

## Rabies Surveillance Update— Connecticut, 2005–2009

During 1991, a spread of the raccoon rabies epizootic from the southern United States (US) to Connecticut was followed by a resurgence of rabies in wild animals, and the first rabid domestic animals in the state since the 1940s (1). Raccoons are the principal terrestrial animal reservoir in the northeastern US for the rabies virus. Initially to monitor the spread of the raccoon rabies strain, the Department of Public Health (DPH) Laboratory tested all dead wild animals. By the end of 1994, each of Connecticut's eight counties were affected and the testing focus shifted to risk assessment for exposed people or domestic animals. Although the raccoon rabies virus is the primary strain circulating in Connecticut, the bat strain has been present since the 1950's.

During 2005–2009, 13,026 animals were submitted for rabies testing to the DPH Laboratory. Nearly one third of all animals submitted were bats (3,969), followed by 3,244 (25%) cats, 1,900 (15%) dogs, 1,398 (11%) raccoons, and 727 (6%) skunks. Of the animals submitted, 12,716 (98%) viable specimens were tested. A total of 992 (8%) animals tested positive and included 817 (82%) wild terrestrial animals, 142 (14%) bats, and 33 (3%) domestic animals (Table 1).

Of the 817 positive wild terrestrial animals, there were 579 (71%) raccoons, 195 (24%) skunks, 21 (3%) fox, 13 (2%) groundhog, 5 (1%) deer, 2 (0.2%) coyote, 1 (0.1%) bobcat, and 1 (0.1%) opossum. Of the 33 positive domestic animals, there were 29 (88%) cats, 2 (6%) dogs, 1 (3%) donkey, and 1 (3%) horse.

From 2005-2009, the average annual number of animals submitted for rabies testing was 2,605 (range 2,206 – 2,771), the average number that tested positive for rabies was 198 (range 153–219) (Figure 1, pg 14).

Raccoons were the most likely animal to test positive (42%) followed by skunks (28%). Cats and

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dogs were among the least likely animals to test positive (1% and 0.1% respectively). Of the 530 rodents tested, with the exclusion of groundhogs, none were positive for rabies (Table 1).

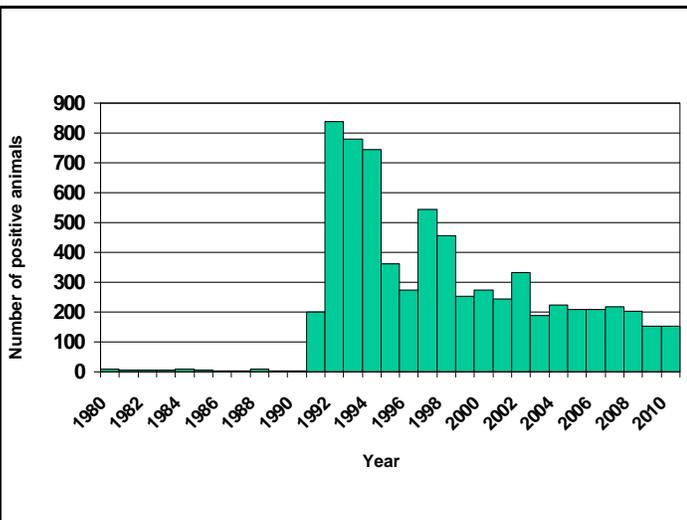
**Reported by:** K Kudish, DVM, MSPH, S Ertel, R Nelson, DVM, MPH, Epidemiology and Emerging Infections Program; T Brennan, BA, State Public Health Laboratory, Department of Public Health.

**Table 1. Animals tested for rabies, by test result and percent positive, Connecticut 2005-2009**

Animal Type	Total	Positive	Negative	% Positive
Bats	3,765	142	3,623	4
Domestic Cats	3,235	29	3,206	1
Domestic Dogs	1,895	2	1,893	0.1
Raccoons	1,372	579	793	42
Skunks	703	195	508	28
Rodents <sup>1</sup>	530	0	530	0
Other <sup>2</sup>	458	1	457	0.2
Groundhogs <sup>3</sup>	330	13	317	4
Domestic Hoofstock <sup>4</sup>	210	2	208	1
Wild Canids <sup>5</sup>	160	24	136	15
Mustelids <sup>6</sup>	31	0	31	0
Wild Hoofstock <sup>7</sup>	27	5	22	19
<b>Total</b>	<b>12,716</b>	<b>992</b>	<b>11,724</b>	<b>8</b>

