

***Listeria monocytogenes* Infections Associated with a Commercially Distributed Product**

February

Douglas County/Multiple states

On March 3, 2020, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified a cluster of three *Listeria monocytogenes* clinical isolates from two individuals that were closely related by whole genome sequencing (WGS) analysis. Four additional isolates from the national PulseNet database (Michigan, 2; Colorado, 1; and Texas, 1) were also closely related to the Minnesota isolates. The cluster was assigned MDH identification number wLAS2020001 and an investigation was initiated.

Both Minnesota cases had been interviewed, and both reported eating at a restaurant (Restaurant A) in Alexandria, Minnesota on February 15 or 16. They reported no other restaurants or grocery stores in common. State partners, Horizon Public Health, the Minnesota Department of Agriculture (MDA), and the Centers for Disease Control and Prevention (CDC) were notified. The national outbreak was designated 2003MLGX6-1.

The Michigan Department of Health and Human Services reported that the Michigan isolates were from a sample of cut watermelon spears collected from a retailer in Michigan.

Cases were identified through routine surveillance. A case was defined as an individual with *L. monocytogenes* isolated from a clinical specimen that was closely related by WGS, specifically whole genome multi locus sequence typing (wgMLST).

Listeriosis cases are routinely interviewed by MDH staff with a standardized national “*Listeria* Initiative” exposure interview form, and the de-identified data are provided to CDC. Outbreak cases were also interviewed and re-interviewed about food items of interest, lists of buffet items, and restaurants using several supplemental questionnaires.

Starting on March 5, a sanitarian from Horizon Public Health visited Restaurant A multiple times to evaluate food preparation and handling procedures, gather invoices and information on food items served, advise cleaning/sanitizing of restaurant food preparation surfaces and other areas, evaluate the potential for cross-contamination from raw products, and embargo food for testing.

On March 6, an MDA inspector visited the restaurant to collect food samples for testing. MDA conducted a traceback investigation of the suspected outbreak vehicle, and visited a Minnesota sprouter facility to conduct an environmental assessment. MDA notified the United States Food and Drug Administration (FDA).

Food samples were tested at the MDA Laboratory for *Listeria monocytogenes*; WGS analyses were performed at the MDH PHL.

Cases

Four cases from three states were identified in this outbreak: Minnesota (2), Colorado (1), and Texas (1). Specimen collection dates ranged from February 10, 2019 to February 20, 2020. The clinical isolates were 0-7 alleles different by wgMLST. Cases had a median age of 60 years (range, 15 to 67 years), and one (25%) was female. All cases were hospitalized, and no deaths were reported.

The two Minnesota cases reported eating at Restaurant A independently on February 15 (one case had initially reported a February 16 meal and subsequently checked records to confirm) and reported illness onset on February 16 and February 17. Incubation periods were approximately 1 and 2 days. Both cases had *L. monocytogenes* isolated from a blood specimen, 1 day and 3 days after illness onset. One case also had *L. monocytogenes* isolated from stool 2 days after illness onset. All three isolates were 0 alleles different by wgMLST and core genome MLST. The cases were a previously healthy 15 year-old with no known underlying

conditions and an adult in his 60s; both were male. The cases were hospitalized for 4 and 7 days and both recovered.

Restaurant Follow-up

Both Minnesota cases were asked about a variety of other restaurants and grocery stores – no other specific common exposures were identified. Both cases ate food from the restaurant's buffet, which included at least 96 different items. Difficulty in procuring a complete list of menu items available on the buffet complicated the investigation. Food items reported by both cases (including "maybe") included cheese wontons, crawfish, chicken kabobs, sweet/sour chicken, and sweet/sour sauce. Both denied eating sprouts, either of the sprout-containing menu items (egg foo young and vegetable lo mein), or any kind of melon.

Samples of green beans, mung bean sprouts, and honeydew melon from the restaurant were collected from the restaurant – decisions were made based on preliminary reports of items served on the buffet that have been commonly associated with listeriosis outbreaks (sprouts), the related watermelon sample (honeydew melon), and preliminary reports from one case (green beans). *L. monocytogenes* that was closely related to the clinical isolates was recovered from the mung bean sprouts; it was 0 alleles from the Minnesota clinical isolates by wgMLST and cgMLST. Two additional isolates from the mung bean sprouts were >1000 alleles from the outbreak strain. *Listeria* was not found in the honeydew melon or green bean samples.

