

## Outbreak of *Vibrio parahaemolyticus* Associated with Raw Shellfish Consumption, Connecticut, June – October 2013

*Vibrio* species are gram-negative bacteria that occur naturally in estuarine and marine environments; approximately 12 species are known to cause human disease (1). Environmental factors that influence growth include salinity, as well as, water and air temperatures. The number of bacteria peak during the summer and fall, when the water is warmest. *Vibrio* infections result in an estimated 80,000 illnesses, 500 hospitalizations, and 100 deaths each year in the United States (2). The incidence of *Vibrio* infection has been increasing since the mid-1990's, and continued to increase significantly in 2013 (3,4). Illness is typically characterized by diarrhea (i.e. gastroenteritis), septicemia, wound infections, or other extraintestinal infections (3). Gastroenteritis typically occurs after consumption of raw or undercooked shellfish. Wound or soft tissue infection, occurs after skin exposure to seawater or raw seafood drippings.

In June – October 2013, Connecticut experienced an outbreak of *Vibrio parahaemolyticus* infections. A total of 28 cases were reported to the Connecticut Department of Public Health (DPH). In comparison, during this same period in the previous two years, an annual average of 13 cases was reported. The number of cases reported during the 2013 season represented a 115% increase. This report summarizes the findings of the epidemiologic, laboratory, and environmental investigations.

In Connecticut, *Vibrio* is both a provider reportable disease and a laboratory reportable finding, and is required to be reported to the DPH and local health department (LHD). Clinical laboratories are required to submit all *Vibrio* isolates to the Katherine A. Kelley State Public Health Laboratory for confirmation and speciation. *V. parahaemolyticus* isolates are further subtyped by pulsed-field gel electrophoresis (PFGE). Additionally, as part of this investigation, all *V.*

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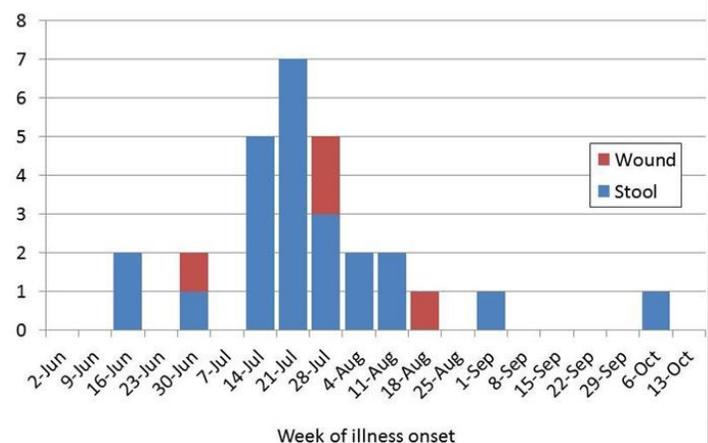
*parahaemolyticus* isolates were forwarded to the Centers for Disease Control and Prevention (CDC) for serotyping.

### Epidemiologic Investigation

All 28 reported cases were interviewed by local or state health department staff. Information collected concerned clinical presentation, seafood consumption, and environmental risk factors.

Cases ranged in age from 9 to 79 years (median 52 years); 17 (61%) were male. Cases were reported from the following counties: Fairfield (14), New Haven (7), Hartford (3), Tolland (2), Litchfield (1), and Middlesex (1). Reported dates of onset ranged from June 18 – October 9, 2013 (Figure). Of the 28 cases, 3 (11%) were hospitalized; no deaths occurred. Among the 24 case-patients with gastrointestinal infections, 21 (88%) reported consuming raw shellfish including raw oysters (18, 86%), and/or raw clams (7, 33%) in the week before onset of illness.