1. beaver, mouse, mole, vole, squirrel, flying squirrel, chipmunk, guinea pig, hamster, muskrat, porcupine, rat (excludes groundhogs)
2. Non-human primate, opossum, shrew, or rabbit
3. aka woodchuck
4. horse, cow, goat, pig, sheep, llama, alpaca, donkey
5. coyote, fox, bobcat
6. weasels, ferrets, fisher cats, mink, otter (excludes skunks)
7. deer, buffalo, moose

**Figure 1: Number of animals testing positive for rabies, Connecticut 1980—2009**



**Editorial Note:**

Surveillance for animal rabies is a laboratory-based system dependent upon animal submissions for rabies testing to the DPH Laboratory. This surveillance is performed for risk assessment purposes following interactions of humans or domestic animals with suspected rabid animals. Data from this system provide information on the general trend over time, relative yearly fluctuations, and types of animals that acquire rabies. It may also serve to identify specific circulating strains. While incidence and prevalence of rabies among animals in the wild cannot be drawn from this data, it does demonstrate that rabies is well established in Connecticut.

Encounters with wild animals are considered potential rabies exposures and require evaluation by medical care providers or public health practitioners. The DPH Laboratory conducts rabies testing free of charge to confirm the need for rabies post-exposure prophylaxis when the animal species, type of contact, and circumstances of the incident indicate that an exposure may have occurred. Testing under any other circumstance most often results in unnecessary euthanasia of animals, and a burden on DPH Laboratory resources and staff. The DPH and local health departments are available to assist health care providers, animal control officers, police, animal rehabilitators, and other responders who may evaluate potential exposures and determine the need for animal testing.

**Rabies Post-Exposure Prophylaxis Updated Recommendations Include a 4-dose Vaccine Schedule\***

*For persons not previously vaccinated*

- Wound cleaning: thorough cleansing of wounds with soap and water and application of a virucidal agent such as povidine-iodine solution if available.
- Human rabies immune globulin: Administer 20 IU/kg body weight by infiltrating the full dose around and into the wound(s) if anatomically feasible and any remainder by intramuscular injection at a site distant from vaccine administration.
- Vaccine: Administer 1 mL of either human diploid cell vaccine or purified chick embryo cell vaccine by intramuscular injection in the deltoid area (for young children the outer aspect of the thigh may be used) on days 0, 3, 7 and 14 of treatment (immunosuppressed patients receive an additional dose on day 28).

**For persons previously vaccinated**

- Wound cleaning: thorough cleansing of wounds with soap and water and application of a virucidal agent such as povidine-iodine solution if available.
- Human rabies immune globulin: Should not be given.
- Vaccine: Administer 1 mL by intramuscular injection of either human diploid cell vaccine or purified chick embryo cell vaccine in the deltoid area on days 0 and 3 of treatment.

\* CDC. Use of a Reduced (4-Dose) Vaccine Schedule for Post – Exposure Prophylaxis to Prevent Human Rabies. MMWR 2010;59:1-9. available at: [http://www.cdc.gov/rabies/resources/acip\\_recommendations.html](http://www.cdc.gov/rabies/resources/acip_recommendations.html)

Bites from animals known to be rabies reservoir species and wild carnivores are of greatest concern. Other animal contact that does not result in a bite (i.e., touching, petting) rarely require animal testing. Small rodents should only be tested if a bite is unprovoked. When a person initiates the contact, such as attempting to pick up or feed the rodent, testing is not warranted. Persons bitten by cats, dogs or other domestic animals should report the incident to a local or state animal control officer (ACO). The ACO will determine if the animal should be euthanized and tested for rabies or observed in quarantine for 14 days.

In recent years, bat-associated rabies virus variants accounted for most human rabies infections in the US and suggests that bat bites may go unrecognized (2). These cases led to public health guidelines regarding rabies exposure involving bats, and an increase in bat testing (3,4). Bat exposures are not always clearly identifiable. A bat exposure can include a person who has direct contact with a bat and a wound cannot be confidently ruled out. The guidelines do clearly state, however, that a person who awakens to find a bat in

the room in which they were sleeping should have the bat tested. Also, if a person who can not communicate (e.g., young child, someone inebriated) is in a room in which a bat is found the bat should be tested. Under these circumstances, if the bat is not available for testing, prophylaxis is recommended. Guidelines do not suggest testing every bat found in a home. It is also not recommended that all persons in a building in which a bat was found receive rabies post-exposure prophylaxis.

