

***E. coli* O157:H7 Infections Associated with Consumption of Ground Beef**

March-May

Multiple counties/Multiple states

From May 1 through May 4, 2007, the Minnesota Department of Health (MDH) Public Health Laboratory identified five clinical isolates of *E. coli* O157:H7 with indistinguishable pulsed-field gel electrophoresis (PFGE) subtype patterns through routine surveillance. This PFGE subtype (designated PulseNet pattern *Xba*1 EXHX01.0047 and *Bln*1 EXHA26.0015) is common in Minnesota and comprises 5.7% of the patterns in the national *E. coli* O157:H7 PulseNet database. For both *Xba*1 and *Bln*1 enzymes, the patterns were the most common in their respective groups. A 60-day review of the PulseNet database showed seven additional states with matching patterns, including Arkansas (1), Iowa (4), Michigan (1), Ohio (2), Texas (3), Utah (1), and Virginia (4). In addition, there were two additional isolates with matching patterns identified in Minnesota in March.

The Minnesota isolates from May originated from five patients; these patients were interviewed by MDH staff with a routine detailed questionnaire about illness history and food consumption in the week prior to illness onset. All patients reported consuming ground beef in the week prior to illness onset.

A case-control study was conducted during May 4–7, 2007, to specifically evaluate ground beef and other food exposures. For the case-control study, a case was defined as a person with diarrheal illness (≥ 3 loose stools in a 24-hour period), from whom the outbreak PFGE pattern of *E. coli* O157:H7 was isolated from stool and with illness onset after April 20, 2007. Due to the length of time that had elapsed, the two additional case-patients from March were not included in the case-control study. Three controls per case were enrolled through sequential digit dialing using the case-patient's telephone number. Controls were matched to case-patients by age group, and reported no diarrhea or vomiting during the 2 weeks preceding the case-patient's onset date. All cases and controls were interviewed using a standard questionnaire that included specific questions about ground beef purchase locations, purchase dates, and package sell-by-dates.

Seven cases and 21 matched controls were enrolled in the case-control study. All seven case-patients reported consumption of ground beef during the week prior to illness onset compared with 15 of 21 controls; this association was not statistically significant (odds ratio [OR], undefined; 95% confidence interval [CI], 0.55 to infinity; $p = 0.28$). However, consumption of ground beef purchased at Grocery Chain A or Grocery Chain B was significantly associated with illness (6 of 7 case-patients vs. 4 of 21 controls; OR, 25.5; 95% CI, 2.4 to 619; $p = 0.003$). Grocery Chain A and Grocery Chain B are high-end grocery stores in the Minneapolis/St. Paul metropolitan area, are owned by the same company, and share common distributors.

On May 8, MDH issued a press release and health alert to enhance case finding and inform the public. All persons who had ground beef purchased from Grocery Chain A or Grocery Chain B since April 7, 2007, were encouraged to discard it or return it to the store. Anyone who developed bloody diarrhea after consuming ground beef from Grocery Chain A or Grocery Chain B were encouraged to seek medical care.

For this outbreak, a case was defined as a person who had a culture-confirmed *E. coli* O157:H7 infection with the outbreak PFGE subtype and who had consumed beef purchased at Grocery Chain A or Grocery Chain B during March–May, 2007. A total of 10 cases were ultimately identified, all through routine surveillance. The median age of case-patients was 53 years (range, 5 to 76 years). Seven (70%) case-patients were female. Illness onset dates ranged from March 27 through May 4, 2007, and seven (70%) case-patients were hospitalized with a median duration of hospitalization of 5 days (range, 2 to 9 days). No cases of hemolytic uremic syndrome were identified. Nine case-patients consumed ground beef purchased at one of four Grocery Chain A or Grocery Chain B stores in the Minneapolis/St. Paul metropolitan area. One case-patient did not consume ground beef from Grocery Chain A or Grocery Chain B but consumed a New York strip steak from Grocery Chain A.

Five samples of ground beef were collected from three culture-confirmed case-patients and submitted to the Minnesota Department of Agriculture (MDA) Laboratory for culture during the outbreak investigation. The MDA Laboratory isolated *E. coli* O157:H7 with the outbreak PFGE pattern from one opened ground beef package with a sell-by-date of April 19, 2007, and one intact ground beef package with a sell-by-date of April 22, 2007. Both packages were purchased at the same Grocery Chain B in Minnetonka, Minnesota; they were submitted by two different case-patients.

A traceback investigation by MDA and the United States Department of Agriculture Food Safety and Inspection Service (USDA-FSIS) found that all the beef trim used for ground beef in the implicated Grocery Chain A and Grocery Chain B stores originated from a single slaughter facility located in Windom, Minnesota. On May 10, the slaughter facility issued a voluntary recall of 117,500 pounds of beef trim that was produced on March 27 and distributed to distributors and retail outlets in eight states (Arizona, Illinois, Iowa, Michigan, Minnesota, Ohio, Virginia, and Wisconsin). Subsequently, the USDA isolated *E. coli* O157:H7 with the outbreak PFGE pattern from a product sample within the plant. The plant was issued a Notice of Intended Enforcement (NOIE). The NOIE listed a number of food safety issues that the plant needed to address within a set time period or face the possibility of USDA-FSIS removing inspectors from the plant.

This was an outbreak of *E. coli* O157:H7 infections associated with ground beef ground and sold in Grocery Chain A or Grocery Chain B grocery stores in the Minneapolis-St. Paul metropolitan area. The beef trim used to make this ground beef originated from a single slaughter facility in Windom, Minnesota. Ten cases were identified in Minnesota. Routine, real-time PFGE subtyping and interviewing of case-patients made rapid detection of this *E. coli* O157:H7 outbreak with a common PFGE subtype possible. A case-control study supported by product sampling allowed for rapid identification of ground beef as the outbreak vehicle, resulting in a

press release to alert the public, a product recall, and intervention at the implicated processing plant by USDA.