

Measles in Connecticut, 2014-2019*

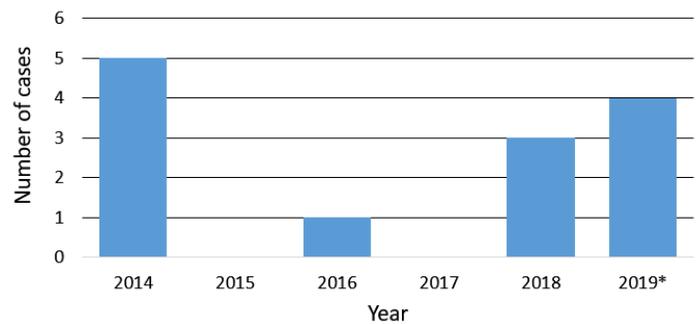
Measles is a highly contagious viral respiratory illness characterized by a prodrome of fever, cough, coryza, and conjunctivitis, followed by a maculopapular rash. The rash usually begins on the face and progresses down the body. While measles is usually a mild to moderate illness, it can result in complications such as pneumonia, encephalitis, and death. Measles virus can remain in the air for up to two hours after an infected person leaves a room, and people are contagious for 4 days before and 4 days after rash appearance (1). Measles cases require extensive follow-up and contact tracing, on average involving over one hundred exposures per case (1).

During 2014–2019, a total of 13 cases of measles were reported in Connecticut (Figure 1). Of the 13 cases reported during 2014–2019, 4 (31%) were in children under the age of 18 years, 4 were hospitalized, 4 were linked to international travel, 2 were linked to domestic travel, 4 acquired their infection in Connecticut, and for the remaining 3 cases it was unknown where measles was acquired. Of the 13 cases, 8 (62%) had an unknown vaccination status, 4 (31%) were unvaccinated, and 1 (8%) had documentation of two doses of measles-containing vaccine. Of the 6 cases where genotype was known, 4 were genotype D8 (1 from 2018 and 3 from 2019) and 2 were B3 (both from 2018); these 2 genotypes are wild-type strains and the most commonly detected genotypes worldwide in the past 12 months.

An outbreak of measles is defined as 3 or more cases linked together in time and place. During 2014, one measles outbreak involving 3 cases was identified. These 3 cases were related to an importation of measles from an outbreak in the Philippines and led to one generation of spread (i.e. one case resulted in the transmission of measles to two other cases).

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Figure. Number of measles cases by year, Connecticut, 2014-2019*.



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Editorial

Cases of measles in the United States have decreased since the introduction of the measles vaccine in 1963. One dose of measles-containing vaccine is 93% effective in preventing measles disease and 2 doses is 97% effective (2). In 2000, endemic measles was declared eliminated from the United States (3). However, measles outbreaks still occur in other countries and travelers can bring measles into the United States. From January 1 - November 7, 2019, 1,261 cases of measles were reported in the United States, which is the highest number of cases reported since 1992 (4).

Connecticut has historically had high statewide immunization rates. Data collected from the 2018-2019 school survey showed that statewide 96.1% of kindergartners received MMR vaccine prior to school entry, which is above the $\geq 95\%$ MMR

* 2019 data are preliminary.

coverage rate that is recommended to achieve community immunity. Of the schools with more than 30 kindergarten students, 134 schools have MMR rates below 95% and 41 schools have MMR rates below 90%. Maintaining high immunization levels in the community is imperative to keeping measles from spreading, and protecting the public's health (5).

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An Outbreak of Norovirus Gastroenteritis Associated with a School Event, Connecticut, 2019

In March 2019, the Connecticut Department of Public Health (DPH) received notification of a possible foodborne outbreak among individuals who had attended a three-day event that involved more than 1,000 students, parents and school staff from Connecticut and neighboring states. Foods for the event included items prepared by several local food establishments (FE) and a school-run concession stand, as well as sandwich ingredients purchased at a grocery store. The DPH Epidemiology and Emerging Infections Program and Food Protection Program (FPP) assisted the local health department (LHD) in the investigation. This report summarizes the epidemiologic, laboratory and environmental findings of the investigation, and implementation of control measures.

