

Enterotoxigenic *E. coli* O6:NM Infections Associated with Minnesota Correctional Facilities

July-August

Multiple counties

On August 1, 2011, the Medical Director for the Minnesota Department of Corrections (DOC) called the Minnesota Department of Health (MDH) foodborne illness hotline to report an increase in gastroenteritis cases at two correctional facilities; approximately 18 of 1,600 inmates at Minnesota Correctional Facility (MCF) – Stillwater had developed gastroenteritis since July 24, and five inmates at MCF – Lino Lakes had developed similar symptoms in the week prior to the report. DOC operates 11 facilities in Minnesota, all of which share the same food distributor in Wisconsin. Kitchens at each facility are staffed both by inmates and food vendor staff. MDH Environmental Health and the Washington County Department of Public Health and Environment (WCPHE) were notified, and an investigation was initiated.

DOC staff monitored all MCFs for gastroenteritis cases during the investigation; illnesses were subsequently identified at MCF – Faribault. MCF – Moose Lake reported two cases of gastroenteritis among inmates; however, since no additional cases were reported from MCF – Moose Lake during the outbreak, the investigation focused on the other three facilities.

A case was defined as an MCF inmate who developed gastrointestinal symptoms (diarrhea, vomiting, or abdominal cramps) from July 23 through August 26, 2011. Symptoms were recorded by health services staff at the correctional facilities and provided to MDH. Cases who worked with food were excluded from food service for 72 hours after symptoms had resolved. Scheduled transfers of ill inmates to other facilities were deferred until the inmate had recovered.

Incarcerated inmates were unable to be interviewed, so exposure histories were not obtained from inmates. Stool samples were collected from ill inmates by DOC health services and submitted to the MDH Public Health Laboratory (PHL) for bacterial and viral testing.

Environmental health specialists from MDH and Washington County visited several of the facility kitchens to evaluate food handling procedures and procure records. DOC staff provided the commissary menu, recipes, and records of inmate purchases of packaged food items from the canteen service for the time periods of interest.

The Minnesota Department of Agriculture (MDA) obtained invoices for food items received at the three facilities during the time period of interest. Receipt dates for specific food items, particularly produce and spices, were compared between facilities based on the timing of illness onsets at the facility and the commissary menu for the time periods of interest. Canteen purchases were compared between inmates who became ill and those who did not.

Sample trays (“Dead Man Trays”) of food items served at the commissary during the time periods of interest were tested for enterotoxigenic *E. coli* (ETEC) at the MDA laboratory.

