

Investigation of Two Multistate Outbreaks of Salmonellosis, Connecticut, 2012

Pulsed field gel electrophoresis (PFGE) is an important tool for multistate outbreak investigations. In Connecticut, all isolates of *Salmonella* identified by clinical laboratories are sent to the Connecticut Department of Public Health (DPH) State Laboratory for confirmation, serotyping, and PFGE subtyping to determine the organism's molecular fingerprint. These PFGE patterns are tracked within the state and are also shared through PulseNet, a national network of public health and regulatory laboratories that perform PFGE of foodborne bacteria, to look for potential clusters of illness (1). The recent outbreaks of *S. Bareilly* and *S. Infantis* illustrate the importance of routine surveillance to identify cases of illness associated with multistate clusters that may otherwise go undetected.

Salmonella Bareilly and *Salmonella* Nchanga Investigation

The DPH is participating in an ongoing multistate investigation of *Salmonella* Bareilly and *Salmonella* Nchanga infections associated with a frozen raw scraped ground tuna product. As of June 21, 2012, 376 cases of *S. Bareilly* and 14 cases of *S. Nchanga* have been reported from 27 states and the District of Columbia; the majority from the Eastern United States. Among cases with known onset dates, symptom onset occurred during January 28-June 3, 2012. Cases occurring after May 18, 2012 may not yet be reported (2).

In Connecticut, 11 cases of *S. Bareilly*, with specimen collection dates during February 16-May 20, 2012, were identified as part of the national outbreak using PulseNet; no cases of

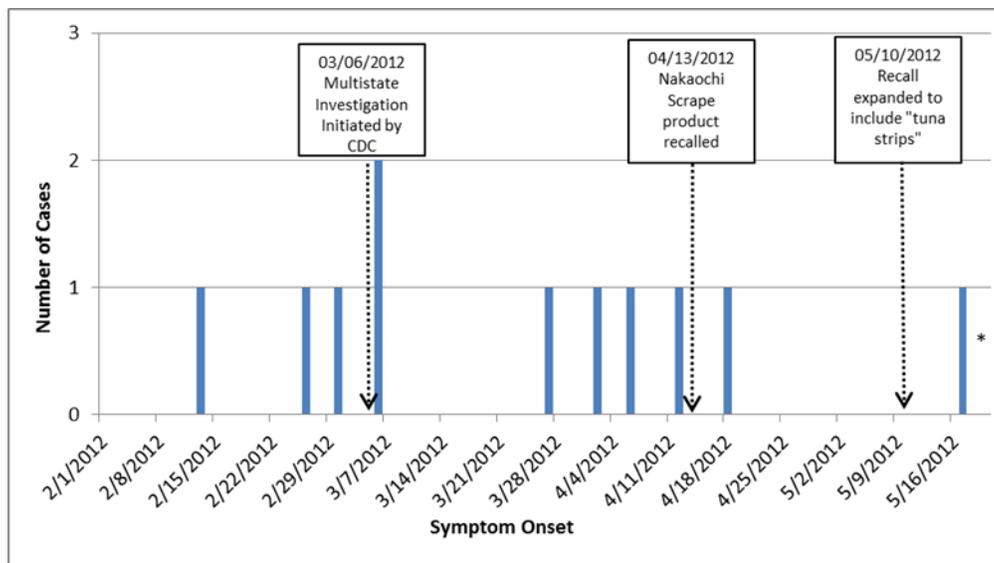
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S. Nchanga were identified. To assess illness and potential exposures, case-patients were interviewed using a standardized questionnaire. Of the 10 respondents, onset of illness ranged from February 13-April 18, 2012 (Figure 1), median age is 30 years (range: 17-68 years), and 55% are female. Cases were reported from New London (n=5), Fairfield (n=4), and Litchfield (n=2) counties and reported the following symptoms: diarrhea (n=10 [100%]), abdominal cramps (n=9 [90%]), bloody diarrhea (n=4 [40%]), and fever (n=2 [20%]); no deaths or hospitalizations were reported. Sushi was consumed in 8 (80%) cases; 7 case-patients (70%) consumed specifically "spicy tuna."

