Connecticut Epidemiologist

Volume 34, No. 7 December 2014

# Investigation of a Norovirus Outbreak at a Summer Camp—Connecticut, 2014

On July 24, 2014, the Connecticut Department of Public Health (DPH) Epidemiology and Emerging Infections Program (EEIP) was notified of a possible outbreak of gastrointestinal (GI) illness among persons who attended an overnight camp during July 20-25. A total of 36 persons were in attendance during the camp session: 24 campers and 12 staff, including 6 volunteers. Overnight campers and staff consumed all meals in a private dining facility and shared common sleeping areas and bathrooms. Although the session ended on July 25, many ill campers left for home on July 24. Attendees of a day camp held during the same time period did not experience any illnesses. EEIP staff notified the local health department (LHD), Food Protection Program (FPP), and Camp Licensing Programs. This report summarizes the findings of the outbreak investigation.

## Epidemiologic Investigation

Staff of the EEIP interviewed overnight campers and staff. A standardized questionnaire was developed and administered in-person, or was self-administered on-line or by completing a paper copy.

A case was defined as vomiting and/or diarrhea (≥ 2 stools in a 24 hour period) in a camper or staff member with symptom onset during July 23-25, 2014. Among the 36 attendees, 33 (92%) were interviewed. Of these, 25 (76%) met the case definition, 6 were asymptomatic (18%), and 2 had unrelated symptoms (6%). Of the 25 cases, 24 (96%) had vomiting and 2 (8%) had diarrhea. The median age of case-patients was 14 years (range 13–41), and 17 (68%) were female. Eleven of the case-patients were residents of Connecticut and 14 were from other states. Onset of illness ranged from July 23-July 25 (Figure). Of the 8 case-patients who had recovered by the time of the interview, the median duration of illness was 34.5 hours (range 9–72 hours). Six case-patients (24%) sought medical attention; none required hospitalization.

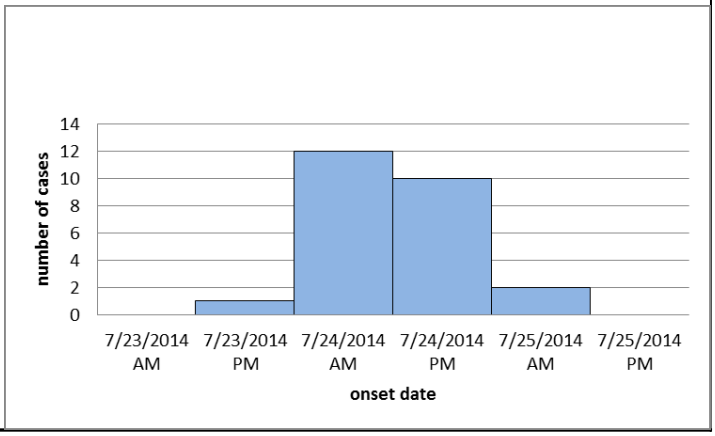
All camp meals were served buffet-style in the private dining facility, which was one of four onsite food service establishments (FSE). Campers also had access to snacks and beverages from a gift shop. Data collected on all meals served between dinner on July 20 and dinner on July 23 were assessed using univariate analysis. Due to the high proportion of ill persons and lack of well controls, a specific meal or food item could not be statistically implicated.

To further characterize the outbreak, a second standardized questionnaire was developed and administered to non-camp staff members at the venue who had access to the same onsite FSE as the campers. This survey was distributed via e-mail to 180 persons, and was available in paper format for staff who did not have a work e-mail address. Exposure questions concerning consumption of food and/or beverages from the four onsite FSE, and visiting the sleeping quarters of campers were

*In this issue...*



**Figure. Epidemic Curve of Onset of GI Illness at an Overnight Camp in Connecticut, July, 2014**



included. Of the 180 non-camp staff who received the questionnaire via e-mail, 116 (64%) completed it; 14 employees submitted paper surveys. A case was defined as diarrhea (≥ 2 stools in a 24 hour period) in a non-camp staff with symptom onset after July 20, 2014. Of the 130 respondents, 8 (6%) met the case definition. Upon univariate analysis, none of the exposures were significantly associated with illness.

**Laboratory Investigation**

Stool samples were collected from 18 persons including 1 ill camper, 1 non-camp staff, 3 camp staff, and 13 food workers that prepared meals for the camp. Samples were submitted to the DPH State Laboratory for routine bacterial pathogens and norovirus (NoV) testing. Of the persons tested, the ill camper, 1 camp staff, and 3 food workers tested positive for NoV genotype II (GII). One additional ill camper sought medical attention. Their stool sample was submitted to a clinical laboratory for testing and yielded NoV (not typed).

**Environmental Investigation**

The LHD and the DPH FPP conducted the environmental investigation. Interviews of food workers about recent GI illness, and an evaluation of food handling practices began on July 25 by the LHD sanitarian. The FSE of interest served food to the general public, employees, and overnight campers and staff; however, meals were served to the overnight campers and staff in a separate private dining room not used by other groups or the public. Also, the menu may not have been the same for overnight campers and staff as it was for the general public.

