



Protecting, maintaining and improving the health of all Minnesotans

***Salmonella* Newport Infections Associated with Chipotle Mexican Grill**

Multiple counties/multiple states

August-September 2015

Background

On August 28, 2015, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified a cluster of two *Salmonella* Newport clinical isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns. On September 2, the PHL identified 21 clinical isolates with specimen collection dates since August 24 that were either *Salmonella* Newport or group C2 *Salmonella* (which includes Newport). The following day, 12 of 13 interviewed cases had reported eating at one of six locations of Chipotle Mexican Grill (Chipotle) during the week before their onset of symptoms. MDH Environmental Health (EH), City of Maplewood EH, City of Minnetonka EH, the Minneapolis Health Department (MHD) EH Unit, the Hennepin County Human Services and Public Health Department (HSPHD) Epidemiology and EH Units, and the Minnesota Department of Agriculture (MDA) were notified, and an investigation was initiated.

Methods

Confirmed cases were defined as Minnesota residents who dined at a Chipotle location and subsequently had *S. Newport* isolated from a clinical specimen that was indistinguishable by PFGE from either pattern designation JJPX01.0011 or JJPX01.0030, and with a specimen collection date after August 1, 2015. Probable cases were defined as patrons who developed diarrhea (≥ 3 stools in a 24-hour period) that either lasted 3 or more days or was accompanied by fever after dining at a Chipotle location that was also reported by a confirmed case. Confirmed cases were initially interviewed with a routine surveillance questionnaire and then re-interviewed with a questionnaire specific to the Chipotle menu. MDH epidemiologists obtained online orders for a sample of affected restaurants. Meal companions of confirmed cases and patrons identified via online orders or complaint calls were interviewed with the Chipotle-specific questionnaire.

Sanitarians from MDH EH, City of Maplewood EH, City of Minnetonka EH, MHD EH, HSPHD EH, City of Bloomington EH, City of Edina Health Department, City of Minnetonka EH, Olmsted County Public Health Services (OCPHS), Ramsey County EH, and the City of St. Cloud Health and Inspections Department visited

Chipotle restaurant locations with confirmed cases to interview food workers, check the employee illness log, and evaluate food preparation and handling. Food workers reporting diarrhea since August 1, 2015 were excluded from food service until two stool samples collected at least 24 hours apart tested negative for *Salmonella*.

Stool samples from consenting patrons and ill food workers were submitted to the MDH PHL for *Salmonella* testing.

MDA inspectors collected samples of suspected products from restaurant locations for *Salmonella* testing by the MDA laboratory. MDA gathered invoices for products served at the Minnesota Chipotle locations. A traceback investigation of food items of interest was conducted in conjunction with the U.S. Food and Drug Administration (FDA) to determine the source of those items.

