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An Outbreak of *Escherichia coli* O121 Involving a Common Food Service Establishment, Connecticut, April - May 2016

The Connecticut Department of Public Health (DPH) Laboratory identified a cluster of Shiga toxin -producing *Escherichia coli* (STEC) O121 with matching pulsed field gel electrophoresis (PFGE) patterns in stool samples collected within sixty days of each other during April-May 2016. Staff of the DPH Epidemiology and Emerging Infections Program and Yale FoodCORE Program conducted interviews of reported case-patients. Results identified a common food service establishment (Restaurant A). The DPH Food Protection Program (FPP) and local health district (LHD) conducted the environmental investigation. This report summarizes the epidemiologic, laboratory and environmental findings of the investigation.

Epidemiologic Investigation

A case was defined as a Connecticut resident with laboratory-confirmed *E. coli* O121 infection detected in stool, with the designated outbreak PFGE patterns identified during April – May 2016; 7 cases were identified. Case-patients ranged in age from 18 -68 years (median 22 years); 6 (86%) were female and no hospitalizations or deaths were reported. Among the case-patients, 6 (86%) were interviewed and reported symptoms of diarrhea (100%), bloody diarrhea (83%), fever (33%), and vomiting (17%). Illness onset ranged from April 11 – May 22, 2016 (Figure, see page 14). Median duration of illness was 6 days (range 5-10 days). Among case-patients with known onset and exposure dates, the median incubation period was 2 days (range 2 – 10 days).

Of the 6 case-patients interviewed, 5 (83%) reported eating at Restaurant A during the week before illness onset. Three case-patients reported consuming the same menu item, a sandwich that included turkey, avocado, raw cheddar cheese, vegetables (cucumber, spring mix, tomatoes, carrots and cabbage) and dill mayo. One case-patient ate the same sandwich without turkey, and one ate a bean burger consisting of white and black beans, raw cheddar cheese, spring mix lettuce, tomato, and dill mayo. Ingredients in common were raw cheddar cheese, vegetables, and the dill mayo. The remaining 2 case-patients were lost to follow-up.

Laboratory Investigation

The DPH Public Health Laboratory performed testing on specimens submitted by one clinical laboratory on 7 case-patients; 7 isolates were confirmed positive for STEC O121 and had matching PFGE patterns. Stool samples were also collected from 9 food workers. Of the 9 samples, 1 yielded STEC O121 with matching PFGE patterns to the case-patient isolates.

A total of 10 food samples were collected from Restaurant A between May 6 - 10, (including sliced onions, whole avocado, shredded cabbage, sliced tomatoes, shredded carrots, sliced deli turkey, spring mix lettuce, sliced cucumbers, dill mayo and raw milk cheddar cheese). All food samples tested negative for STEC at the DPH Public Health Laboratory.

Environmental Investigation

During May 7-10, the LHD and FPP conducted onsite environmental assessments at Restaurant A. The assessments included interviewing food workers and reviews of handwashing and manual

