

***Salmonella* Muenchen Infections Associated with Iceberg Lettuce**

June-July

Multiple counties/Multiple states

On July 11, 2011, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) determined that two clinical *Salmonella* Muenchen isolates submitted through routine surveillance had indistinguishable pulsed-field gel electrophoresis (PFGE) patterns (Centers for Disease Control and Prevention [CDC] *Xba*I designation JJ6X01.1021; MDH designation SMU104). The cases were both interviewed using the standard MDH *Salmonella* questionnaire. From July 12 through July 15, five additional isolates with the outbreak PFGE pattern were identified by the MDH PHL through routine surveillance. On July 15, the New York State Department of Health reported two *S. Muenchen* isolates with the outbreak PFGE pattern to the national PulseNet database. A multi-state investigation was initiated.

A case was defined as a person from whom *S. Muenchen* with the outbreak PFGE pattern (JJ6X01.1021) was isolated, with a specimen collection date after June 15, 2011. Minnesota cases were interviewed with the standard MDH *Salmonella* questionnaire. In Minnesota, exposures of interest identified during hypothesis generation were compared to non-outbreak *Salmonella* and *E. coli* O157:H7 cases interviewed during the same time period (i.e., case-case comparison design). The Minnesota Department of Agriculture (MDA) initiated traceback investigations of suspect products.

Nationally, 24 cases from 8 states were identified in this outbreak (11 in Minnesota, 7 in New York, and 1 each in Massachusetts, Michigan, Montana, New Jersey, Pennsylvania, and Wisconsin). Thirteen (52%) cases were female. The cases had a median age of 54 years (range, 17 to 93 years), and illness onset dates ranged from June 27 through August 12.

Of the 11 Minnesota cases, 6 (55%) were female. The cases had a median age of 39 years (range, 25 to 93 years), and illness onset dates ranged from June 27 through July 6. All 11 cases reported diarrhea, 9 (82%) reported cramps, 8 (73%) reported fever, 6 (55%) reported vomiting, and 2 (18%) reported bloody stools. Five (45%) Minnesota cases were hospitalized.

Upon initial interview, all 11 Minnesota cases reported eating at one or more restaurants in the week prior to illness onset; 10 (91%) reported eating at multiple restaurants or at the same restaurant multiple times. However, none of the cases had any restaurants in common. Cases reported eating a wide variety of foods. Nine (82%) cases reported consuming iceberg lettuce, eight (73%) tomatoes, eight (73%) onions, eight (73%) strawberries, six (55%) pre-packaged salad, and six (55%) carrots.

In the Minnesota case-case comparison study, 29 non-Muenchen *Salmonella* and *E. coli* O157:H7 cases with illness onsets from June 1 through July 15, 2011 were used as a comparison group. Consumption of iceberg lettuce (8 of 9 *S. Muenchen* cases vs. 10 of 28 comparison cases; odds ratio [OR], 14.4; 95% confidence interval [CI], 1.6 to 132.3; $p = 0.008$) and consumption of cabbage (5 of 9 *S. Muenchen* cases vs. 4 of 29 comparison cases; OR, 7.8; 95% CI, 1.4 to 42.1; $p = 0.02$) were associated with illness.

Nationally, three additional cases in other states were interviewed using an expanded food consumption questionnaire. Two had attended separate conferences in the week prior to illness onset, and all of the meals were consumed as part of a menu plan; however, those menus were not obtained.

MDA initiated traceback investigations of the iceberg lettuce consumed at restaurants by eight Minnesota cases. Six different distributors were identified from point of service records, but it was not clear from the invoices what types of lettuce were received (e.g., iceberg vs. other, shredded vs. whole head). Further analysis of upstream distribution was not pursued.

This was a multi-state foodborne outbreak of *S. Muenchen* infections. Eleven cases of *S. Muenchen* related to this outbreak were identified in Minnesota. In Minnesota, cases were most likely associated with consuming a produce item such as iceberg lettuce or cabbage. The tight distribution of case illness onsets, which suggests a food vehicle with a short shelf life, supported this conclusion. The national investigation was limited in that only 14 of 24 cases (including the 11 cases in Minnesota) were interviewed with a detailed food consumption questionnaire. In addition, the state government shutdown in Minnesota in July made the investigation more difficult to conduct completely and in a timely manner within Minnesota.