

Vibrio vulnificus Wound Infections - Connecticut, 2020

Vibrio bacteria are found in warm salt or brackish water (mix of salt and fresh water) of estuarine or marine environments. There are about a dozen species (*spp.*) of *Vibrio* bacteria that may cause illness in humans, known collectively as vibriosis. People can become infected with *Vibrio spp.* by consuming raw or undercooked seafood, most commonly oysters, or when an open wound is exposed to raw or undercooked seafood juices or warm salt or brackish water (1,2). According to the Centers for Disease Control and Prevention (CDC), an estimated 80,000 illnesses, 500 hospitalizations, and 100 deaths occur annually in the United States due to *Vibrio* infections (3). *Vibrio vulnificus* can cause necrotizing soft tissue infection or septicemia. In Connecticut, vibriosis is seasonal, with illnesses most commonly occurring during June – October when water temperatures are warmest. *Vibrio spp.* wound infections follow a similar seasonal pattern; however, most cases occur during July – September (Figure 1).

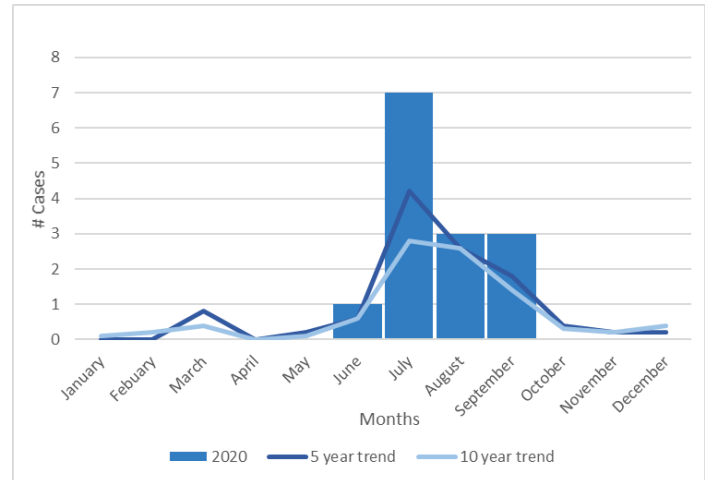
The Connecticut Department of Public Health (CT DPH) has conducted statewide surveillance for *V. vulnificus* since 1999 when *V. vulnificus* infections were added to the list of reportable diseases and laboratory reportable findings (4). In 2006, all clinical *Vibrio spp.* isolates, including *V. vulnificus*, were required to be sent to the State Public Health Laboratory (SPHL) for confirmatory testing and subtyping (5). All *Vibrio* reports are followed-up with an interview of the patient by staff of the CT DPH using the national Cholera and Other Vibriosis Illness Surveillance [form](#) to collect demographic, clinical, and exposure information, including seafood consumption and environmental exposures.

During August of 2020, 5 *V. vulnificus* infections were reported to the CT DPH. One case reported illness onset during July and 4 reported illness onsets during August. Cases were residents

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Figure 1. Vibriosis wound infection cases by month - Connecticut, 2020



of Fairfield (1), Middlesex (1), and New Haven (3) counties and were 49 – 85 years of age (median 73); 4 (80%) were male. All cases were hospitalized with 2 having septicemia (infection of the bloodstream) and 3 having wound infections; no deaths were reported. All cases reported exposure to salt or brackish water during activities such as swimming, crabbing, and boating prior to onset and had pre-existing wounds or sustained new wounds during these activities. Whole genome sequencing (WGS) was conducted at the SPHL for 4 clinical *V. vulnificus* isolates, and high-quality single nucleotide polymorphism (hqSNP) analysis was conducted at CDC. The hqSNP analysis found the 4 isolates differed by greater than 1,900 SNPs.