To date, 2 restaurant clusters have been identified as part of this outbreak; 4 case-patients consumed sushi from Restaurant A in New London County, and 2 case-patients consumed sushi from Restaurant B in Fairfield County. Invoices from Restaurant A were collected and assessed for

Figure 1. Number of cases of *Salmonella* Bareilly by onset of illness, Connecticut, 2012.



*Estimated onset based on date of specimen collection.

common ingredients and distribution patterns. This information was shared with the United States Food and Drug Administration (FDA). Invoice and trace back information from restaurant clusters in 4 states, including Connecticut, led to the identification of a frozen scraped tuna product as the likely source of the nationwide outbreak.

On April 13, 2012, the frozen raw scraped yellowfin tuna product, known as Nakauchi Scrape, from Moon Marine USA Corporation, was voluntarily recalled (3). The FDA provided the DPH with a list of restaurants that received recalled product. The DPH worked with local health departments to assure that the recalled product was removed from restaurants to prevent future illnesses. An unopened recalled scraped tuna product was obtained from one of these restaurants and was tested at the DPH State Laboratory. The outbreak strains of both *S. Bareilly* and *S. Nchanga* were isolated from these samples.

Salmonella Infantis Investigation

The DPH is participating in an ongoing multistate investigation of human *Salmonella* Infantis infections associated with dry pet food. As of June 13, 2012, 22 cases of *S. Infantis* have been reported from 13 states, with the majority of cases occurring in the Eastern United States; 2 were from Canada. Reported onset of illness ranged from October 2011 - May 11, 2012. Cases occurring after May 11, 2012 may not yet be reported (4).

On April 6, 2012, Diamond Pet Foods recalled Diamond Naturals Lamb Meal & Rice dog food due to potential contamination with *Salmonella* (5). To identify additional cases of human illness that may be associated with the recalled product, public health officials used PulseNet. The one case of *S. Infantis* identified in Connecticut was reported to have an exposure to a brand of dry dog food that differed from the recalled product. An open package of dry dog food was obtained from the case-patient's home and tested at the DPH State Laboratory. The sample tested positive for the same outbreak strain of *S. Infantis*. This dry dog food was produced in the same facility as the recalled product, leading to an expansion of the initial recall (4).

Reported By

K. Soto, MPH, J. Krasnitski, MPH, M. Maloney, MPH, Q. Phan, MPH, Epidemiology and Emerging Infections Program; C. Applewhite, RS, T. Weeks, MS, Food Protection Program; M. Mandour, L. Mank, MS, A. Kinney, State Laboratory, Connecticut Department of Public Health; Local Health Department staff.

Editorial

During 2004-2011, the DPH investigated a total of 143 foodborne outbreaks (range: 13-24 annually). During this same time period, Connecticut residents were linked to 23 known multistate outbreaks (range: 1-4 annually). Although multistate outbreaks only account for 16% of total investigations in Connecticut, they are often resource-intensive, requiring increased coordination between key stakeholders at the local, state, and national levels. The DPH's role in multistate investigations can vary greatly depending on the scope of the outbreak and may include active case finding, epidemiological and environmental studies, facilitating laboratory testing of suspected products, and implementing control measures to prevent further illnesses.

Although typically only a small number of Connecticut residents are identified as being part of multistate outbreaks, these outbreaks may have far reaching impact nationally as most multistate outbreaks are associated with widely distributed products. Rapid identification of cases, and prompt local investigations, can contribute to the national investigation effort leading to the removal of implicated products from commerce. Physicians play a critical role in contributing to these public health efforts through diagnosing and reporting cases of foodborne or enteric disease. Stool culture should be considered among persons presenting with an acute diarrheal illness. Isolation of the causative organism is necessary to perform molecular subtyping to aid in the identification of potential outbreaks.