Figure. Number of *V. parahaemolyticus* cases by week of illness onset, June-October 2013



## Laboratory Investigation

Among the 28 reported *V. parahaemolyticus* cases, 24 (86%) had positive stools (gastrointestinal infections), and 4 (14%) were from other sites including open wounds (3), and the mouth (1). Isolates were submitted to the DPH State Laboratory for 27 (96%) of 28 case-patients. PFGE analysis of the 27 isolates yielded 11 different patterns, with one predominant outbreak pattern that accounted for 16 (59%) isolates. Among the 27 isolates, 8 different serotypes were identified, which included O4:K12 (18 isolates), O5:K(unknown) (2), O11:K(unknown) (2), O1:K33 (1), O1:K56 (1), O1:K(unknown) (1), O3:K(unknown) (1), and O11:K20 (1).

## Environmental Investigation

Local health department staff conducted onsite investigations of food service establishments where case-patients reported consuming or purchasing raw shellfish. Copies of shellstock tags and individual invoices showcasing shellfish purchases were obtained. Shellfish records were forwarded to the DPH Food Protection Program, and the CT Department of Agriculture Bureau of Aquaculture (DA/BA). The DA/BA, worked closely with shellfish authorities in other states to conduct trace backs in an effort to identify the shellfish harvest areas and dealers associated with the implicated mollusks. The investigators also evaluated the handling of shellfish through the distribution chain.

The trace back investigations determined that oysters and clams harvested from the coastal waters of Norwalk and Westport were the source of 2 or more *V. parahaemolyticus* infections. On August 2, 2013, the DA/BA initiated a closure and recall of all shellstock (both hard clams and oysters) harvested during July 3-August 2, 2013, from specific locations in Norwalk and Westport. At least 20 cases of *V. parahaemolyticus* (including cases identified in other states) were traced back to the affected harvest areas in Connecticut.

## Reported by

Q Phan MPH, M Maloney MPH, T Rabatsky-Ehr MPH, J Brockmeyer MPH, P Gacek MPH MPH, J Krasnitiski MPH, K Soto MPH, Epidemiology and Emerging Infections Program; R Wisniewski, Food Protection Program; C Nishimura MPH, A Esliger, L Mank MS, State Public Health Laboratory, Connecticut Department of Public Health. K DeRosia-Banick, Bureau of Aquaculture, Connecticut Department of Agriculture.

## Editorial

In 2013, an outbreak of *V. parahaemolyticus* occurred in CT and nationally. The multistate investigation identified a total of 104 cases from 13 states. Illnesses were associated with eating raw shellfish from Atlantic Coast harvest areas in CT, MA, NY, and VA. In response to these illnesses, shellfish authorities in these 4 states closed implicated harvest areas; additionally, CT and MA also issued shellfish recalls. This outbreak was associated with serotype O4:K12 (the Pacific Northwest strain), which had not been associated with shellfish outside of the Pacific Northwest prior to 2012. This strain is possibly becoming endemic along the Atlantic Coast. (5)

Clinicians, health departments, and shellfish authorities should be prepared for the possibility of shellfish-associated diarrheal illness caused by this strain. Prompt case investigations, shellfish trace backs, and closure of implicated harvest areas will help prevent additional illnesses. Clinicians should consider *Vibrio* infection in patients with diarrhea and a history of consuming raw or undercooked shellfish. Laboratory testing for *Vibrio* must be specifically requested since special selective culture media is needed to facilitate identification of *Vibrio* species. Consumers can reduce their risk for *Vibrio* infection by not eating raw or undercooked shellfish, especially oysters and clams.

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## Chikungunya Virus Infection

Chikungunya virus is transmitted to humans through the bite of mosquitoes; most often *Aedes aegypti* and *Aedes albopictus*. Mosquitoes become infected after feeding on an infected person. Symptoms of chikungunya infection occur 3-7 days after being bitten by an infected mosquito and commonly include fever and severe pain in multiple joints. Other symptoms may include headache, muscle aches, nausea/vomiting, and rash. Patients generally feel better after a week; however for some, joint pain may continue for months (1). About 1 in 1000 case-patients die from chikungunya virus infection, and most deaths occur among the elderly, newborn and debilitated (2).