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Prior to 2020, *V. vulnificus* rarely caused illnesses in Connecticut (Figure 2). During 2010 – 2019, 7 cases were reported to CT DPH. These 7 cases were among residents of Fairfield (3), Hartford (2), Middlesex (1), and Litchfield (1) counties and were 9 – 79 years of age (median 69); 4 (57%) were male. Five cases were hospitalized, 3 with septicemia, and 3 with serious wound infections; one death was reported.

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Discussion

Infection with *V. vulnificus* can result in serious illness often requiring hospitalization, intensive care, and limb amputation, and can lead to bloodstream infection causing septicemia. According to CDC's national surveillance data, 1 in 5 people with *V. vulnificus* infection die, sometimes within a day or two of becoming ill (1). People at greatest risk for illness are those with weakened immune systems and the elderly (1).

During July – August 2020, 5 *V. vulnificus* infections were reported to the CT DPH, which was highly unusual as only 7 infections were reported in total during the previous 10 years. There were demographic differences among the 5 cases reported during 2020 when compared to the 7 cases reported during 2010-2019; 80% of the 2020 cases were male and the ages were more

tightly clustered ranging between 49-85 years old. During 2020, all 5 *V. vulnificus* cases were hospitalized, compared to 71% of the cases during 2010-2019. In response to the unusual increase in *V. vulnificus* cases reported during the summer of 2020, the CT DPH issued a [press release](#) on September 12, 2020 to warn residents in shoreline areas about the potential dangers of exposure to salt or brackish water along Long Island Sound.

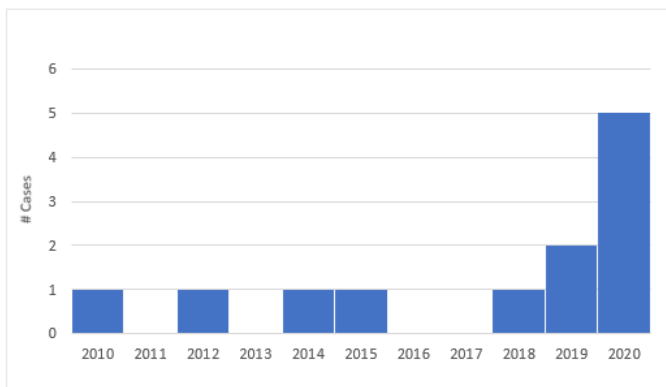
It is unclear why an increase in *V. vulnificus* occurred in 2020 and whether this increase will be sustained during 2021. Whole genome sequencing revealed that the 4 *V. vulnificus* clinical isolates analyzed were diverse and unlikely to be related. The WGS data provided evidence that high diversity among *V. vulnificus* strains was potentially circulating in Long Island Sound during summer 2020. Starting in 2021, the Department of Agriculture, Bureau of Aquaculture will conduct *V. vulnificus* testing of shellfish found in beds along the Long Island Sound coastline. Shellfish testing will provide baseline data on strains of *V. vulnificus* circulating in Long Island Sound. These data may be helpful in identifying trends and determining when and where to focus prevention messages to visitors of Connecticut beaches.

The risk of acquiring *V. vulnificus* wound infections can be minimized. Prevention measures include staying out of saltwater or brackish water when wounds are present, including wounds from recent surgeries, piercings, or tattoos. If avoidance of salt or brackish water is not possible, wounds should be covered with a waterproof bandage to help prevent potential exposure. Exposure can occur at beaches during activities such as swimming, wading, fishing, or walking on the shoreline. Also, protective gloves can be worn to prevent wounds while crabbing, fishing, or handling shellfish. If a wound is sustained while in direct contact with saltwater or brackish water, it is important to wash the wound thoroughly with soap and water.

The CDC recommends the following for management of *V. vulnificus* wound infections:

- *V. vulnificus* should be considered as a possible cause of infected wounds if they had been exposed to coastal waters.

Figure 2. *Vibrio vulnificus* confirmed cases - Connecticut, 2010-2020



Animal Rabies Testing Connecticut, 2017-2020

- Culture the wound or hemorrhagic bullae and forward all *V. vulnificus* isolates to the SPHL.
- Antibiotics should be initiated before isolate results are available as immediate treatment improves survival.
- Blood cultures are recommended if the patient is febrile, has hemorrhagic bullae, or signs of septicemia.
- Careful attention should be given to the wound site; necrotic tissue should be aggressively debrided. Severe cases may require fasciotomy or limb amputation.

