA reaction with ***Trypanosoma cruzi*** epimastigotes from culture (magnification 400x). . (CDC DPD Parasite Image Library)

- In August 2007, the Florida Department of Health (FDOH) Bureau of Community Environmental Health received a report from a County Health Department in south Florida of a frequent blood donor positive for *T. cruzi*. The 18 year old male was born in the U. S. and reported travel to resort areas in Mexico that were considered low risk for exposure. Both parents are Latin American immigrants. The man was determined to be a good candidate for treatment and received medication from CDC. It was recommended that his mother be tested to determine if the infection was acquired congenitally. Tests on the mother are pending.
- Also in August 2007, a woman in the panhandle area was reportedly exposed to a *Triatoma lecticularia*. The bug was sent to the CDC laboratory for testing and was found to be positive for *T. cruzi*. The woman then submitted a blood sample through the County Health Department, which was also sent to CDC for testing. The sample was negative. Further investigation revealed that the bug was crawling on the inside wall of the woman's home. It was engorged when she killed it, raising the possibility that it had recently fed on someone indoors. The woman reported living in a rural area, but did not report seeing other bugs of this type in or around her home.

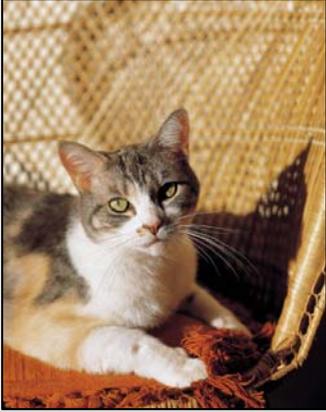
The detection of *T. cruzi* infections in Floridians raises several public health issues. Chagas disease is not reportable in Florida, nor is it nationally notifiable. For this reason, many blood banks do not report positive donors to the County Health Department. When the County Health Department does hear of a positive donor, the public health response is 3-fold. An investigation must be conducted to determine where the exposure likely occurred, to rule out locally-acquired infections; the positive individual must be evaluated by a physician to determine if s/he is eligible for treatment; and testing needs to be facilitated for any at-risk family members, especially children of infected mothers. These investigations are fairly labor-intensive. As this is a "new" disease to most people, much of the focus is on education. In addition, many individuals in the affected population can not easily access the health care system. The Florida Department of Health is currently working with the county health departments and CDC to develop protocols to streamline the investigation and data collection processes, as well as ways to facilitate access to care.

Resources:

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2. Centers for Disease Control and Prevention. Blood donor screening for Chagas disease—United States, 2006-2007. *MMWR Morb Mortal Wkly Rep*. 2007;56(7):141-143. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5607a2.htm>
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Rebecca Shultz is the Arthropod-borne Disease Surveillance Coordinator for the Florida Department of Health.





EPA study: House dust with flame retardant may be linked to hyperthyroidism in cats, could be an issue for kids



In Brief:

EPA Study - Flame retardant dust may be linked to hyperthyroidism

Mary Echols, DVM, MPH

A recent, preliminary study conducted by the U.S. Environmental Protection Agency (EPA), published in the September 15th *Environmental Science & Technology*,¹ suggests that household dust containing the common flame retardant polybrominated diphenyl ether (PBDE) may be linked to an increase in hyperthyroidism in cats.

In the late 1970s, PBDEs were introduced as a flame retardant in household products, including plastics, foams, fabrics, upholstered furniture, carpet padding, wire insulation, and electronics. During the early 1980s, the incidence of feline hyperthyroidism (FH) rose dramatically in pet cats. The clinical signs of FH, weight loss, polyphagia and tachycardia, were due to the increased T₄ levels resulting from the development of thyroid adenomatous hyperplasia and autonomously hyperfunctional benign nodules.² The pathological changes in the cats' thyroids resembled toxic nodular goiter in humans.³

Twenty-three cats were tested in the current EPA study, including 11 with hyperthyroidism. All of the cats carried PBDEs but the animals with thyroid disease had higher average concentrations.

Although elevated levels of PBDEs have been found in some cat foods, especially fish varieties, the study concludes that house dust is probably more likely the source of the cats' PBDEs. Cats are particularly vulnerable to PBDE contamination because they live in close contact with the treated carpets and upholstered furniture, and their meticulous grooming habits make them prone to ingesting PBDE- laden dust from their fur.

Children, especially toddlers, may be at a similar risk as the cats, due to their increased floor contact time and their "mouthing" behaviors. The authors conclude that "further studies are needed as improved understanding of PBDE-related endocrine effects in cats may have public health ramifications for both veterinary and human patients alike."

Resources:

¹ Dye, Janice A, Venier, Marta, et al. Elevated PBDE Levels in Pet Cats: Sentinel for Humans? *Environ. Sci. Technol.*, 41 (18), 6350-6356, 2007.

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³ Gerber, H, Ferguson, DC, et al. Etiopathology of feline toxic nodular goiter. *Vet. Clin. North Am. Small Anim. Pract.* 1994, 24, 541-565.

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Coming Events:

- **One Health Initiative Task Force Meeting**
January 31 – February 1, 2008
-

- **The International Conference on Emerging Infectious Diseases (ICEID)**
March 16 – 19, 2008 - Atlanta, Georgia, USA

The International Conference on Emerging Infectious Diseases brings together public health professionals to encourage the exchange of scientific and public health information on global emerging infectious disease issues.

<http://www.iceid.org>



Special “Thanks!”
to

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