Epidemiologic Investigation

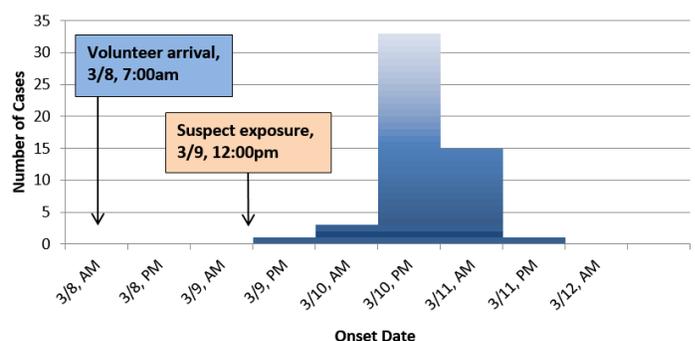
Because initial reports of illness were limited to event volunteers and custodians, the epidemiologic investigation focused on these two groups. A standardized questionnaire was developed and

administered to volunteers via Survey Monkey[®], and in-person interviews of ill custodians were conducted by the LHD. A link to the online questionnaire was provided to the volunteer coordinator for distribution to volunteers. A case was defined as illness consisting of vomiting and/or diarrhea (≥ 3 stools in a 24 hour period) in a volunteer or custodian who ate food served at the event with symptom onset following the start of lunch on March 9, 2019. Of the 105 identified volunteers, 75% completed the survey. Three respondents reported having gastrointestinal illness prior to the event and were excluded from analysis. A total of 53 cases were identified, of which two were custodians and 11 were self-identified students. The median age of cases was 30 years (range 16-69); 29 (55%) were male.

Onset of illness ranged from March 9-11 (Figure). The median incubation period was 32.5 hours (range 2.5-48) and median duration of illness was 36 hours (range 2 - 72). Ten cases remained ill at the time of survey completion. Reported symptoms among cases included nausea (100%), vomiting (94%), chills (89%), headache (89%), muscle aches (87%), fever (78%), cramps (74%), diarrhea (71%), and bloody diarrhea (4%). One case reported overnight hospitalization.

A cohort study was conducted to determine associations of illness with food exposures. Multiple food items were significantly associated with illness, including the combination variables "any lunch item on Saturday, March 9th" [Risk Ratio (RR)= 2.80; 95% Confidence Interval (CI)= 0.86-9.09; p -

Figure. Number of Norovirus cases by onset date and time, New Haven County, CT, March 2019



value<0.01], “any snack on Saturday” (RR= 1.43; 95% CI= 1.00-2.04; *p*-value=0.02), and “any grinder for Saturday lunch” (RR= 2.42; 95% CI= 1.26-4.65; *p*-value=0.0001), as well as the roast beef grinder (RR= 1.31; 95% CI= 1.05-1.65; *p*-value<0.05) and macaroni salad (RR= 1.43; 95% CI= 1.03-1.99; *p*-value<0.05). “Any lunch item on Saturday” remained statistically significant when controlling for “any snack on Saturday”; however, when controlling for “any lunch item on Saturday”, “any snack on Saturday” no longer remained significant.

Laboratory Investigation

Stool specimens collected from 3 volunteers, 7 custodians and 5 food workers (FW) that prepared foods served at the event were tested at the DPH State Public Health Laboratory (DPHL) for Norovirus (NoV) by RT-PCR. All 3 volunteers, 2 custodians and 1 FW tested positive for NoV Genotype II. All 6 NoV GII positive samples were forwarded to the New York State Wadsworth Laboratory for sequencing; 4 (2 volunteers and 2 custodians) yielded sequence strain GII.P12-GII.3.

Environmental Investigation

On March 13th, environmental investigations of the two locations that prepared lunch on Saturday were conducted by LHD staff. Onsite evaluations included interviews of FW, distribution of stool specimen kits, and assessment of food handling practices and procedures. Upon interview, no FW reported gastrointestinal illness during the month prior to the event.

