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West Nile Virus – Connecticut, 2018

West Nile virus (WNV) is an arbovirus that is transmitted primarily through the bite of infected mosquitoes (*1*). Since 2000, the Connecticut Department of Public Health (DPH) has conducted human WNV surveillance. This surveillance has allowed DPH to monitor infections in Connecticut residents and, with mosquito surveillance data, guide prevention measures.

During 2018, 23 human cases of WNV were reported to DPH; 22 infections were acquired in-state. One patient spent half the incubation period out of state. Of the 23 patients, 14 (61%) had encephalitis (including meningoencephali-tis), 4 (17%) meningitis and 5 (22%) WNV fever. Seventeen (74%) were hospitalized, and 1 (4%) patient died. Patients resided in 19 towns in 5 counties including Fairfield (11), Hartford (5), Middlesex (3), New Haven (3) and Windham (1) counties (Figure 1). Towns reporting more than one case included Bridgeport (2), Danbury (2), Fairfield (2), Newington (2), Stamford (2), and Southington (2). Onset of illnesses occurred from July 28 – October 22. The median age of patients was 69 years (range = 8-83 years).

Mosquito surveillance was conducted by the Connecticut Agricultural Experiment Station at 92 permanent trapping stations located in 72 municipalities throughout the state (*2*). Mosquito trapping and testing for 2018 began on June 4 and concluded on October 18. During 2018, 334,369 mosquitoes were trapped and tested. A total of 393 isolations of WNV were made from 13 mosquito species collected from 65 sites in 53 towns in 6 counties (*2*). Of the 393 WNV mosquito isolates, 214 (54%) were mosquitoes trapped in 9 towns including Stamford (57), Bridgeport (35), Greenwich (26), Darien (24), West Haven (19), Monroe (16), Norwalk (16), Westport (11) and Stratford (10). WNV infected mosquitoes were collected between June 18 and October 10, with 353 (90%) isolates obtained between July 23 and September 20. Two WNV-infected horses were reported: Glastonbury (1) and Greenwich (1).

During 2018, human cases of WNV associated illnesses, and WNV positive mosquitoes indicated heightened transmission in southern Connecticut towns (Figure 1). Of the 23 patients, 13 (61%) were residents of Fairfield and New Haven counties. The onsets of human illnesses across the state were highest in late August and mid-September, and were preceded by increases in the number of WNV-positive isolates from mosquitoes per week (Figure 2, page 14).

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Editorial Note

Precipitation and temperatures were well above normal throughout much of the state this summer,

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Figure 1. West Nile virus activity, Connecticut, 2018

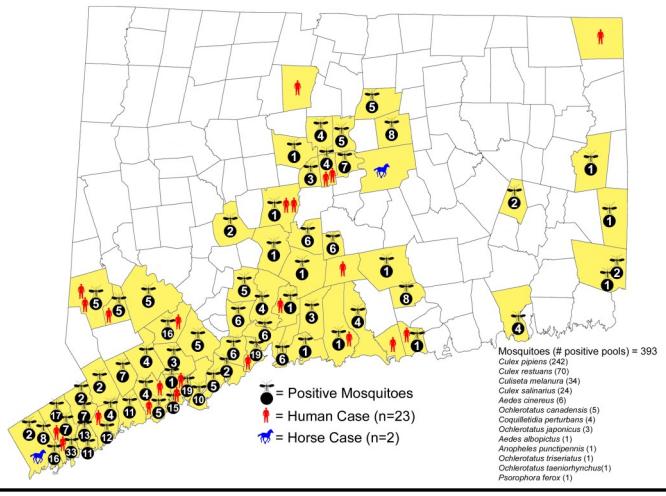
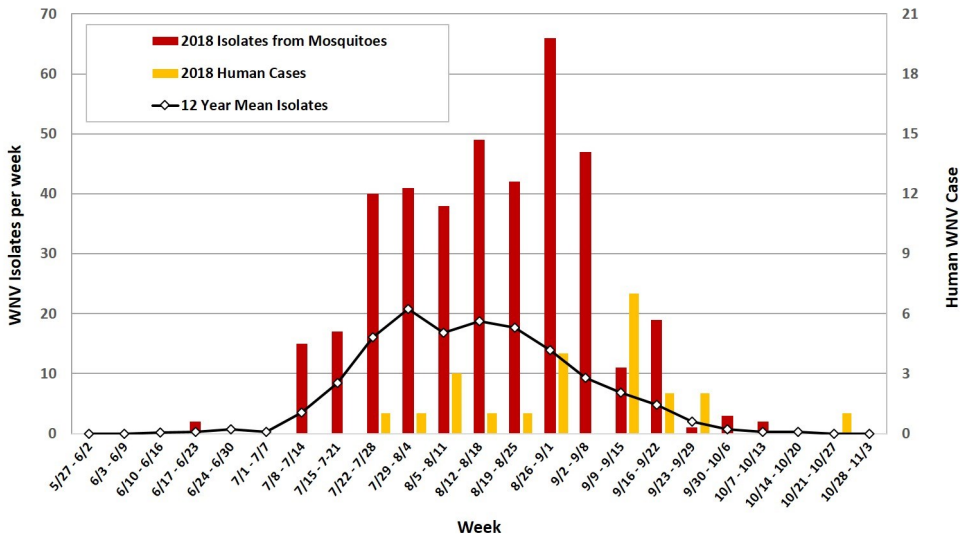