Locally acquired cases have been reported from areas of Africa, Asia, the Caribbean, Europe, Oceania/Pacific Islands, and South America. As of August 5, 2014, 484 travel-related cases were identified in the continental United States. Since July 17, 2014, the Florida Department of Health has reported 4 cases of locally acquired infection, the first in the United States (3).

As of August 11, 2014, the Connecticut Department of Public Health (DPH) received 14 reports of travel-related chikungunya virus infection among state residents. Of these, 6 (43%) traveled to the Dominican Republic, 6 (43%) to Haiti, 1 (7%) to St. Martin, and 1 (7%) to Puerto Rico. These patients resided in Fairfield County (4, 36%), New London County (2, 18%), and 1 (9%) each from Hartford, Litchfield, Middlesex, New Haven, and Windham counties. Most cases were reported in May and June (Figure).

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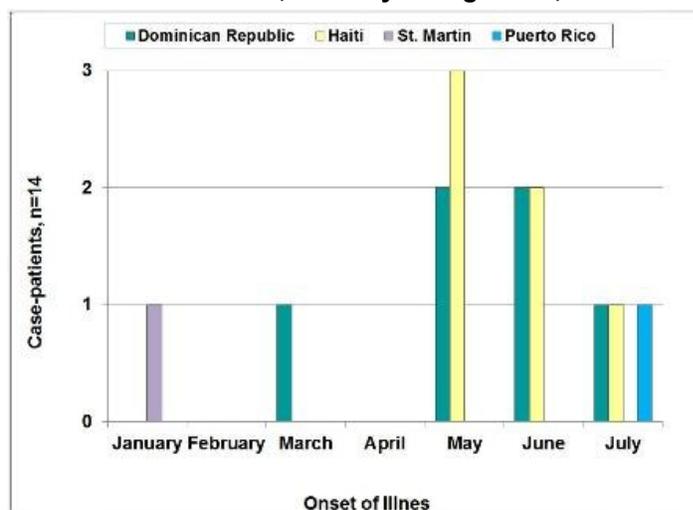
S Ertel, B Esponda, R Nelson DVM MPH, Epidemiology and Emerging Infections Program, Connecticut Department of Public Health.

### Editorial

Chikungunya is likely to spread in tropical and subtropical areas of the Americas where *Aedes aegypti* can survive year round. This emphasizes the importance of effective surveillance and adoption of preventive measures to avoid mosquito bites. The risk of the virus spreading in the US is real as infected travelers return home.

There is currently no specific treatment for chikungunya virus infection and no vaccine available to prevent it. The only way to prevent

Figure. Travel-related chikungunya virus infections among Connecticut residents, by destination and month of illness onset, January 1-August 11, 2014.



becoming infected with chikungunya is to prevent mosquito bites. Symptoms are treated much the same as those for influenza. Getting plenty of rest and fluids will help, and for fever, aches and pains, ibuprofen, acetaminophen, or naproxen may be used.

Healthcare providers need to maintain a high level of clinical suspicion for cases of chikungunya, especially in international travelers. Please report suspected cases to the DPH at (860) 509-7994.

For more general information about chikungunya in Connecticut visit the DPH website at: [www.ct.gov/dph/chikungunya](http://www.ct.gov/dph/chikungunya).

For information concerning clinical evaluation and diagnostic testing, please visit the Centers for Disease Control and Prevention website at: [www.cdc.gov/chikungunya/hc/index.html](http://www.cdc.gov/chikungunya/hc/index.html).

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## Powassan Virus Disease — an Emerging Tick-borne Illness

In Connecticut, six human tick-borne diseases are currently reportable. The three most common are anaplasmosis, babesiosis, and Lyme disease, which are transmitted through the bite of infected *Ixodes scapularis* (blacklegged tick). The three less common are ehrlichiosis, Rocky Mountain spotted fever (RMSF), and tularemia. Ehrlichiosis is transmitted through the bite of infected *Amblyomma*

*americanum* (Lone Star tick), RMSF through the bite of *Dermacentor variabilis* (American dog tick), and tularemia through the bite of *D. variabilis* or *A. americanum*. Abundant habitat for support of the tick vectors that transmit these diseases, and the wildlife reservoirs of these organisms, exist in most areas of the state. In addition, some ticks can become infected with more than one pathogen. Transmission of multiple pathogens through one bite can result in human co-infections.