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The Changing Epidemiology of Hepatitis A Virus Infection (HAV) in Connecticut, 2006-2011

In the United States, the incidence of hepatitis A virus (HAV) has declined by 92% since the introduction of hepatitis A vaccine in 1995 (1). In Connecticut, positive immunoglobulin M antibodies to HAV (IgM anti-HAV) results are a laboratory reportable finding, and hepatitis A is a provider reportable disease. We describe the epidemiology of HAV disease, and examine differences between positive IgM anti-HAV reports that met the surveillance case definition versus those that did not.

During 2006-2011, demographic, clinical, laboratory, and reason for testing information were collected from the reporting laboratory and ordering physician on all positive IgM anti-HAV reports. Reports were classified according to the national surveillance case definition for acute hepatitis A (2). Reports meeting the case definition were considered “confirmed cases”; those that did not were “non-cases.” Risk factor information on confirmed cases was collected through interviews with case-patients using a standardized form.

During the study period, the Connecticut Department of Public Health received 633 positive IgM anti-HAV reports. Of these, 159 (25%) were classified as confirmed cases and included symptoms of jaundice (n=114 [72%]), nausea (n=105 [66%]), abdominal pain (n=96 [60%]), loss of appetite (n=90 [57%]), vomiting (n=88 [55%]), dark urine (n=82 [52%]), fever (n=81 [51%]), and diarrhea (n=49 [31%]); 53 (33%) were hospitalized and no deaths were reported. Risk factors included international travel, a household contact who traveled internationally in the 3 months before the case-patient’s onset of illness, raw shellfish consumption, contact with a person confirmed or suspected as having HAV infection, using street drugs that were non-injectable, and using injectable drugs not prescribed by a doctor (Table 1).

Of the 18 (11%) confirmed case-patients working in “high-risk” occupations, 7 (4%) were food handlers, 6 (4%) were health care workers with direct patient contact, and 5 (3%) were an attendee or employee in a day care center, nursery, or preschool. Of the 65 case-patients reporting international travel, 3 regions of the world accounted for nearly 75% of all cases: Asia or Pacific Islands (n=22 [34%]), South America (n=19 [29%]), and North America (n=9 [14%]). Travel to 3 countries accounted for nearly 50% of all cases: India (n=14 [22%]), Ecuador (n=12 [19%]), and Mexico (n=9 [14%]).

Differences between confirmed cases and “non-cases” were assessed. The median alanine aminotransferase (ALT) and aspartate aminotransferase (AST) among confirmed cases was 1500 (range: 20-7620) and 854 (range: 16-7080) respectively, and 36 (range: 7-1824) and 34 (range: 8-1036) among non-cases respectively. Of the 474 non-cases, HAV testing was conducted on 232 (49%) asymptomatic patients, which included 166 (35%) with no risk factors and 66 (14%) with risk factors, and 115 (24%) with elevated liver enzymes. Patients tested due to asymptomatic screening were 1.6 times more likely to be a classified as a non-case when compared to patients tested for other reasons (95% confidence interval (CI), 1.51-1.77). Patients tested because of acute-HAV symptoms were 8.4 times more likely to be a confirmed case; 146 (92%) (95% CI, 5.53-12.89). Incidence of HAV disease decreased from 1.25 cases per 100,000 population in 2006 to 0.45 in 2011 (p<0.001). The proportion of IgM anti-HAV positive reports classified as non-cases increased from 49% to 85% (p <0.001) (Table 2, page 20).