Providers can contact the CT DPH Epidemiology Program with questions concerning potential *Vibrio* infections at 860-509-7994.

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Animal rabies is an important public health concern because of the potential for human infection. The virus is transmitted primarily through bites from an infected animal; less commonly, the virus can be transmitted by infectious saliva or central nervous system tissue contacting open wounds or mucus membranes. The principle reservoir species in the United States include bats, raccoons, skunks, and foxes (*I*). Coyotes, bobcats, woodchucks, and other large mammals may also develop and transmit rabies. Small rodents such as squirrels, chipmunks, mice, and rats are not considered rabies vectors as they are unlikely to survive an attack by a rabid animal.

The rabies virus infects the nervous system and the disease is fatal to wild animals and unvaccinated domestic animals. In humans, once clinical disease develops the infection is nearly always fatal. Clinical illness can be prevented by conducting a thorough risk assessment based on [The Advisory Committee on Immunization Practices](#) (ACIP) national guidelines and appropriate administration of rabies post-exposure prophylaxis (rPEP) if indicated (2).

To assist decision making regarding rPEP, the Connecticut Department of Public Health (CT DPH) State Public Health Laboratory (SPHL) offers testing of animals that could have exposed people to the rabies virus. In July 2016, modifications to rabies testing requirements at SPHL that emphasized testing only animals involved in potential human exposures were fully implemented (3). Although the changes were initiated mid-year, the number of animals tested at the SPHL in 2016 decreased by 37% relative to 2015 (3).

During 2017-2020, 4596 animal specimens were tested for rabies virus by the SPHL, including 2214 (48%) from domestic species, 1866 (41%) from bats, and 516 (11%) from wild terrestrial species. Domestic animal specimens included 1113 (50%) cats, 1046 (47%) dogs, 25 (1%) goats, and 18 (1%) cattle. Wild terrestrial animal specimens included 185 (36%)

raccoons, 74 (14%) skunks, 54 (10%) squirrels, 50 (10%) groundhogs, and 30 (6%) foxes (Table). Of the bat specimens submitted, 1734 (93%) were identified as big brown bats (*Eptesicus fuscus*).

Among all animals tested, 171 (4%) tested positive. Those testing positive, included 112 (66%) wild terrestrial animals, 43 (25%) bats, and 16 (9%) domestic animals. Overall, positivity rates varied by species and included 37% of foxes, 36% of raccoons, 19% of skunks, 11% of domestic cattle, 8% of groundhogs, 2% of bats, 1% of cats, and <1% dogs. Testing was not performed on 138 (3%) specimens and results were indeterminant or unsatisfactory for 10 (<1%) specimens. The most likely causes were poor handling of the carcass (significant decomposition), poor sample size, or method used when euthanizing the animal. A combined total of 77 animals not considered to be rabies vectors were submitted for testing including 54 (71%) squirrels and 14 (18%) chipmunks (Table). None tested positive for rabies virus.

Table. Animal specimens tested for rabies virus by the State Public Health Laboratory - Connecticut, 2017-2020.

Animal Type	Total*	Positive N (%)
Bats	1866	43 (2%)
Domestic Cats	1113	12 (1%)
Domestic Dogs	1046	2 (<1%)
Raccoons	185	66 (36%)
Skunks	74	14 (19%)
Domestic Livestock ¹	50	2 (4%)
Groundhogs ²	50	4 (8%)
Wild Canids ³	40	11 (28%)
Non-vector Species ⁴	77	0 (0%)
Bobcats	12	3 (25%)
Other ⁵	37	0 (0%)
Unknown	46	14 (30%)
Total	4596	171