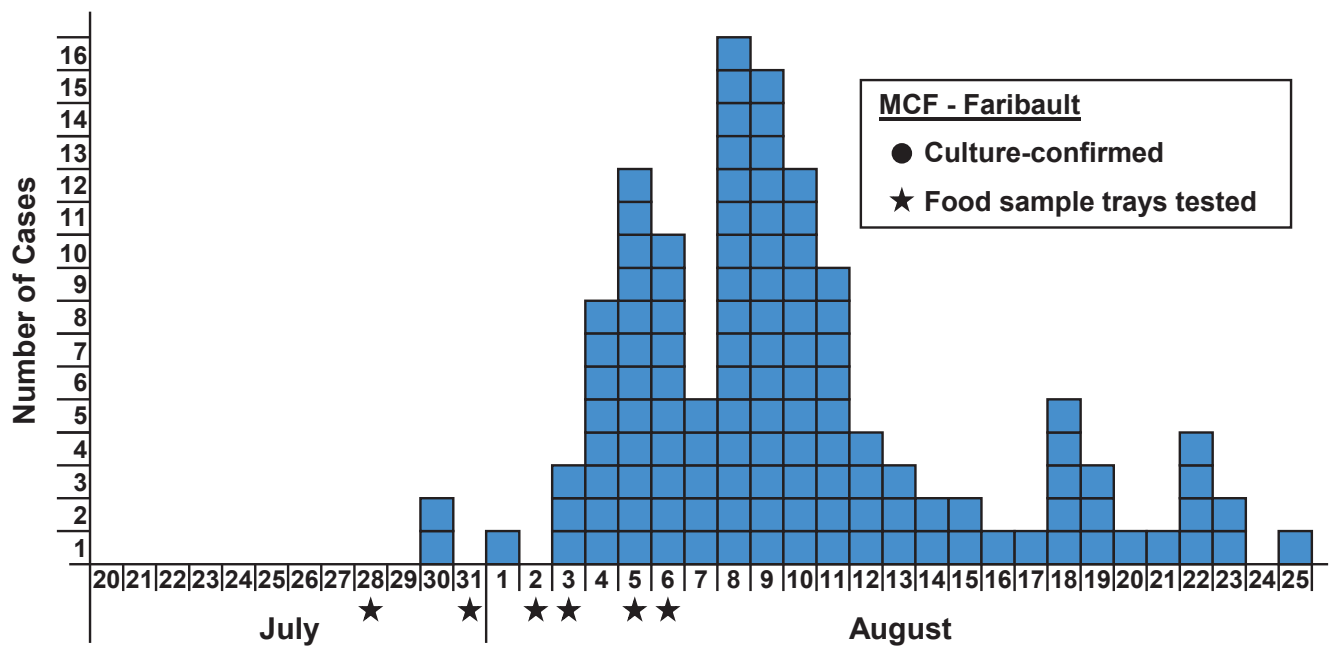
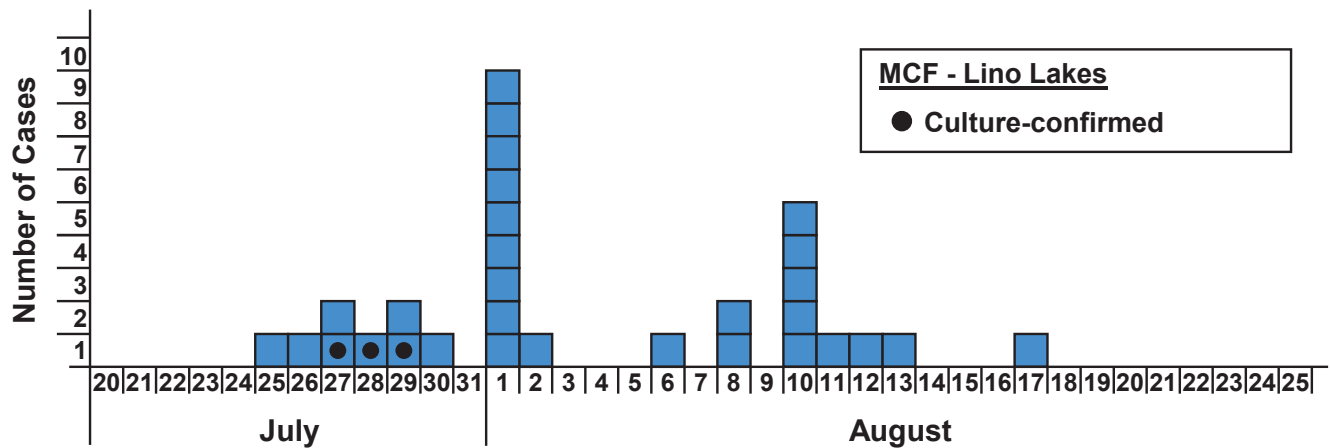
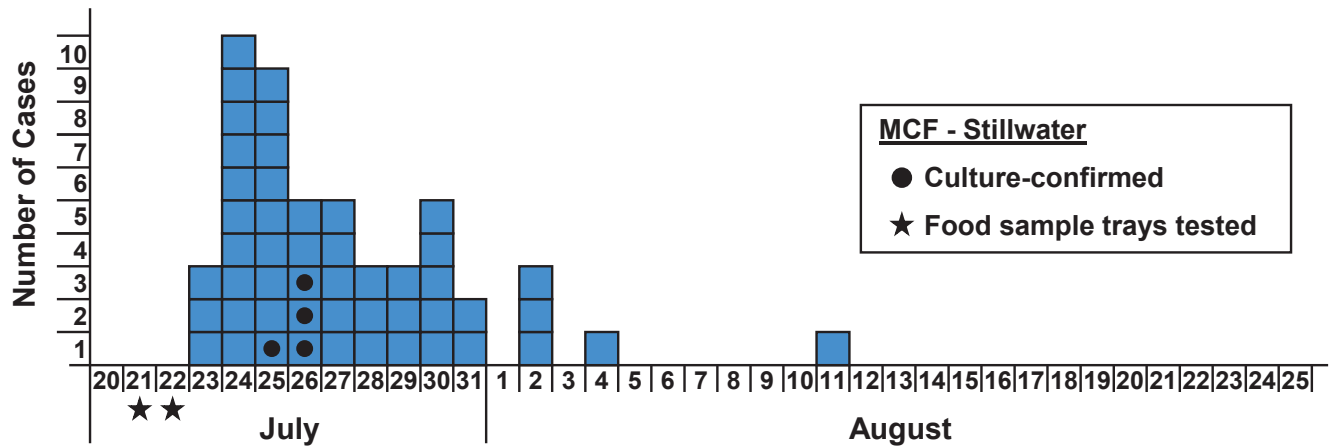
A total of 209 cases were identified in inmates from the three correctional facilities: 54 cases among MCF – Stillwater’s 1,600 inmates (attack rate 3.4%) with illness onset dates from July 23 to August 11, and a peak of 10 new cases on July 24 (see epidemic curve); 30 cases among MCF – Lino Lakes’ 1,400 inmates (attack rate 2.1%) with illness onset dates from July 25 to August 17, and a peak of 9 new cases on August 1; and, 125 cases among MCF – Faribault’s 2,000 inmates (attack rate 6.3%) with illness onsets from July 30 to August 25, and a peak of 16 new cases on August 8. Cases were identified in multiple living units at each facility. Some inmate illnesses may have been the result of person-to-person secondary transmission; however, because the outbreak vehicle was not identified, primary transmission could not be ruled out and all cases were classified as primary cases. Inmates who reported gastrointestinal illness were confined to their cells until they were symptom-free or had been on antibiotic treatment for 24 hours; therefore, the potential for underreporting of illness was high.

