

***Salmonella* Bareilly Infections Associated with Sushi**

September

Hennepin County

In September 2012, the Minnesota Department of Health (MDH) Public Health Laboratory identified two *Salmonella* Bareilly isolates with MDH pulsed-field gel electrophoresis (PFGE) pattern designations BRL24 and BRL25. These two PFGE pattern were one band different from each other. There were no PFGE matches nationally. An investigation was initiated on October 2.

In Minnesota, a case was defined as a Minnesota resident with laboratory-confirmed infection with *S.* Bareilly PFGE subtypes BRL24 or BRL25.

MDH staff contacted cases by phone for an interview regarding illness history and potential exposures.

Both cases had eaten at the same restaurant in Minneapolis, Restaurant X. Hennepin County Public Health Protection (HCHP) epidemiologists identified additional restaurant patrons from reservation lists for September 8 and September 11-13, and interviewed them about illness history and food consumption at the restaurant.

City of Minneapolis Environmental Health specialists visited the restaurant to evaluate food preparation and handling procedures, interview food workers, and collect fish samples for testing and invoices for tuna.

Stool samples collected from food workers who reported recent history of gastrointestinal illness were submitted to the MDH Public Health Laboratory for *Salmonella* testing.

Minnesota Department of Agriculture (MDA) laboratory tested fish samples and collected trace-back information for the tuna used at the restaurant.

Two cases, one with a *S.* Bareilly BRL24 and one with BRL25, were identified in Minnesota. The two cases had illness onset on September 9 and September 13, respectively. Neither case was hospitalized. Both cases reported having diarrhea and cramps; one case reported bloody stools, one vomiting, and one fever. The duration of diarrhea was 6 days for both cases. Both cases recovered.

One of the cases ate at a multiple restaurants in Minnesota and Florida in the 7 days prior to illness onset, including two sushi restaurants. One of the two sushi restaurants was Restaurant X, where he ate on September 8 with two meal companions who did not become ill. He had a variety of menu items including a Dynamite roll (tuna, albacore tuna, avocado and chili sauce), Maguro (yellowfin tuna), and Hotate (sea scallops). The second case reported eating at two restaurants in the week prior to onset, one of which was Restaurant X. The case ate at Restaurant X on September 12 and reported eating a Dynamite roll, California roll (snow crab, avocado, cucumber and Masago or caplin roe) and squid. Eating at Restaurant X was the only common exposure between the two cases, and the Dynamite roll was the only sushi type in common, although there may have been ingredients in common in different menu items. The cases' illness incubations were 21 and 24 hours, respectively.

Sixty-eight restaurant patrons identified from reservation lists were interviewed, including 43 who ate at the restaurant on September 8, 13 on September 11, 5 on September 12, and 7 on September 13. None reported symptoms consistent with a *Salmonella* infection. Among the 56 patrons who could provide at least some of the specific menu items eaten, 38 reported eating a tuna-containing sushi, and of those, 3 specifically mentioned eating the Dynamite roll. Due to the low number of persons remembering

everything they ate and the small number of cases, statistical analysis to implicate a specific food item or ingredient was limited to tuna-containing sushi and Dynamite roll consumption. Eating a tuna-containing sushi was not statistically associated with illness (2 of 2 cases vs. 38 of 56 controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; $p = 1.0$); however, eating a Dynamite roll was statistically associated with illness (2 of 2 cases vs. 3 of 56 controls; OR, undefined; 95% CI, undefined; $p = 0.006$). The restaurant provided information on numbers sold for the Dynamite roll: 35 Dynamite rolls were served on September 8, and 37 Dynamite rolls were served on the 12th.

Forty-four food workers interviewed. One food worker reported two separate instances of gastrointestinal illness in the month of September: vomiting of 4 days duration with onset on September 17, and diarrhea of 2 days duration with onset on September 28; no fever was reported. That person was excluded from work until results of testing of two stool specimens collected a day apart were available. Both specimens were negative for *Salmonella*.

The environmental health evaluation found that bamboo mats were used to roll sushi instead of the required plastic wrap, that sushi cutting boards were only washed, rinsed and sanitized at the end of the day, and there was bare-hand contact during sushi preparations. It is unknown if any of these findings contributed to transmission. Holding temperatures of raw fish and other raw foods were all 40° F or lower.

The ingredients in the Dynamite roll were albacore tuna, yellowfin tuna, lettuce, Kaiware (radish sprouts), avocado, rice, Gobo (a root vegetable), Thai chili peppers, and a chili sauce made of two purchased chili sauces, mirin, soy sauce and sesame seed oil.

Since *S. Bareilly* of a different PFGE subtype pattern was previously associated with tuna-containing products, additional information was gathered on tuna handling and sources. Yellowfin tuna was purchased as fresh loins, and Albacore tuna was purchased as frozen loins; no tuna scrape was used.

MDA attempted to trace back the Albacore and Yellowfin tuna. The Albacore tuna was traced back to a seafood company in Vancouver, British Columbia. The fish was purchased directly from fishermen fishing off the coast of North America. The precise source of the fish was not determined. The Yellowfin tuna originated from one of four possible suppliers in Louisiana, Florida, New Jersey, or Washington. It was not possible to identify the exact source of the fish served at the restaurant when the cases ate there.

Samples of Albacore and Yellowfin tuna were obtained from the restaurant at the time of the investigation for testing at the MDA laboratory, even though the samples obtained were not from the same shipments served at the restaurant during the outbreak. All the samples tested negative for *Salmonella*.

This was an outbreak of *S. Bareilly* infections associated with consumption of sushi at a restaurant in Minneapolis. Eating a Dynamite roll was statistically associated with illness. The contaminated food item or ingredient was not identified. Since only two cases were identified, the level of contamination was likely very low. No problems with handling that could have contributed to the outbreak were identified at the restaurant. No other cases were identified nationally.