Results

Case Summary

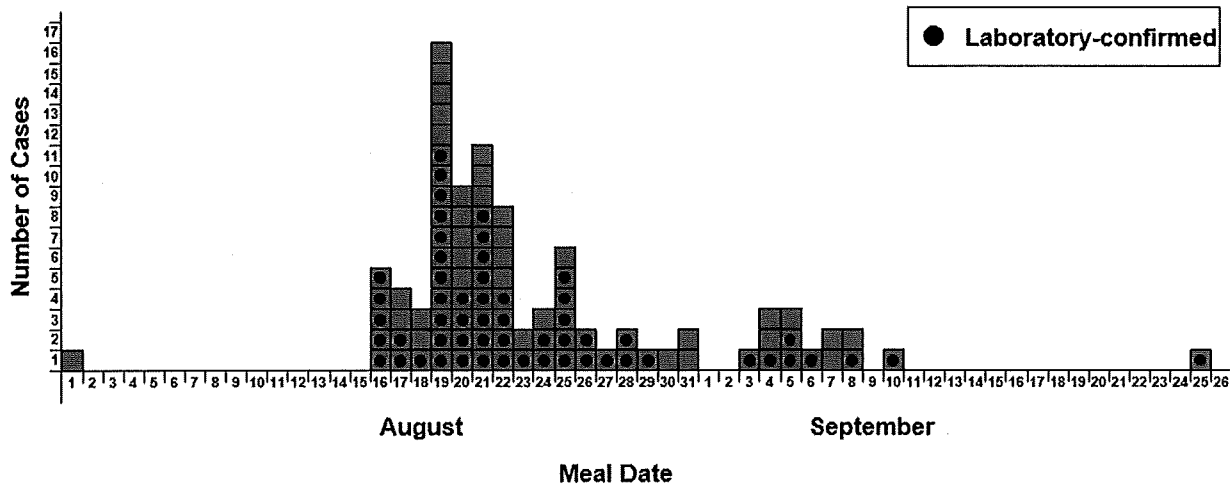
During August to October, 92 *S. Newport* cases detected through routine surveillance at the MDH PHL were indistinguishable from one of the two outbreak PFGE patterns (JJPX01.0030, 77 cases; JPX01.0011, 15 cases). Eighty-one (88%) of the 92 culture-confirmed cases reported that they ate or likely ate at a Chipotle location before onset of illness. Ten (12%) cases denied exposure to Chipotle, and one (1%) case was secondary to a household member with a Chipotle exposure. In addition to the confirmed cases, 260 Chipotle patrons were interviewed; 34 (13%) probable cases were identified, and 67 (26%) individuals reported illness that did not meet the case definition. Among the probable cases, 25 cases called the MDH foodborne illness hotline, 8 cases were identified via online order lists, and 1 case was a household member of a confirmed case. Among the 67 patrons reporting illness that did not meet the case definition, 47 (70%) reported mild illness, and 20 (30%) did not eat at a Chipotle location that was also reported by a confirmed case.

In total, 115 (81 confirmed and 34 probable) cases were identified in Minnesota as part of this outbreak. The median age of cases was 32 years (range, 13 to 91 years); 53% were female. All cases reported diarrhea, 108 (94%) abdominal cramps, 88 (81%) of 109 fever, 58 (50%) bloody stools, and 37 (32%) vomiting. Reported onset dates ranged from August 2 to September 27. The median incubation period was 3 days (range, 2 hours to 31 days; inter-quartile range, 2 to 6 days). Sixteen (14%) cases had incubations longer than 7 days (8 days, 5; 9 days, 4; 10 days, 2; 11 days, 1; 12 days, 2; 21 days, 1; and 31 days, 1). The median duration of illness was 8 days (range, 1 to 39 days) for the 74 cases who had recovered by the time of interview. Seventeen (15%) cases were hospitalized, 18 (16%) were seen at an emergency department, and 54 (47%) sought care at an outpatient clinic.

No cases died. Stool kits were sent to five ill hotline callers. Four kits were received at the MDH PHL; all were negative for *Salmonella*.

Known meal dates for cases ranged from August 1 to September 25. However, the majority of cases reported meal dates during August 16 to 28 (see epidemic curve). Several cases reported multiple meal dates, and multiple locations. Confirmed cases reported eating at least 1 of 27 Chipotle locations in Minnesota (St. Louis Park, 10; Ridgedale Center, 6; US Bank Plaza Minneapolis, 6; Hopkins, 5; Maplewood-Highway 36, 5; Minnetonka, 4; Shoreview, 4; Bloomington, 3; Calhoun Village Minneapolis, 3; Crystal, 3; Maple Grove, 3; St. Cloud-5th Avenue, 3; Uptown Minneapolis, 3; Blaine-Northtown, 2; Edina, 2; 7 Corners Minneapolis, 1; Blaine-Highway 65, 1; Eagan Promenade, 1; Mankato, 1; Maplewood Mall, 1; Minneapolis-50 S. 6th Street, 1; Richfield-66th St, 1; Rochester-S. Broadway, 1; Rochester Marketplace, 1; St. Paul Lawson, 1; Stillwater, 1; and Wayzata, 1). Four confirmed cases reported multiple restaurant locations, and three confirmed cases were not able to recall the exact Chipotle location. Probable cases were identified from 17 of the implicated restaurants (Calhoun Village Minneapolis, 6; St. Cloud-5th Avenue, 4; Stillwater, 3; 7 Corners Minneapolis, 2; Blaine-Northtown, 2; Hopkins, 2; Maple Grove, 2; Maplewood-Highway 36, 2; Rochester-S. Broadway, 2; US Bank Plaza Minneapolis, 2; Bloomington, 1; Eagan Promenade, 1; Minnetonka, 1; Ridgedale Center, 1; Shoreview, 1; St. Paul Lawson, 1; and Uptown Minneapolis, 1). An additional 11 restaurant locations that were not associated with confirmed cases were reported by ill hotline callers.