All 209 cases were male. Open-ended symptom histories were available for Stillwater and Faribault cases (n=179). Of these, 163 (91%) reported diarrhea, 66 (37%) reported abdominal cramps, 8 (4%) reported vomiting, 4 (2%) reported fever, and 1 (1%) reported bloody stools. The median duration of illness for 160 cases was 7 days (range, 1 to 19 days). No cases were hospitalized.

Stool samples from 17 inmates were tested at the MDH PHL (5 from Stillwater, 5 from Lino Lakes, and 7 from Faribault); enterotoxigenic *E. coli* (ETEC) O6:NM was found in samples from 4 Stillwater inmates and 3 Lino Lakes inmates. The positive samples came from inmates with illness onset dates from July 25 through July 29. Six of the ETEC isolates had indistinguishable pulsed-field gel electrophoresis (PFGE) patterns (Minnesota pattern designation ETEC3EB3; Centers for Disease Control and Prevention [CDC] pattern designation EVEX01.0005/EVEA26.0002). The seventh isolate (from a Stillwater inmate) was two bands different by first enzyme (Minnesota pattern ETEC4EB3; CDC pattern EVEX01.0007/EVEA26.0002). The main outbreak PFGE pattern was indistinguishable from an ETEC outbreak that occurred in May 2011 at a New York City wedding; several potential common ingredients were identified, but no direct link was found. Several inmates who submitted stool samples had been taking antibiotics, which may have affected the lab results; two specimens from MCF – Faribault had no growth on enteric media and could not be tested further. All other specimens were negative for Shiga toxin-producing *E. coli*, *Shigella*, *Salmonella*, and *Campylobacter*. The Stillwater and Lino Lakes specimens were also tested for norovirus and were negative. Expanded *E. coli* virulence marker PCR testing was conducted; 4 of 15 (27%) specimens representing all three facilities tested positive for diffusely adherent *E. coli* (DAEC), including two that were also positive for ETEC. One DAEC-positive specimen, from a Lino Lakes inmate, was also positive for enteroaggregative *E. coli* (EAEC); this sample was negative for ETEC.

All 11 MCFs use the same commissary menu, and food items used to fulfill this menu are ordered and received from the same distributor. The food service director at each facility orders food independently for his/her facility based on the menu guidelines and need. Most facilities receive two food deliveries per week, and a single delivery truck may visit multiple facilities. For example, MCF – Oak Park Heights receives food from the same delivery truck on the same day as MCF – Stillwater (though the facilities may have ordered different foods for delivery on this truck); no illnesses were identified at MCF – Oak Park Heights. The facilities use a standard menu and an alternate, ovo-lacto vegetarian menu. Inmates may also order pre-packaged foods from the canteen service, which is operated by MINNCOR.

Enterotoxigenic *E. coli* O26:NM Cases in Three Minnesota Correctional Facilities by Illness Onset Date



Onset Date

No food items were implicated based on a comparison of dates for produce and spice items received by all three facilities during the time period of interest. Examination of pre-packaged food purchases among ill and non-ill inmates was limited by uncertain illness statuses and lack of consumption history; again, no food items were implicated.

MCFs routinely freeze and store a representative tray of food from each meal served at the facility; some of these frozen “Dead Man Trays” were available for the periods of interest at two of the correctional facilities involved in the outbreak. Seven Dead Man Trays from MCF – Faribault were collected from the facility on August 19. The trays represented a meal served at the commissary on July 28, July 31, August 2, August 3, August 5 (two meals), and August 6. Produce items from the trays, which included cantaloupe, lettuce, apples, nectarines, tomato, plum, orange, carrot, celery, and frozen spinach, were sampled and tested for ETEC at the MDA laboratory; no ETEC was found.

Most Dead Man Trays from the time period of interest had been discarded at MCF – Stillwater during a freezer cleaning. Two trays (representing a July 21 and a July 22 meal from an inmate with a tomato allergy) were picked up. Produce items on these trays included frozen veggie blend, Normandy blend, lettuce, carrot sticks, celery sticks, and frozen carrots. All food products on the Stillwater trays were tested; no ETEC was found.

Trays were not available from MCF – Lino Lakes for the time period of interest.

This was an outbreak of ETEC infections at three Minnesota correctional facilities. Twenty-seven percent of inmate stool samples also tested positive for DAEC, and one for EAEC; the significance of these results is unknown. Inability to obtain food histories from incarcerated inmates created a challenge in identifying the outbreak vehicle. The source of the outbreak was not determined, but the likely vehicle was a food item received from a common distributor and served at the three facility cafeterias at slightly different times. Studies show that only about 25% of ETEC cases diagnosed in the United States are among non-travelers, and past outbreaks have been associated with imported produce. Therefore, an imported spice or produce item is the most plausible vehicle for the outbreak. DOC staff worked with the facility kitchens to enhance produce-washing procedures to lower the risk of future outbreaks.