Of the 3 food workers who tested positive for NoV GII, 2 (67%) reported illnesses consistent with NoV with onsets of illness on July 22 and July 24. The environmental investigation identified several factors that may have contributed to the outbreak, including improper glove use and hand washing, not having a qualified food operator, inadequate concentration of chlorine solution for use to sanitize food contact surfaces, and not having proper test strips on hand to test the level of chlorine concentration. Several control measures were implemented that included interviews with all food workers, exclusion of ill food workers, culturing all food workers, and the FSE of interest was thoroughly cleaned and disinfected.

## Reported by

*J Krasnitski, MPH, J Mullins, DVM, MPH, PhD, K Soto, MPH, Q Phan, MPH, T Rabatsky-Ehr, MPH, Epidemiology and Emerging Infections Program; C Costa, BS, Food Protection Program; C Nishimura, MPH, State Public Health Laboratory, Connecticut Department of Public Health; and Local Health Department Staff.*

## Editorial

Noroviruses are the most common cause of domestically acquired foodborne illnesses in the United States, accounting for 58% of reported foodborne illnesses in 2011 (*1*). A person generally develops symptoms of gastroenteritis 12 to 48 hours after being exposed to NoV. Typical symptoms include the sudden onset of vomiting, watery, non-bloody diarrhea with abdominal cramps, and nausea (*2*).

Noroviruses are highly contagious. A person with NoV infection can shed billions of particles, but it only takes as few as 18 viral particles to infect another person (*2*). Noroviruses are generally spread through close personal contact with an infected person or through the fecal-oral route when a person consumes contaminated food or water. From 2009 – 2012, 64% of reported NoV outbreaks were associated with a restaurant setting, and of those, 70% implicated food workers (*3*).

The epidemiologic, environmental, and laboratory evidence suggest that a foodborne outbreak occurred among overnight campers and staff during July 23 – 25. Symptoms, incubation period, and duration of illnesses were consistent with NoV. This hypothesis was further supported by laboratory confirmation of NoV in the stool specimen of 1 camper, and NoV GII in samples from 3 food workers, 1 camper, and 1 camp staff member.

This outbreak appears to have been limited to overnight campers and staff. The survey of non-camp staff did not identify any association with the FSE of interest. Anecdotally, attendees of the day camp did not experience any gastrointestinal illness. The day camp attendees did not have the same opportunity as the overnight campers and staff to consume meals in the FSE of interest, as they brought meals/snacks from home.

Contamination of food by one or more ill food workers is a possible cause of this outbreak. Although the investigation identified multiple ill food workers, it is unclear whether they contributed to the outbreak or were victims. However, improper glove use and inadequate hand washing were noted by local and state health sanitarians.

One limitation of this investigation is the lack of well controls for the univariate analysis. This made it difficult to identify a specific food item(s) using epidemiological methods.

The findings of this outbreak reinforce the need for food managers to train and supervise staff on prevention methods for foodborne disease. Food workers with symptoms of vomiting and/or diarrhea should be excluded from food handling until at least 72 hours (3 days) after resolution of symptoms.

## References


1. CDC. CDC Estimates of Foodborne Illness in the United States. http://www.cdc.gov/foodborneburden/PDFs/FACTSHEET_A_FINDINGS_updated4-13.pdf. Accessed November 21, 2014.
2. CDC. Norovirus Clinical Overview. http://cdc.gov/norovirus/hcp/clinical-overview.html Accessed November 21, 2014.
3. CDC. Vital Signs: Foodborne Norovirus Outbreaks – United States, 2009-2012. MMWR 2014; Vol. 63(22): 491-495.


# A Case of Hantavirus Pulmonary Syndrome, Connecticut 2014

Hantavirus Pulmonary Syndrome (HPS) is a severe and sometimes fatal illness caused by infection with hantavirus, a rodent host virus in North America. Rodents shed virus in their urine, saliva, and droppings, contaminating the environment including nesting materials. Transmission occurs indirectly through inhalation of air contaminated with the virus or rarely through the bite of an infected rodent. Virus-containing particles can be stirred into the air through sweeping, vacuuming or other continual movement. Onset of illness typically occurs 1-5 weeks after inhalation of the virus. A prodromal phase occurs during the first 3-5 days of illness with rapid progression to severe pulmonary edema and hypoxia (*1*). This report describes the first documented case of HPS in a Connecticut resident.

In September 2014, the Connecticut Department of Public Health (DPH) was notified of a case of HPS. The patient was 40-50 years of age and smoked, but had no other significant medical history. Symptoms developed in August 2014, and included fever, non-productive cough, and shortness of breath. Three days after onset of symptoms, the patient sought medical care at an urgent care center, and was transferred to a hospital with a fever of 102.8°F. Upon admission the patient was tachypneic and hypoxic with improvement after receiving oxygen. The patient's breathing continued to worsen and ventilator support was required.