**S. Newport Cases Associated with Chipotle,
by Meal Date***



*Only cases with single meal dates

Due to the large number of cases, recent meal dates, and likelihood that individuals may still be ill, the public was notified of the investigation via a press release on September 10. At the time of the press release, available epidemiologic data and traceback information from Chipotle strongly suggested that tomatoes were the outbreak vehicle, but this conclusion was not yet confirmed. In addition to the press release, a Health Advisory was sent out to alert healthcare providers of the outbreak and provide recommendations for treatment of salmonellosis.

Confirmed cases and controls from six locations were selected for a case-control study. Only patrons with single meal dates from August 16 through August 28, and controls that shared a meal date and location with a confirmed case were enrolled in the study. In the univariate analysis, consumption of mild tomato salsa (22 of 24 cases vs. 56 of 119 controls; odds ratio [OR], 12.4; 95% confidence interval [CI], 2.8 to 55.0; $p < 0.001$), carnitas (5 of 23 cases vs. 5 of 117 controls; OR, 6.2; 95% CI, 1.6 to 23.7; $p = 0.01$), and brown rice (13 of 24 cases vs. 36 of 119 controls; OR, 2.7; 95% CI, 1.1 to 6.7; $p = 0.03$) were significantly associated with illness. In a multivariate model including these three menu items, mild tomato salsa (adjusted odds ratio [AOR], 17.6; 95% CI, 3.1 to 101.0; $p = 0.001$) and carnitas (AOR, 12.1; 95% CI, 2.0 to 71.1; $p = 0.01$) were significantly associated with illness. The mild tomato salsa contains tomato, jalapeño, red onion, cilantro, citrus, and salt. At the univariate ingredient level, only tomato was significantly associated with illness (22 of 24 cases vs. 56 of 119 controls; OR, 12.4; 95% CI, 2.8 to 55.0; $p < 0.001$). The mild tomato salsa is the only menu item that contains raw tomatoes.

In a univariate analysis including all confirmed cases and controls from all locations with single meal dates from August 16 through August 28, consumption of mild tomato salsa (48 of 51 cases vs. 73 of 146 controls; OR, 16.0; 95% CI, 4.8 to 53.7; $p < 0.001$), carnitas (8 of 50 cases vs. 9 of 144 controls; OR, 2.9; 95% CI, 1.0 to 7.9; $p = 0.045$), and black beans (30 of 51 cases vs. 58 of 147 controls; OR, 2.2; 95% CI, 1.1 to 4.2; $p = 0.02$) were significantly associated with illness. When those variables were included in a multivariate model, only mild tomato salsa (AOR, 15.1; 95% CI, 4.4 to 51.5; $p < 0.001$) remaining significantly associated with illness. At the ingredient level in the expanded analysis, tomato (48 of 51 cases vs. 73 of 146 controls; OR, 16.0; 95% CI, 4.8 to 53.7; $p < 0.001$), jalapeño (48 of 51 cases vs. 111 of 146 controls; OR, 5.0; 95% CI, 1.5 to 17.2; $p = 0.004$), and red onion (49 of 51 cases vs. 119 of 146 controls; OR, 5.6; 95% CI, 1.3 to 24.3; $p = 0.01$) were significantly associated with illness. However, similar to the previous result, in a multivariate model only tomatoes (AOR, 50.1; 95% CI, 2.9 to 878.3; $p = 0.01$) were associated with illness. Among all confirmed and probable cases, 96 (88%) of 109 cases ate or likely ate tomatoes at Chipotle.