Powassan virus (POWV) is an emerging infectious disease issue. This virus is transmitted through the bite of infected *I. scapularis* or *I. cookei* (groundhog tick). From 2001-2012, 47 POWV neuroinvasive disease cases were reported in the US, primarily from states in the upper Midwest and Northeast (2). They include residents of Maine (2), Michigan (1), Minnesota (19), New York (13), Pennsylvania (1), Virginia (1), and Wisconsin (10). Illnesses due to POWV are voluntarily reportable in Connecticut. Although human cases have not been reported in Connecticut, POWV has been isolated from ticks (3). Also, POWV-specific neutralizing antibodies have been detected in deer.

Powassan virus is an RNA virus that belongs to the genus *Flavivirus* and is related to West Nile virus. It comprises two genotypes, each with a distinct natural history. The genotypes include lineage 1, which is maintained in an enzootic cycle involving mainly *I. cookei* and *I. marxi* (squirrel tick), and medium-sized mammals such as red squirrels, groundhogs, and skunks. These tick species do not readily feed on people. Lineage 2 is maintained in nature primarily by *I. scapularis* and small rodents such as white-footed mice, both are abundant in Connecticut. As with other tickborne diseases in Connecticut, the greatest risk for transmission to people is during spring through fall.

People who become infected with POWV may develop mild symptoms or none at all; however, it can cause serious illness. Healthcare providers should watch for symptoms that include fever,

headache, vomiting, and generalized weakness. POWV can infect the central nervous system and cause meningitis and encephalitis. Powassan encephalitis has a 10% case-fatality rate, and up to 50% of survivors will experience long-term neurological symptoms that may include stiff neck, altered mental status, seizures, aphasia, paresis, movement disorders, or cranial nerve palsies (1). The incubation period is generally 7-14 days; however, can be up to one month after a tick bite.

Testing of serum or cerebrospinal fluid for the presence of virus-specific Immunoglobulin M and neutralizing antibodies is the primary method for laboratory diagnosis of POWV. These tests are not commercially available, but can be performed by the Centers for Disease Control and Prevention (CDC).

Requests for specimen testing can be made through the DPH Laboratory by completing a Clinical Test Requisition form available at [http://www.ct.gov/dph/lib/dph/laboratory/labhome/forms/clinical\\_test\\_requisition\\_019b\\_fill.pdf](http://www.ct.gov/dph/lib/dph/laboratory/labhome/forms/clinical_test_requisition_019b_fill.pdf). On the bottom left of the form, select “Test, Agent or Disease Not Listed (Specify)”, and write in “Powassan virus testing at CDC”. For questions regarding specimen submissions, health care providers can call the Serology/Virology Laboratory at 860-920-6662 or the Main number at 860-920-6500.

Additional information is available from the CDC at <http://www.cdc.gov/powassan/> or by calling the DPH Epidemiology and Emerging Infections Program at 860-509-7994.

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<p>Jewel Mullen, MD, MPH, MPA Commissioner of Public Health</p> <p>Matthew L. Cartter, MD, MPH State Epidemiologist</p> <p>Lynn Sosa, MD Deputy State Epidemiologist</p>	<p>Epidemiology and Emerging Infections 860-509-7995</p> <p>Healthcare Associated Infections 860-509-7995</p> <p>HIV &amp; Viral Hepatitis 860-509-7900</p> <p>Immunizations 860-509-7929</p> <p>Sexually Transmitted Diseases (STD) 860-509-7920</p> <p>Tuberculosis Control 860-509-7722</p>	<p><b>Connecticut Epidemiologist</b></p> <p>Editor: Matthew L. Cartter, MD, MPH</p> <p>Assistant Editor &amp; Producer: Starr-Hope Ertel</p>
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