Hematology results included thrombocytopenia (66,000/µL), elevated white blood cell count (12,000/µL, 82% neutrophils) with left shift (9.8% bands), and hematocrit of 53.2%. Initial radiographs indicated bilateral ground-glass alveolar opacities, upper lobes with alveolar edema, and basilar effusions. Pulmonary lesions rapidly progressed and included extensive bilateral pulmonary infiltrates consistent with Acute Respiratory Distress Syndrome (ARDS). Serologic testing by an enzyme linked immunosorbent assay was performed at a reference laboratory with IgM and IgG (6.21 and 9.11 respectively, cutoff < 2.00) antibodies detected for hantavirus (Sin Nombre serotype). The patient's condition improved, and ventilator support was removed after 8 days. The patient received a 7 day combined therapy of azithromycin, ceftriaxone, and doxycycline, and was discharged to a rehabilitation facility after a stay of 12 days. Acute hypoxic respiratory failure due to HPS was the final diagnosis.

An epidemiologic investigation was conducted to assess the case-patient's rodent exposures. The case-patient reported visiting a trailer parked at a campsite in Vermont two weeks before onset of illness. The trailer had been unoccupied for an extended period of time and had evidence of mouse infestation that included rodent droppings. The case-patient cleaned the trailer by sweeping up debris and wiping down surfaces with disinfectant wipes. No personal protective equipment was worn. The case-patient indicated that cleaning stirred up a lot of dust resulting in 1-2 days of cough and throat irritation. No other potential rodent exposures were identified. The Vermont Department of Health was notified about the case and potential exposure site, and they reported no additional HPS cases were identified related to this campsite.

## Reported by

*K Soto, MPH, L Backman, RN, MHS, R Nelson, DVM, MPH, Epidemiology and Emerging Infections Program, Connecticut Department of Public Health.*

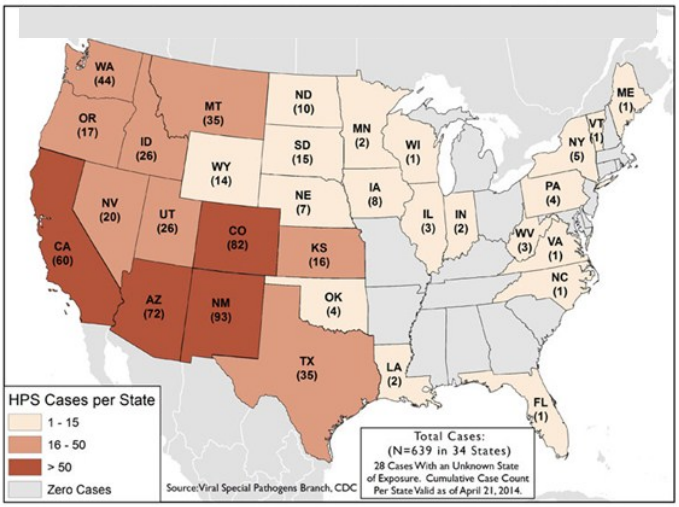
During 1993-2013, 606 cases (11-48 per year) of HPS have been reported nationally (*2*). Most human infections have been acquired in the western U.S. (Figure). Although HPS has previously been unreported in Connecticut, white-footed mice, a host -reservoir species, are present and capable of transmitting the virus to humans via direct or indirect contact (*3*). Clinicians should consider HPS in their differential diagnosis for patients presenting with bilateral interstitial pulmonary infiltrates, consistent with ARDS, in a previously healthy individual. Appropriate diagnostic testing should be ordered to confirm infection (*2*). Although HPS is not specifically on the list of reportable diseases, cases should be reported to the DPH and the local health department where the case resides under the 'unusual disease or illness' criteria.

Rodents may directly and indirectly transmit HPS and other diseases to people who have contact with them. To prevent hantavirus, individuals are encouraged to take the following steps:

- Identify and seal areas where mice and other rodents may enter the home
- Properly store or eliminate potential rodent food sources
- Use traps to control rodent populations in and around the home
- Wear gloves when cleaning up after rodents
- Appropriately clean and disinfect contaminated areas by opening doors and windows and wetting surface areas with a liquid disinfectant before removing urine or droppings
- Avoid sweeping, vacuuming, and other activities that may stir up mouse droppings, urine, and nesting materials
- For heavy rodent infestations or infestations of air systems, a commercial cleaning service should be considered

For more detailed recommendations, please visit the CDC Rodent Website (*4*).

**Figure. United States Hantavirus Pulmonary Syndrome (HPS) Cases, by State of Exposure as of April 21, 2014.**




## References

1. American Academy of Pediatrics. "Hantavirus Pulmonary Syndrome." Red Book 2012. pp 352-354.
2. Centers for Disease Control and Prevention. Hantavirus Pulmonary Syndrome (HPS). Accessed September 24, 2014.
3. Mills JN, Amman BR, Glass GE. Ecology of hantaviruses and their hosts in North America. Vector Borne Zoonotic Dis 2010;10:563--74.
4. Centers for Disease Control and Prevention. Rodents. Accessed September 24, 2014.

**For Public Health Emergencies**

**After 4:30 P.M. or on Weekends**

**Call the Department of Public Health**

**860-509-8000**