An additional four culture-confirmed cases that were Wisconsin residents were reported by the Wisconsin Department of Health. All four of the Wisconsin cases reported eating tomatoes at a Chipotle location from August 17 through August 28. One case was exposed in Wisconsin at the Eau Claire location; the remaining cases were exposed at three different Minnesota locations. Nationally, additional *S. Newport* cases with isolates that were indistinguishable by PFGE were detected, but were not considered to be part of this outbreak.

Environmental Health Investigation

Beginning on September 3, sanitarians from 10 jurisdictions interviewed 446 (89%) of 502 employees at the 22 implicated Chipotle locations. A total of 22 (5%) ill employees were identified from 8 restaurant locations. Known illness onset dates for employees ranged from August 12 to September 25. Twenty employees had two *Salmonella*-negative stool specimens and were cleared to return to work; two employees left employment with the company. No *Salmonella*-positive employees were identified. On September 11, Chipotle implemented symptom surveys for all employees prior to starting a shift at all 60 restaurants in the Minnesota distribution chain (which includes the Eau Claire, Wisconsin location). Any employees that were reported to be ill were to be tested for *Salmonella* by Chipotle. No employees were tested by Chipotle.

On September 4, MDA inspectors visited the St. Louis Park and Ridgedale Mall Chipotle locations to collect samples of tomatoes, jalapeños, and cilantro. All samples were negative for *Salmonella*.

Preparation of the mild tomato salsa was observed by OCPHS sanitarians at a location in Rochester on September 18. The restaurant prepped six large hotel pans of the salsa per day. Tomatoes are washed in a produce sink with Victory Wash. The whole tomatoes are then put into an automatic dicing machine. Raw jalapeños, red onions, and cilantro are diced separately by hand. The ingredients are then combined and placed in the cooler until needed. The employee agitated the tomatoes in the sink with bare hands. No additional bare-hand contact was observed. The sanitarian observed appropriate food handling procedures.

The carnitas arrive pre-cooked into each store and are reheated before serving.

Traceback Investigation

Chipotle locations in Minnesota were supplied through a contract with Wholesale Produce Supply (WPS). WPS received tomatoes, packed or re-packed them, and shipped them to Reinhart Food Service for delivery to Chipotle locations. Reinhart Food Service only delivered boxed tomatoes, and did not re-pack in any way. WPS was shipping tomatoes from Paragon, a Lipman company, but did fill orders from other suppliers when needed. Reinhart Food Service reported that all tomatoes destined for Chipotle have a unique item number and are stored together in their system.

By analyzing supply chain data, Chipotle corporate determined that the tomatoes served during the outbreak period were likely sourced from a specific Virginia farm (Farm A). In response to this finding, Chipotle bypassed the normal packing and distribution of tomatoes to the 60 stores in the Minnesota distribution chain and switched to an Ohio grower. The Ohio tomatoes were served in the restaurants beginning on September 10. With the exception of one case who reported a meal date of September 25, no meal dates were reported after September 10.

The MDA Rapid Response Team gathered traceback documentation for four Chipotle locations selected by FDA. FDA used this information to conduct a traceback investigation. A single field and source of contamination were not identified by FDA.

Conclusions

This was a foodborne outbreak of *Salmonella* Newport infections associated with tomatoes served at multiple locations of Chipotle Mexican Grill in Minnesota and Wisconsin. Tomatoes were implicated as the outbreak vehicle by an ingredient-specific analytic study, supported by internal product distribution information provided by Chipotle corporate. Carnitas were also significantly associated with illness in the analytic study. However, carnitas could explain only a small proportion of cases and were pre-cooked, and are thus unlikely to have contributed to the outbreak. The ultimate source of contamination (i.e., the tomato farm or packing house) was not identified.