Following the positive FW laboratory result, staff from the FPP and LHD conducted an assessment at the FE of interest. The positive FW reported preparing the grinders for the Saturday lunch, and admitted to likely using bare hands when preparing food items. The assessment also showed the absence of written policies for avoiding bare hand contact, handwashing, and the management of ill food workers.

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Editorial

In the United States, noroviruses cause between 19 and 21 million acute cases of gastroenteritis annually. The majority of foodborne illnesses are caused by norovirus (*1*). By 2014, infected food workers caused about 70% of reported norovirus outbreaks associated with contaminated food, most of which involve bare hand contact with ready-to-eat foods (*2*). Norovirus is very contagious, requiring only a small number of viral particles to cause illness. Victims may infect others while symptomatic, or before symptoms start and after they resolve (*2*).

The epidemiologic, environmental, and laboratory evidence indicate that a foodborne outbreak occurred among volunteers and custodians at a school event during March 2019. The symptoms, incubation period, and duration of illnesses were consistent with norovirus. Consumption of foods from lunch on March 9, and particularly of grinders, was significantly associated with illness.

An infectious asymptomatic food worker that used bare hand contact with ready-to-eat foods was most likely the cause of this outbreak. The environmental investigation determined that one food worker prepared the grinders served at the lunch, likely using bare hand contact. This food worker denied symptoms but tested positive for the same genotype of Norovirus as that isolated from ill volunteers and custodians.

Investigative findings demonstrate the importance of addressing bare hand contact during routine inspections at FEs. Findings also reinforce the general need for training on safe food handling practices including appropriate handwashing, avoidance of bare hand contact, and development of an accompanying written policy. Policies addressing the management of ill food workers should likewise be developed and reviewed with employees.

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Powassan Virus - Connecticut, 2016-2019

Powassan virus (POWV) is an arbovirus transmitted primarily through the bite of infected *Ixodes* species ticks. In Connecticut, Powassan virus has been found in *Ixodes scapularis*, or “black-legged” (“deer”) ticks, the same species that transmits Lyme disease, babesiosis, anaplasmosis, and *Borrelia miyamotoi* (1).

During 2016-2018, 3 human cases of POWV disease were identified in Connecticut. In an effort to better understand the epidemiology of POWV in the state, the infection was made reportable to the Connecticut Department of Public Health (DPH) in 2019 (2). Of the cases identified during 2016-2018, all were hospitalized with a diagnosis of encephalitis; 1 patient died. Patients were residents of Windham, Middlesex, and New London counties and had onsets during May-November. One patient reported out of state travel during the incubation period.

As of November 25, 5 cases of POWV infection were reported to DPH in 2019. All 5 infections were acquired in-state and all patients were hospitalized with a diagnosis of meningitis or encephalitis; 1 patient died. Patients were residents of New Canaan (1), New Preston (1), Newtown (1), Ridgefield (1), and Woodbury (1). Onsets of illnesses occurred during early April to mid-November. The median age of patients was 61 years (range = <1 year -75 years).

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Editorial Note

Nationally, reported cases of POWV infection have been increasing during the last decade, primarily in Northeastern and Upper Midwest states (3,4). Like other arboviral infections, such as West Nile virus, POWV disease can range from a mild

febrile illness to severe neuroinvasive disease. Neuroinvasive disease has an approximately 10% fatality rate and about half of survivors suffer from long-term neurologic symptoms. Transmission of the virus can occur within as little as 15 minutes of tick attachment, making prevention of tick bites critical for preventing POWV disease (5).

Clinicians should consider POWV disease when evaluating a patient with a history of being in a tick-endemic area for encephalitis or meningitis. It is important to be aware that onset of POWV disease may occur in early spring or late fall, well outside of the typical mosquito-borne arbovirus transmission season. Diagnosis of POWV infection is typically made through detection of virus specific IgM antibodies in serum or cerebrospinal fluid followed by confirmatory neutralizing antibody testing. The IgM antibodies are generally first detectable 3 to 8 days after the onset of illness. Currently testing is available at the CDC; specimens can be submitted through the DPH State Public Health Laboratory. More information about POWV can be found at <https://www.cdc.gov/powassan/index.html>.

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