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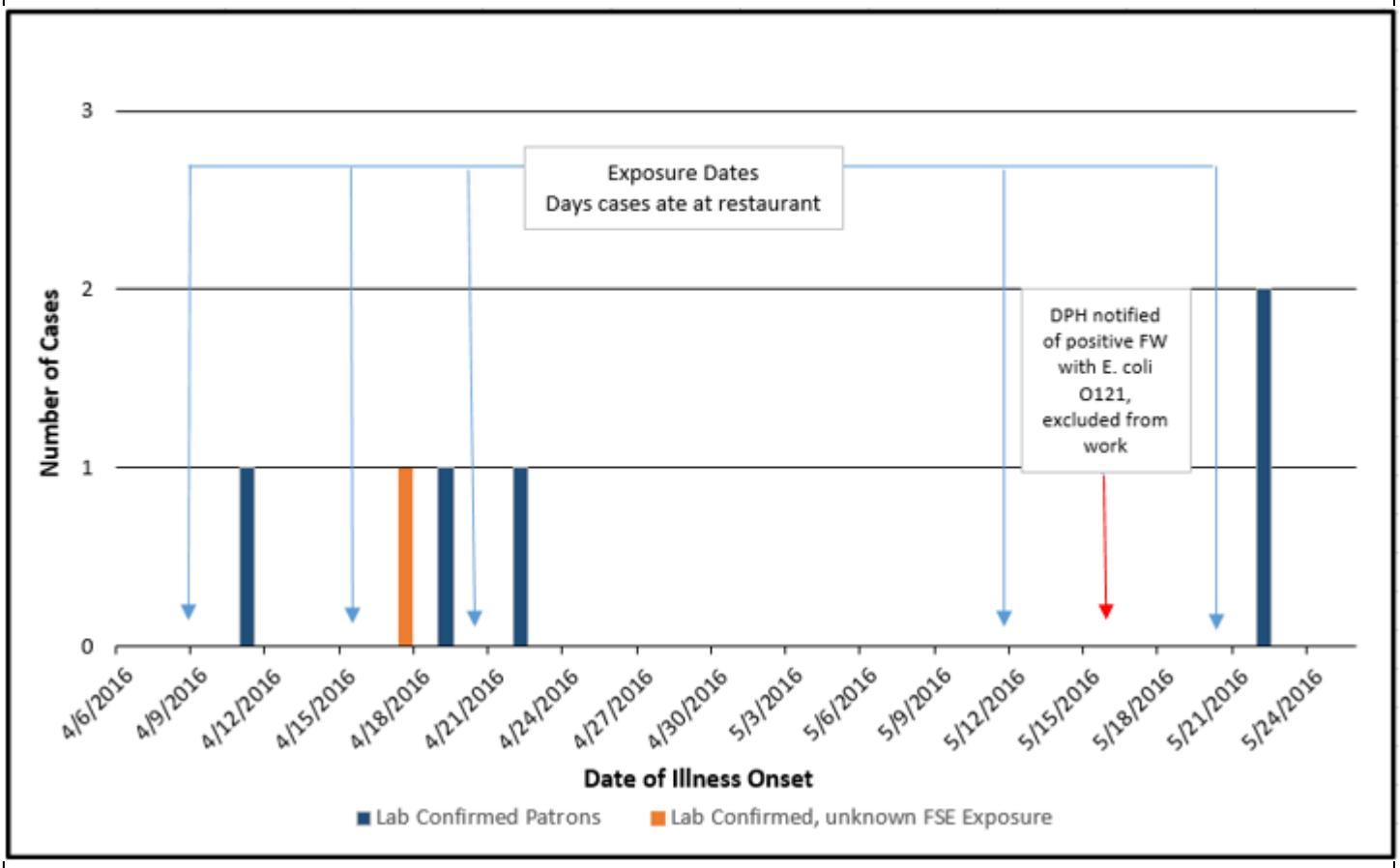
Figure. *Escherichia coli* O121 cases by date of symptom onset, Restaurant A, Connecticut, April—May 2016.



warewashing (i.e., dishwashing in a commercial setting) procedures, ill food worker policies, and bare-hand contact with ready-to-eat foods. No food workers reported recent gastrointestinal symptoms. The investigation identified several factors that could have contributed to the outbreak. Instances of bare-hand contact while preparing produce, sandwiches and salads were observed. Restaurant A did not have an adequate ill food worker policy in place at the time of the assessment.

Regular duties, performed by the employee who tested positive for STEC O121, consisted of conducting prep work and making sandwiches. This employee, however, reported no recent gastrointestinal illness. Based on the positive stool sample, the employee was excluded from work until 2 consecutive negative stool samples were obtained. Additionally, as a control measure, all food items prepared by this employee were discarded.

Reported by

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Editorial

Shiga toxin-producing *E. coli* are an important cause of diarrheal illness and non-O157 STEC infections have become recognized with greater frequency due to changes in STEC laboratory practices. STEC O121 is among the top six non-O157 serogroups reported in the United States (*1*). However, few outbreaks of STEC O121 have been documented in the literature. This is the second outbreak of STEC O121 in Connecticut, the first was associated with a Connecticut lake in 1999 (*2*).

The findings of this investigation suggest that a foodborne outbreak of STEC O121 occurred among patrons of Restaurant A during April - May 2016. Of the 7 confirmed cases, 5 were linked to Restaurant A. These 5 case-patients ate food items that contained some common ingredients. A food worker at Restaurant A tested positive for *E. coli* O121, however, it is unclear what role this food worker may have played, if any, in this outbreak. The food worker did not report any illness and did not work at the time that one of the later case-patients reported eating at Restaurant A.