Figure 2. West Nile virus mosquito activity and human case onset by week, Connecticut, 2018



resulting in a record number of mosquitoes that were tested for viruses. The number and geographic spread of WNV isolates from mosquitoes obtained in 2018 was also unprecedented. The previous record high for WNV isolations occurred in 2012, when 235 isolates were made from mosquitoes collected from 51 sites in 44 towns. In the same year, 21 human cases were reported in Connecticut.

During 2018 the geographic distribution of human WNV associated illnesses was largely consistent with historical patterns, reflecting land use characteristics and increased human risk in developed areas (*3,4*). In 2018, the first case of WNV virus associated illness in northeastern Connecticut was reported. Although no out of state travel was reported, the patient may have traveled to areas of known WNV transmission within Connecticut.

West Nile Virus has a complex life cycle that includes wild bird hosts and a variety of mosquito vectors (*1*). The spread of WNV can be influenced by factors including the weather, number of infected birds, number of mosquitoes that spread the virus, and human behavior. Because of this, it is difficult to determine how many people will develop illness each year, and the locations where infections will be acquired. While WNV activity varies annually and ongoing surveillance is necessary, some regional and temporal patterns of human illness and virus isolations from mosquitoes have emerged that can help focus the public health response. In Connecticut, risk for human WNV infections is generally highest in August and September in southern Fairfield County and southeastern New Haven County, and is preceded by identification of WNV positive mosquitoes (*3*).

Surveillance data are shared with local health departments, health care providers, and the public through press releases that are meant to raise awareness and encourage the use of prevention measures. It is important to reduce standing water on personal properties, especially during the summer months. Municipalities, especially in regions of the state with frequent yearly WNV transmission, should implement larviciding programs targeting breeding areas of *Culex* mosquito species. The State and local health departments use press releases to alert the public when WNV activity has been detected so that resident can take precautions to avoid mosquito bites. This is particularly important for older people who are at the highest risk for developing severe WNV-associated illnesses.

Information about WNV associated illnesses and human cases can be found on the DPH website. Information about mosquitoes and mosquito testing is available on the Mosquito Management Program website.

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Lyme Disease — Connecticut, 2017

Lyme disease (LD) in Connecticut first became reportable in 1987 (*1*). Since then, LD has become the most commonly reported vector-borne disease in the United States (*2*). Currently, physicians are required to report all LD cases using the Reportable Disease Confidential Case Report Form PD-23 (PD-23) or by completing the supplemental Lyme Disease Laboratory Surveillance follow-up form.

In 2007, Lyme disease was added to the laboratory list of reportable findings to more completely measure the magnitude of the Lyme disease problem in Connecticut. Laboratories with automated electronic reporting (ELR) to the DPH are required to report positive findings of *Borrelia burgdorferi*. Laboratories without automated electronic reporting are not required to report until they have implemented electronic laboratory reporting. Supplemental LD laboratory surveillance forms are mailed to providers in an effort to collect clinical information necessary for case classification.

For surveillance purposes, DPH uses the National Surveillance Case Definition (NSCD). In 2008, the NSCD was revised and implemented to include a probable case definition. Connecticut combines confirmed and probable cases in their statewide incidence rate. Confirmed and probable cases are included in the national surveillance data; however, national disease incidence is calculated using the number of confirmed cases only.

During 2017, DPH received 5,581 LD reports involving Connecticut residents, 2,022 (36%) met the NSCD for a confirmed or probable case. Of the 1,363 confirmed cases, 557 (41%) patients had EM only, 530 (39%) had one or more systemic manifestation only, and 276 (20%) had both EM and systemic manifestation(s) of LD. Of cases reported with systemic manifestation only, 464 (88%) patients had arthritic symptoms, 120 (23%) had neurologic manifestations (Bell's palsy, encephalitis, radiculoneuropathy, lymphocytic meningitis), and 10 (2%) had cardiac complications. Cases may have had multiple systemic symptoms.

The statewide incidence for all cases (confirmed and probable) was 56.6 cases per 100,000 population. Adults 60-69 years of age and over 70 years of age had the highest incidence rates (99 and 95.7 cases per 100,000 population, respectively). The lowest incidence occurred among those aged 20 -29 years (32.1 cases per 100,000 population); 59% of all cases were male. Of 914 cases with known onset date, 52% occurred during May, June, and July. Litchfield and Windham counties reported the highest county rates (114.3 and 104.7 respectively). Cases increased in all regions except the Northeast (Tolland and Windham).

