

***Salmonella* Livingstone Associated with Goat Meat**

July

Anoka County

On July 22, 2013, the Minnesota Department of Health (MDH) identified a cluster of three *Salmonella* Livingstone cases, pulsed-field gel electrophoresis (PFGE) pattern LIV4. One of the cases was interviewed that same day. The case reported attending a gathering of family and friends held at a private residence in Ham Lake, Minnesota on July 6. The case, his brother, and his cousin purchased, slaughtered, and processed a goat at a live animal market earlier on the day of the gathering. Foods served at the gathering included goat soup, grilled goat, rice, and vegetables, including tomatoes, potatoes, jalapeños, garlic and onions. An investigation was initiated.

MDH received a partial list of attendees through interviews with the cases. Attendees were interviewed by MDH staff using an outbreak questionnaire about party attendance, food and beverage consumption, foods prepared for the gathering, contact with raw meat and organs, and illness history. A case was defined as an individual who prepared food for the gathering and/or attended the gathering and developed diarrhea (≥ 3 loose stools in a 24-hour period) or tested positive for *S. Livingstone* LIV4 after the event.

No raw meat was available for testing at the time of the investigation.

Eleven individuals were interviewed; 10 attended the gathering and one person aided in the slaughter and processing of the goat but did not attend the gathering. Four (36%) individuals met the case definition. Three of the four cases attended the gathering, and three of the four cases slaughtered and processed the goat. All four cases reported diarrhea, three (75%) reported fever, two (50%) reported vomiting, and one (25%) reported abdominal cramps. The median incubation period for cases could not be calculated due to multiple exposures.

The median duration of illness was 13 days (range, 6 to 20 days). Three cases visited their healthcare provider, including one case who was hospitalized. Those three cases submitted stool samples that tested positive for *S. Livingstone* LIV4. Additional illnesses were reported, but detailed information could not be obtained.

The meat and intestines were cut up at the live animal market after the goat was slaughtered, and transported in a double plastic bag to the site of the gathering. At the Ham Lake gathering location, one case washed the meat using a bucket and filtered water. The meat and organs were then placed in a pit for cooking. Some of the meat was also cooked in soup. Rice was prepared by a gathering attendee, and vegetables prepared on site by gathering attendees were also served. Food preparation for the gathering took place at Ham Lake several hours after the goat was slaughtered; the meal was served sometime between 4:00 and 5:00 p.m. Among the four cases, three participated in the slaughter and processing the goat, including one who did not attend the gathering. Among the three cases who attended the gathering, one did not participate in the slaughter and processing of the goat. The three individuals who slaughtered and processed the goat reported handwashing before leaving the live animal market. The rice was brought by one of the attendees of the gathering; she did not report illness. The owner of the house (who was not ill) helped cut and prepare the vegetables for cooking.

All four cases, and six of seven controls, ate the goat meat. All three cases who attended the gathering and all seven controls ate the rice and the vegetables. Slaughtering and processing the goat was statistically associated with illness (3 of 4 cases vs. 0 of 7 controls; odds ratio, undefined; 95% confidence interval, undefined; $p = 0.02$). No foods were statistically associated with illness, since most cases and controls ate most foods.

This was an outbreak of *S. Livingstone* infections associated with slaughtering, processing and/or eating meat and organs of a goat from a live animal market. Although no foods were statistically implicated, illness in all of the individuals who slaughtered the goat, including one who did not attend the gathering, implicate the goat as the source of illness.