Limitations of this investigation included lack of cooperation from some case-patients to participate in initial and/or follow-up interviews, collection of food worker stool samples within a narrow time frame, and collection of food samples that were unlikely to be from the same lots/production as those consumed by the case-patients. The vehicle and mechanism of contamination could not be determined. Cases were identified over a two-month period, suggesting contamination of a food product with longer shelf-life or contamination by potentially asymptomatic food worker(s) shedding intermittently. Based on assessments of procedures and practices at Restaurant A, the establishment was reminded that bare-hand contact with ready-to-eat foods during preparation and service is prohibited. Additionally, recommendations were made to develop and implement an adequate ill food worker policy, and consider implementing larger preparation and storage areas or limiting the amount or types of food being prepared. These recommendations should facilitate safer food preparation and adequate cleaning within the establishment.

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Babesiosis in Neonates–Connecticut, 2015

Babesiosis is an infection of red blood cells caused by the protozoan *Babesia microti*. Transmission primarily occurs through the bite of an infected *Ixodes scapularis* tick during the nymphal stage. Infection is most common during warmer months, when immature ticks are feeding. Most cases are reported in the Northeast and upper Midwest regions of the United States. It is also possible to become infected through a contaminated blood transfusion or from an infected mother to child during pregnancy or delivery. Although many people infected with *B. microti* will not develop any symptoms, some develop a febrile illness characterized by flu-like symptoms, hemolytic anemia and jaundice. Severe illness may also include thrombocytopenia, hypotension and multi-organ dysfunction. Infection can be life-threatening in individuals at extremes of age, and those who are immunocompromised or have serious underlying medical conditions (*1*). This report describes two unrelated cases of transfusion-associated babesiosis in neonatal intensive care units (NICU).

During 2015, the Connecticut Department of Public Health (DPH) was notified of a case of babesiosis in a neonate. Case-patient #1 was born prematurely at 23 weeks gestational age and was admitted to a NICU at Hospital A since birth. The case-patient developed anemia, thrombocytopenia, and apnea at 38 days of age. On day 39, high levels of *Babesia* parasitemia were detected on a blood smear by microscopic examination.

An epidemiologic investigation was conducted to assess Case-patient #1's potential exposures. Because the patient was hospitalized since birth, tick exposure was unlikely. The mother of the case-patient was tested for babesiosis to assess potential exposure during pregnancy or delivery, and was negative by polymerase chain reaction (PCR) and serology, which ruled out congenital transmission. Prior to diagnosis, the case-patient had received several blood transfusions from 3 separate blood donors. The hospital blood bank coordinated with the American Red Cross (ARC) to test residual

blood specimens and coordinate donor trace back; a residual blood specimen from one donor tested positive for *B. microti*.

Soon after the identification of a contaminated blood source at Hospital A, a second case of neonatal babesiosis was reported from a different hospital (Hospital B). Case-patient #2 was born prematurely at 26 weeks gestational age and was admitted to the NICU at Hospital B since birth. The case-patient was anemic. *Babesia* parasites were noted by the technician performing a routine complete blood count, and *B. microti* was identified in blood by microscopic examination and PCR.

Case-patient #2 received a blood transfusion at 4 days of age. The hospital blood bank and ARC were notified and coordinated trace back activities. The donor's residual blood specimen was tested and was positive for *B. microti*. The donor had given a double red blood cell donation, which was used for 5 individual transfusions at Hospital B. One unit of red blood cells was split and given to 4 neonates in the NICU, including Case-patient #2. The second unit went to an adult patient. The 4 additional blood recipients were screened; 2 neonates developed parasitemia, 1 neonate and the adult did not. Each of the parasitemic neonates received 2 blood transfusions from the infected donor and developed anemia and thrombocytopenia during the course of their infections. Of the neonates admitted to Hospital B, 1 developed a recurrent infection 60 days after their initial parasitemia. All other infected neonates at Hospital A and Hospital B made a full recovery with no long term sequelae.

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Editorial

In 1979-2009, 159 *B. microti* cases related to blood transfusions were identified in the US (*2*). Although rare, transfusion-associated babesiosis is the most frequently reported transfusion-transmitted parasitic infection in the US (*3*).

Currently, at the time of donation, donors are asked if they have ever been diagnosed with babesiosis. If they have, they are indefinitely deferred from donating blood (*4*). The current process is problematic as individuals with asymptomatic *B. microti* infections will still be able to donate blood and may only be identified through retrospective blood testing as part of an investigation of transfusion-related babesiosis.

The ARC is working with IMUGEN, Inc., a clinical laboratory located in Massachusetts, to develop tests under an Investigational New Drug Application to screen blood products for *Babesia* DNA and for the presence of antibodies to *Babesia* in donor blood (*5*). As validated tests for babesiosis in blood products become available, donor blood screening may help to reduce transfusion-associated cases of babesiosis, particularly in areas with high rates of disease prevalence.

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