

***Salmonella* Typhimurium Infections Associated with Seedless Watermelon**

August

Multiple counties/Multiple states

On August 8, 2011, two family members with laboratory-confirmed *Salmonella* Typhimurium pulsed-field gel electrophoresis (PFGE) pattern TM76 (Centers for Disease Control and Prevention [CDC] *Xba*I designation JPXX01.0324) infections were interviewed by Minnesota Department of Health (MDH) staff as part of routine surveillance. The cases reported becoming ill after a family barbeque held on August 6 and that additional family members had also become ill after the event. An investigation was initiated immediately.

From August 12 to September 6, additional *S. Typhimurium* cases with matching PFGE patterns were identified through routine surveillance that were not associated with the family barbeque. A 60-day review of the PulseNet database showed 22 additional states with 141 matching isolates.

All *S. Typhimurium* in Minnesota cases are routinely interviewed about potential exposures, including foods consumed at home and at restaurants, as part of routine surveillance. Interviews of *S. Typhimurium* cases that are indistinguishable by PFGE are compared to identify potential common exposures. Information gathered during routine interviews is reviewed by an MDH epidemiologist.

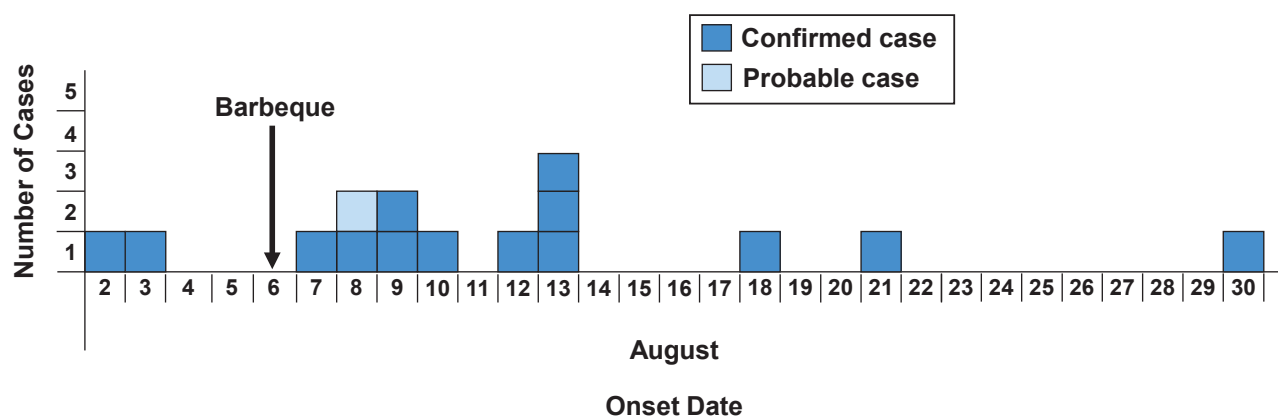
The initial case provided a list of names and phone numbers for additional barbeque attendees and foods served at the event. Subsequent cases that matched by PFGE and denied attending the barbeque were specifically asked about the types of food served at the barbeque.

A confirmed case was defined as an individual from whom *S. Typhimurium* TM76 was isolated since August 1, 2011. A probable case was defined as an individual who developed fever and diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the barbeque. The Minnesota Department of Agriculture (MDA) conducted a traceback investigation of the epidemiologically implicated product.

Minnesota cases

Fifteen barbeque attendees were interviewed; five confirmed cases and one probable case were identified from this event. One attendee reported illness not meeting the case definition and was excluded from further analysis. Ten additional confirmed cases were identified through routine surveillance. One case was classified as a secondary case to an ill household member and was excluded from the exposure analysis. Case illness onsets ranged from August 2 to August 30 (see epidemic curve). Among the 16 cases (confirmed and probable), all 16 reported diarrhea, 15 (94%) reported fever and cramping, 11 (69%) reported bloody diarrhea, and 6 (38%) reported vomiting. The median incubation period for the five barbeque-associated cases for whom an incubation period could be calculated was 58 hours (range, 32.5 to 97 hours). The median duration of illness for the six cases that had recovered by the time of interview was 10 days (range, 9 to 15 days). Two cases were hospitalized, for 6 and 10 days, respectively.