For further information on rabies in Connecticut including statistics, submission of animals for testing, and who to call for assistance, visit the DPH rabies web site at <http://www.ct.gov/dph/rabies> and the Department of Agriculture web site for a copy of the Connecticut Rabies Manual at <http://www.ct.gov/doag/cwp/view.asp?a=1367&q=456520&doagPNavCtr=|44678|#44683>.

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1. CDC. Extension of Raccoon Rabies Epizootic—United States, 1992. MMWR 1992;41:961–964.
2. Blanton, J et al. Rabies Surveillance in the United States during 2008. JAVMA 2009;676–689.
3. Connecticut Department of Public Health. Raccoon Rabies—Connecticut, 1991–2004. Connecticut Epidemiologist 2005;25:7-8.
4. CDC. Human Rabies Prevention – United States, 2008. MMWR 2008;57:11-14.

## Lyme Disease—Connecticut, 2009

Lyme disease (LD) is the most commonly reported vector-borne disease in the United States (1). The Connecticut Department of Public Health (DPH) has maintained surveillance for LD since 1984, although it did not become an officially reportable disease until 1987. Since then, analysis of surveillance data has allowed the DPH to monitor LD trends over time (Figure 1).

In Connecticut, LD surveillance includes physician and laboratory reporting. Only laboratories capable of reporting electronically are required to report positive LD findings. In 2009, two major clinical laboratories submitted reports of positive LD test results that met the national surveillance case definition criteria. Laboratory reports do not include all the information necessary to determine case status, therefore, follow-up was conducted. Supplemental reporting forms and letters requesting clinical and additional demographic information were mailed to the ordering physician. Returned reports were manually entered into the LD database

where case status was automatically determined by system programming.

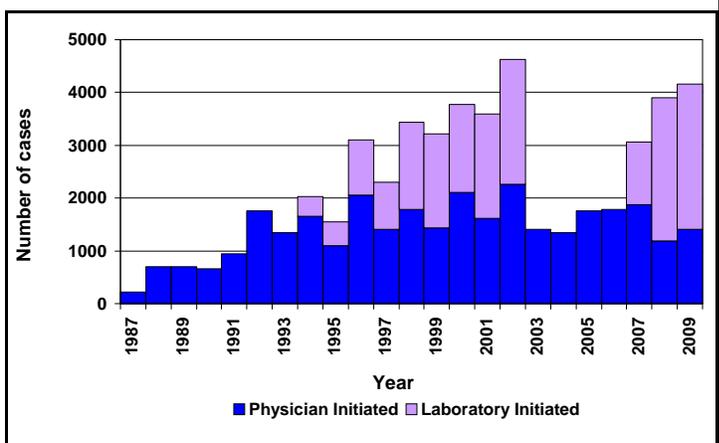
Using the 2008 national surveillance case definition, cases were classified as confirmed, probable, or suspect. Confirmed cases included those identified with erythema migrans (EM), or systemic manifestations of LD and laboratory results that indicated a positive EIA and positive Western blot or positive Western blot IgG or positive culture. Probable cases were those that physicians indicated on the supplemental reporting form as being diagnosed with LD but did not have syndromes necessary for confirmed case classification. Suspect cases were those with a laboratory result that met the national criteria but no clinical information was available. Confirmed and probable cases are included in state and national surveillance data.

During 2009, 7,214 LD reports were received by the DPH. Of these, 2,177 (30%) were initiated through physician surveillance and 5,037 (70%) through laboratory surveillance.

Of the 7,214 reports, 4,156 (58%) met the national surveillance case definition for confirmed or probable cases (2,751 or 1,405 respectively). Of the 2,751 confirmed cases, 1,658 (60%) patients had EM only, 930 (33%) had one or more systemic manifestations only, and 163 (6%) had both EM and systemic manifestations of LD.

Of the 930 systemic LD cases not associated with EM, arthritic symptoms occurred in 723 (78%), neurologic manifestations (Bell's palsy, encephalitis, radiculoneuropathy, lymphocytic meningitis) in 284 (31%), and cardiac complications in 4 (0.4%). Cases may have had multiple systemic symptoms.

**Figure 1. Lyme disease cases by source of initial report and year, Connecticut, 1987-2009**



The remaining 3,058 (42%) reports did not meet the national criteria for a confirmed or probable case and included 2,544 (83%) suspect cases.

The statewide incidence of LD was 122 cases per 100,000 population. Windham County reported the highest county rate (252 cases per 100,000 population) followed by New London County (223 cases per 100,000 population). Hartford County reported the lowest rate (36 cases per 100,000 population) followed by Fairfield County (79 cases per 100,000 population) (Figure 2).