The restaurant used at least five distributors; mung bean sprouts collected for testing were sourced from Sprouter A. Based on a review of invoices, MDA determined that the sprouts tested (from Sprouter A) were received in the restaurant after the cases' meal date. Sprouts from a different firm, Sprouter B, would have been in the restaurant at the time of the case's exposure. MDA reviewed Sprouter A's customer list and determined that none of the restaurant's other suppliers received product from Sprouter A. On March 19, an inspector with the MDA Produce Safety Program (PSP), which oversees regulation of sprouters, visited Sprouter A to conduct a document review and environmental assessment; no issues or concerns were noted. *L. monocytogenes* isolates associated with a 2007 recall by Sprouter A were retrieved from the MDA Laboratory's archives and sequenced by the MDH PHL; these 13 isolates were 0-8 alleles from each other, >1000 alleles from the outbreak isolates, and >1000 alleles from the additional isolates recovered from the sprouts collected at the restaurant.

On March 12, the restaurant was notified of the presumptive results and instructed to clean/sanitize sprout storage, prep, and serving areas. The restaurant reported that they no longer had sprouts in the restaurant and had not served them since March 6.

Restaurant staff reported that sprouts were stored in the walk-in cooler and used only in an egg foo young dish and a vegetable lo mein dish. During preparation, sprouts were removed from the bulk box with bare hands, washed, and added to the dish at the end of cooking. Temperatures were not taken. Finished dishes are put on the buffet under hot-holding. The restaurant receives two deliveries of sprouts a week, with one box of sprouts per delivery. Occasionally, a small amount of leftover sprouts from a previous box may be added to a new box. The positive sample was collected from an open bulk box.

The restaurant cleaned/sanitized the facility and food preparation areas, provided a list of food items served on the buffet, and invoices. The environmental health sanitarian did not note any evidence of cross-contamination at the facility. The restaurant reported no special food items or cleaning tasks around February 15 (the cases' meal date). No sprays are used. The restaurant does substantial raw chicken preparation; no concerns were noted on inspection.

On March 10, a Health Alert was issued to the Health Alert Network so that physicians who may see individuals presenting with symptoms of listeriosis would be on alert and appropriate treatment could be given more expediently.

Michigan Watermelon Sample

The *L. monocytogenes* isolates from Michigan were from a sample of cut watermelon spears that was collected from a grocery store in Michigan on February 3, 2020 – the manufacturer was Distributor A in Minnesota. Distributor A manufactured a large variety of products at their Minnesota facility, including fresh-cut fruits and vegetables, fresh-squeezed juices, and ready-to-eat salads, dips, and wraps. A follow-up swab sample collected from a scale on the fruit line at the Distributor A facility on February 24 by FDA and MDA also tested positive for the outbreak strain of *L. monocytogenes*.

Restaurant A reported that they did not serve watermelon, only honeydew and cantaloupe. MDA examined invoices from the restaurant's suppliers; no connection to Distributor A was identified.

This was a multi-state foodborne outbreak of listeriosis associated with a commercially distributed vehicle. A subcluster in Minnesota was associated with a restaurant. Mung bean sprouts from a Minnesota sprouter collected from an open package at the restaurant tested positive for the outbreak strain of listeriosis. However, based on a review of invoices, the positive sprouts were not in the restaurant at the time of the cases' exposure, and neither case reported directly consuming sprouts. Cross-contamination of another menu item from the sprouts, or contamination of the sprouts from another food item in the restaurant (via employee handling) could not be ruled out. Therefore, the outbreak vehicle of transmission was undetermined. Additionally, watermelon from a Minnesota manufacturer tested positive in another state. No link was identified between the watermelon and the sprouts or restaurant. This was the first outbreak of invasive listeriosis associated with a restaurant reported in Minnesota.

References

1. Health Advisory: Listeriosis Outbreak Along Hwy 94. <https://www.health.state.mn.us/communities/ep/han/2020/mar10listeriosis.pdf> [Accessed June 9, 2020]