***Salmonella* Typhimurium TM76 Cases by Illness Onset Date**



Among the barbeque attendees, no food items were associated with illness. It was later discovered that two watermelons, one seedless and one with seeds, were served at the event. Due to the time that had elapsed before this information became available, individuals were not contacted again and asked specifically if the watermelon they consumed was seedless. Therefore, the association between consuming seedless watermelon and becoming ill could not be evaluated.

Among the nine primary cases not associated with the barbeque, eight (89%) reported consuming watermelon during the week prior to their illness onset, and seven (78%) reported consuming seedless watermelon. No other food item that was also served at the barbeque was reported by more than 50% of the sporadic cases.

The 2007 FoodNet Population Survey was used to estimate the background exposure rate to watermelon in the general population. These data indicated that watermelon consumption in Minnesota is highly seasonal, ranging from 7% of respondents in January to 56% of respondents in July. Of note, participants in the population survey were not asked about seedless watermelon consumption, so we were unable to evaluate that specific exposure. Using a binomial probability model based on the observed 89% exposure among Minnesota cases and estimated maximum 56% background rate of exposure in the general population, a significant association between consumption of watermelon and illness ($p = 0.04$) was identified.

Multiple locus variable-number tandem repeats analysis (MLVA) was performed on 28 clinical isolates from Minnesota (15) and Indiana (13). Ten different MLVA patterns were identified. Nine Minnesota isolates, including all five confirmed cases associated with the barbeque, and one Indiana isolate matched formed the largest MLVA cluster. This pattern had only been seen once before in the national database.

Cases in other states

From July 12 through September 14, 143 isolates with PFGE pattern JPXX01.0324 were observed in 23 states including: AL (25), AR (5), CA (2), GA (13), IA (1), IL (2), IN (7), KY (4), MD (1), MI (6), MN (13), MO (5), MS (12), NC (7), NY (1), OH (5), OR (2), PA (4), SC (9), SD (2), TN (3), WI (6), and WV(1). Three of six (50%) Alabama cases that were interviewed reported consuming seedless watermelon. Indiana reported that their questionnaire did not ask about watermelon consumption. Wisconsin reported that approximately 50% of their cases also reported consuming seedless watermelon. CDC reported that this was a fairly common PFGE pattern, particularly in southern states, and that there had been a seasonal increase in this pattern in August for the past 3 years. However, the pattern was presently not above baseline. A supplemental questionnaire developed by Minnesota was provided to CDC, which forwarded it to the other states.

Traceback investigation

Eight of nine Minnesota cases that reported consuming watermelon purchased it from either a Grocery Chain A (3 locations) or Grocery Chain B (2 locations). The Minnesota Department of Agriculture (MDA) conducted a traceback of the seedless watermelon purchased at these locations. Seedless watermelon purchased at Grocery Chain A traced to Distributor A in Vincennes, Indiana. Seedless watermelon purchased at Grocery Chain B traced to Distributor B, also located in Vincennes, Indiana. However, records at the two distributors did not indicate a common supplier between the two. Additionally, the ninth case consumed seedless watermelon purchased from a different grocery chain. The case was able to provide half of the watermelon that was reportedly consumed prior to the case's

illness onset, and this watermelon had a sticker on it that indicated it was produced in Oaktown, Indiana. The remaining seedless watermelon from the case's home was tested by the MDA for *Salmonella* and was negative.

This was an outbreak of *S. Typhimurium* TM76 infections identified through routine disease surveillance. The likely vehicle was seedless watermelon. While the traceback was not able to implicate a specific producer, the tracebacks did converge on a production area around Vincennes, Indiana. Among the family barbeque attendees, although no food vehicle was epidemiologically implicated, the revelation that two watermelons from different sources were served at the meal suggests that exposure misclassification may have contributed to the inability to implicate a vehicle in this sub-cluster.