1. cow, goat, horse, sheep
2. aka woodchuck
3. coyote, fox
4. chipmunk, mole, mouse, rabbit, shrew, squirrel
5. beaver, deer, ferrets, fisher cats, muskrat, opossum, otters, porcupine, weasels

When compared to 2016 data, the average annual number of specimens tested during 2017–2020 decreased by 15%. Specifically, submissions of opossums decreased by 94%, skunks 65%, raccoons 56%, foxes 47%, groundhogs 43%, cats 23%, and dogs 7%. The number of bats submitted was the same (468 vs 466 respectively). During 2017-2020, the total number of annual submissions decreased (Figure). The overall proportion of positive findings decreased by 3%.

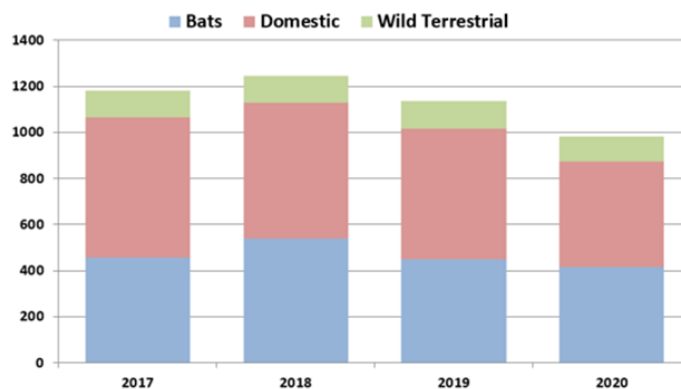
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Discussion

The 2016 changes to rabies testing guidance led to an initial 37% reduction in the number of animals submitted when compared to the previous year’s data, thus reducing the burden for rabies testing at SPHL. Since then, the number of animals submitted for testing and proportion of positive test results has trended downward. Nearly one-half of animals tested at SPHL continues to be cats and dogs. This is likely because domesticated animals have higher likelihood of human interaction and are more often available for testing after a potential human exposure. During 2017-2020, a combined annual average of 540 cats and dogs were submitted for rabies testing, a 16% decrease over 2016 data. Of those, 99% indicated human exposure with 78% reporting a bite exposure. Those submissions not indicating human exposure showed a domestic animal was exposed to potentially rabid wild animals.

Figure. Animals tested for rabies virus by species type, State Public Health Laboratory - Connecticut, 2017-2020.



During 2017-2020, data show the SPHL continues to receive animals that are considered unlikely to be infected by rabies virus including chipmunks, mice, moles, rabbits, shrews, and squirrels. Although these represent 1.7% of all submissions during that period, this unnecessary testing still impacts public health resources.

In Connecticut, domestic animal bites are reportable by the victim to local animal control or to the Department of Agriculture. Vaccination of domestic animals, avoiding contact with wildlife, and maintaining cats and dogs under supervision while outside are essential to preventing rabies exposures. The DPH will work to provide rabies information to the public to educate and outline the importance of staying away from wild animals, bats, and unfamiliar domestic animals. Education about what is considered an exposure, and what is not, may help prevent unnecessary animal testing and rPEP administration.

The rabies statistics presented here only reflect animals tested at SPHL. Animals not involved in potential human exposure, or are not considered to be rabies vectors, can be tested for a fee at the Connecticut Veterinary Medical Diagnostic Laboratory, University of Connecticut. Information concerning service and guidelines, as well as tests and fees for animal rabies testing is available at: <http://cvmdl.uconn.edu/> or by calling 860-486-3738.

Healthcare providers, veterinarians, or animal control professionals with questions about possible human exposure to rabies or administration of rPEP should call the DPH Epidemiology and Emerging Infections Program at 860-509-7994. Healthcare providers may also consult the [ACIP Recommendations](#) of 2008 and 2010 (2); veterinarians and animal control professionals may also consult the [Compendium of Animal Rabies Prevention and Control](#) (4). For questions about domestic animal exposures to rabies, contact local animal control or the Department of Agriculture Animal Control Division at 860-713-2506.

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