Reported by

P. Gacek, MPH, CPH, Q. Phan, MPH, J. Brockmeyer, MPH, J. Krasnitski, MPH, K. Soto MPH, T. Rabatsky-Ehr, MPH, Epidemiology and Emerging Infections Program, Connecticut Department of Public Health

Table 1. Reported Risk Factors Among Acute HAV Confirmed Cases, Connecticut, 2006-2011

| Reported Risk Factors | N | (%) |
|--|----|------|
| International Travel | 65 | (41) |
| Having a household contact who travelled internationally | 33 | (21) |
| Raw shellfish consumption | 18 | (11) |
| Contact with a person confirmed or suspected as having HAV infection | 13 | (8) |
| Attending or working in a child care setting | 5 | (4) |
| Use of street drugs | 3 | (2) |
| Use of injection drugs | 1 | (<1) |

Table 2. Positive IgM anti-HAV Results by Year and Classification

| Year | Non-case | Non-case Rate | HAV Case | HAV Incidence (per 100,000) |
|-------|----------|---------------|----------|-----------------------------|
| 2006 | 41 | 49% | 43 | 1.25 |
| 2007 | 62 | 70% | 26 | 0.74 |
| 2008 | 84 | 76% | 26 | 0.74 |
| 2009 | 89 | 83% | 18 | 0.51 |
| 2010 | 107 | 78% | 30 | 0.81 |
| 2011 | 91 | 85% | 16 | 0.45 |
| Total | 474 | 75% | 159 | 0.75 |

Editorial

In Connecticut, incidence of HAV disease decreased by 64% during 2006-2011. Results of liver function tests (ALT and AST) are considered in determining case classification. Beginning in 2011, Connecticut laboratories were required to report ALT and AST conducted within 1 week of a patient's IgM anti-HAV positive test. These liver function test results are critical for determining which reports are most likely to meet the surveillance case definition. Cases of acute hepatitis A require prompt public health follow-up to minimize potential for further transmission of disease.

Similar to other recently published studies, international travel was the predominant risk factor reported among HAV cases (3). The proportion of HAV cases reporting international travel has increased since 2006. Additionally, the second most prevalent risk factor among cases was having contact with someone who traveled outside of the US 3 months before symptom onset. These findings are a dramatic change from the pre-HAV vaccination era, when only 4% of HAV cases were associated with international travel (3). Persons who are unvaccinated and travel internationally are at greatest risk for contracting hepatitis A. The Advisory Committee on Immunization Practices recommends hepatitis A vaccine for international travelers to countries with high or intermediate prevalence of hepatitis A. For more information see www.cdc.gov/travel.

Case-patients working in occupations with increased risk of hepatitis A require additional follow-up to limit disease transmission. Case-patients attending or working in a childcare setting and or employed in healthcare or food service establishments have the potential to cause large scale outbreaks in the absence of appropriate control measures (4). To prevent transmission, case-patients in high risk occupations should be excluded from work for 7 days after onset of jaundice or 10 days after symptom onset in the absence of jaundice.

An increasing trend in the proportion of IgM anti-HAV positive reports being classified as non-cases was observed during 2006-2011. Although a positive IgM anti-HAV result in an asymptomatic person may indicate asymptomatic acute HAV infection, this is less common in persons >6 years of age. The most likely explanation is prolonged presence of positive IgM anti-HAV from a prior infection or a false positive result (5). Since 2006, over half of non-cases were asymptomatic and tested because of routine screening. To improve the predictive value of a positive IgM antibody to HAV test, it is recommended that testing be ordered only for persons with symptoms consistent with acute HAV infection or for persons who have been exposed to a setting where hepatitis A virus transmission is suspected (5).

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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>HIV Surveillance 860-509-7900</p> <p>Epidemiology and Emerging Infections 860-509-7994</p> <p>Immunizations 860-509-7929</p> <p>Tuberculosis Control 860-509-7722</p> <p>Sexually Transmitted Diseases (STD) 860-509-7920</p> | <p>Connecticut Epidemiologist</p> <p>Editor: Matthew L. Cartter, MD, MPH</p> <p>Assistant Editor & Producer: Starr-Hope Ertel</p> |
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