Of 5,581 reports involving CT residents, 634 (11%) were initiated through physician-based surveillance and 4,760 (85%) through laboratory-based surveillance. Surveillance method was not recorded for 187 (3%) reports, which included 27 confirmed reports, 8 suspect, and 152 reports that did not meet the case criteria. Percentages do not match 100% due to rounding.

Reported by

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Editorial

In 2017, DPH conducted follow-up for 4,760 positive LD test results received through ELR. Of the supplemental forms mailed to providers, 32% (1,543) were completed and returned, of which one-third were confirmed (19%) or probable (13%) cases. Of 634 reports received through physician-reporting, 68% resulted in identification of confirmed cases. Of confirmed and probable cases with known surveillance method, 75% were initiated through ELR-based surveillance. Although laboratory reporting is less efficient than direct provider reporting, it leads to the identification of the majority of cases (1).

After the implementation of ELR in 2007, the total number of cases received by DPH increased through 2009. Between 2010 and 2017, the total number of cases received by DPH decreased by 34%. This includes decreases in both physician-

based surveillance and ELR-based surveillance; however, both reporting methods show similar annual variations (Figure). During the same period, the number of reported EM cases declined by 73% and the number of reported LD cases involving systemic manifestations declined by 48%.

Lyme disease surveillance using traditional surveillance methods places a substantial resource burden on state and local health departments in high incidence states. Several analyses indicate LD is underreported, particularly in high-incidence states, and underreporting is higher for clinician diagnosed cases (*3*). In a national review of clinician-diagnosed LD, patterns of disease were similar to national surveillance data suggesting laboratory based reporting could fulfill the purpose of surveillance, which is to monitor the epidemiology and trends of LD (*3,4*). To reduce the burden of surveillance, some high-incidence states conduct follow-up on a percentage of laboratory reports then extrapolate to determine population level incidence (*4*).

Health care providers should counsel patients about prevention of LD and other tick borne diseases. Patients at increased risk of tick exposure, including those whose occupations or hobbies increase exposure to tick habitat, should be educated about wearing protective clothing, use of insect repellent, performing tick checks, and bathing after potential exposures.

DPH urges healthcare providers to report all cases of LD and to return Lyme Disease Laboratory Surveillance follow-up forms. Electronic fillable "Reportable Disease Confidential Case Report, PD-23" PDFs are available on the DPH Forms webpage. Completed reporting forms can be faxed to DPH at 860-509-7910. Completed PD-23s or supplemental laboratory report forms can also be mailed to the Connecticut Department of Public Health, 410 Capitol Ave, MS#11EPI, Hartford, CT 06134. Please write "Confidential" on any correspondence. To order the most current version of the 3-ply PD-23 reporting form or for questions concerning LD reporting, please contact the Epidemiology and Emerging Infections Program at (860) 509-7994.

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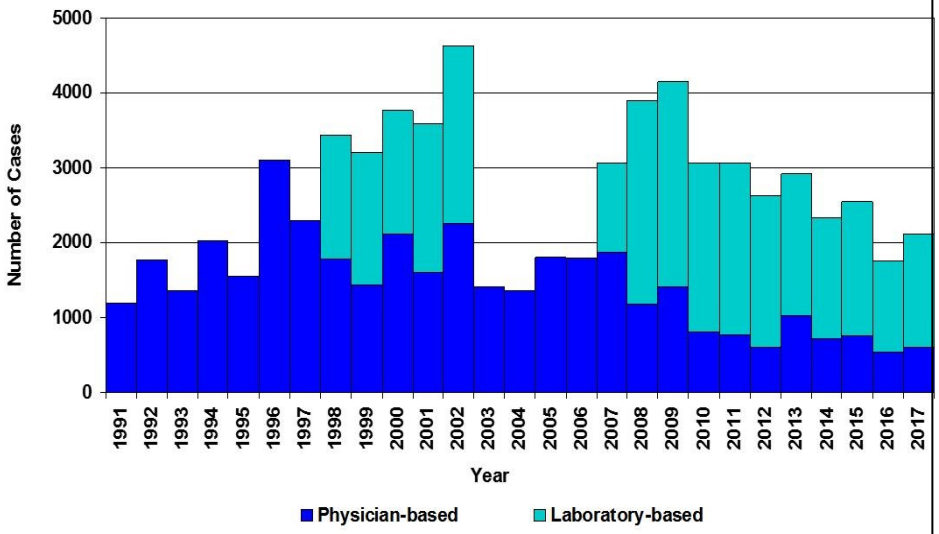
Figure. Number of confirmed and probable Lyme disease cases by surveillance method, Connecticut, 1991-2017



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