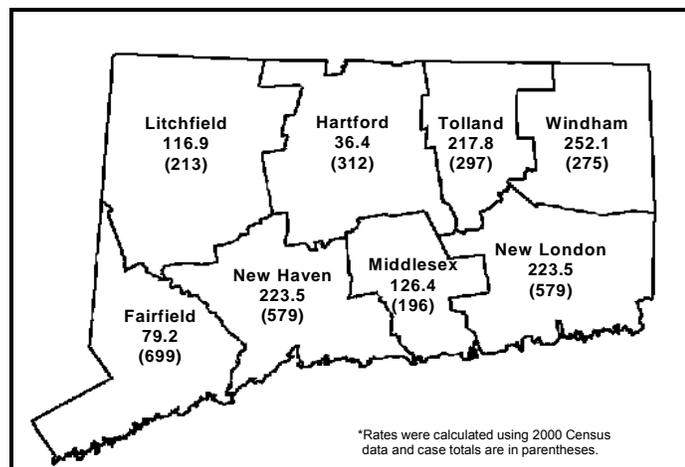
Persons aged 60-69 years reported the highest incidence with 126.8 cases per 100,000 population. The rate for children < 10 years of age was 104.2 cases per 100,000 population; 57% were male. Of cases with known onset dates, 67% occurred during the summer months of June, July, and August.

**Reported by:** S. Ertel, J. Sun, MD, PhD, R. Nelson, DVM, MPH. Epidemiology and Emerging Infections Program, Connecticut Department of Public Health.

**Editorial:**

In 2009, the number of cases of LD identified by the DPH increased by 6.7% compared to 2008 (4,156 vs. 3,896). This increase was due in part to the revised national surveillance case definition and inclusion of confirmed and probable cases in the national LD statistics.

**Figure 2: Lyme disease rates per 100,000 population\* by county— Connecticut, 2009.**



Overall in 2009, laboratories reported almost double (94%) the number of cases than physician surveillance (2,744 and 1,412 respectively). However, only approximately half (54%) of laboratory reported cases met the national surveillance case definition for a confirmed case compared to 91% of cases reported through physician reporting. Of the probable cases, 91% were initiated through laboratory surveillance. The revised laboratory criteria resulted in 48% fewer laboratory reports requiring follow-up in 2009 when compared to 2008 (5,011 vs. 10,490) but 1.2% more cases identified for surveillance purposes.

The DPH will continue to follow-up on all positive laboratory findings that meet the national criteria for LD surveillance. At this time, two major commercial laboratories in Connecticut are reporting results to the DPH accounting for an estimated 85% of all tests of Connecticut patients.

Physicians should report all patients with LD by completing the newest version of the Reportable Disease Confidential Case Report Form (PD-23), which is revised annually or, if received, the Supplemental Lyme Disease Laboratory Case Report form. Timely reporting assures the most accurate data. For questions concerning LD reporting or to order the most recent version of the PD-23, please contact the Epidemiology and Emerging Infections Program at (860) 509-7994. Fillable forms are also available at [www.ct.gov/dph](http://www.ct.gov/dph). Select "Forms" from the top navigation bar, and Reportable Disease Forms and Instructions.

Connecticut LD incidence rates by town and county can be found at [www.ct.gov/dph/lymedisease](http://www.ct.gov/dph/lymedisease) under "Lyme Disease Statistics". Graphs and incidence maps are also available.

**References:**

1. CDC. Surveillance for Lyme disease – United States, 1992-2006. MMWR 2008;57(SS10);1-9.
2. CDC. Lyme disease (*Borrelia burgdorferi*) 2008 Case Definition. [http://www.cdc.gov/ncphi/diss/nndss/casedef/lyme\\_disease\\_2008.htm](http://www.cdc.gov/ncphi/diss/nndss/casedef/lyme_disease_2008.htm).

J. Robert Galvin, MD, MPH, MBA  
Commissioner of Health

Matthew L. Cartter, MD, MPH  
State Epidemiologist

Lynn Sosa, MD  
Deputy State Epidemiologist

HIV/AIDS Surveillance (860) 509-7900  
Epidemiology (860) 509-7994  
Immunizations (860) 509-7929  
Pulmonary Diseases (860) 509-7722  
Sexually Transmitted Diseases (STD) (860) 509-7920

**Connecticut Epidemiologist**

Editor: Matthew L. Cartter, MD, MPH

Assistant Editor & Producer:  
Starr-Hope Ertel