

**Outbreak of norovirus associated with an event held at a church in Liberal, KS--
Seward County, April 2010**



Background

On Wednesday, April 28, 2010, the Bureau of Surveillance and Epidemiology (BSE) at the Kansas Department of Health and Environment (KDHE) was notified of a possible foodborne illness outbreak associated with an event that was held at a church in Liberal, Kansas on April 24. One attendee had been hospitalized and family members reported 19 other individuals becoming ill with gastrointestinal symptoms after attending this event. Meals served at the event included a breakfast catered by Seward County Community College, Great Western Plains Dining Hall and a lunch provided by an unlicensed caterer. KDHE, Seward County Health Department (SWHD), and Kansas Department of Agriculture (KDA) initiated an outbreak investigation to determine the cause of illness and to implement prevention and control measures. A list of attendees was provided to SWHD by the event organizers. Attendees were identified from Oklahoma, Texas, and Mississippi; therefore the Oklahoma State Department of Health, Texas Department of State Health Services, and the Mississippi State Department of Health were notified and assisted with this investigation. Telephone interviews of attendees were conducted by the Bureau of Health Promotion at KDHE, BSE-KDHE, the Oklahoma State Department of Health, and the Texas Department of State Health Services regarding foods consumed and illness history.

Key Findings

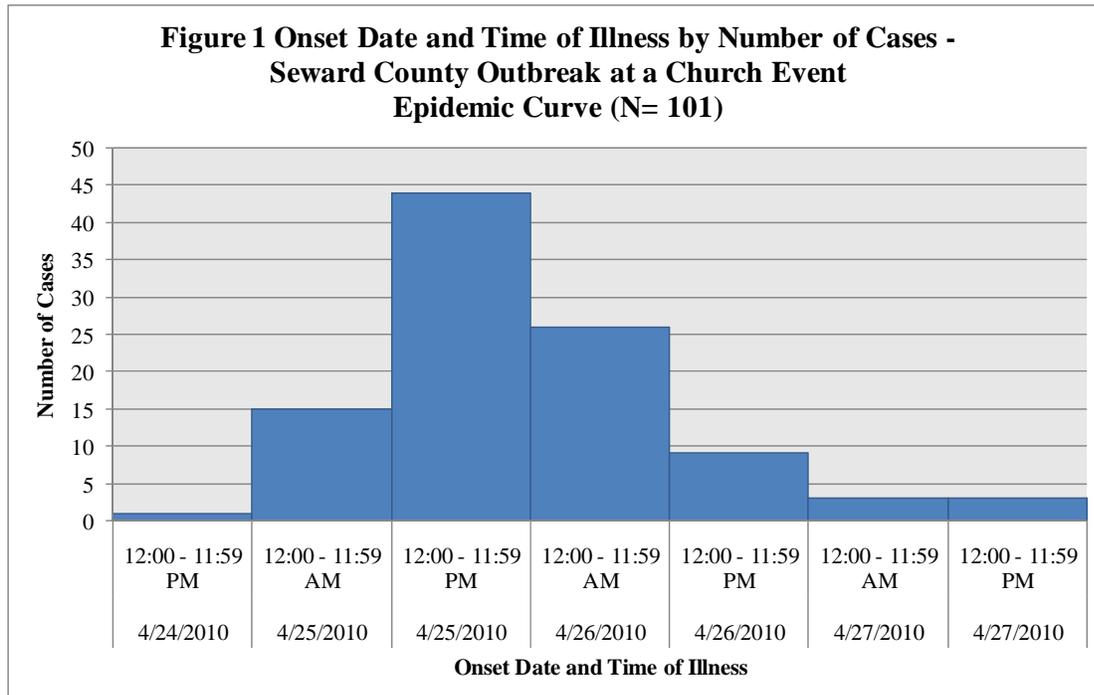
- A cohort study was initiated, and 239 individuals were interviewed. Of those, 122 individuals reported illness and 101 met the case definition. A case is defined as an individual who experienced vomiting or diarrhea within 10 to 78 hours of eating food from the lunch that was served at the church in Liberal, KS on April 24.
- Interviews were conducted with the parents of fifteen children 5 years old and younger. Of those 9 reported gastrointestinal illness. These children attended daycare onsite provided by the church during this event.
- Thirteen case-patients reported gastrointestinal illness among additional household members after the event, resulting in fifteen secondary cases.
- The most commonly reported symptoms among the 101 primary cases were diarrhea, nausea, abdominal cramps, headache, vomiting, muscle aches, and fever (Table 1). Three reported bloody stools. Five sought care from a health care provider, and one attendee was hospitalized.

Table 1: Clinical Information of Cases

Symptoms	Number with Symptoms/ Total Reporting (%)
Diarrhea	90/100 (90)
Nausea	87/101 (86)
Abdominal cramps	78/98 (80)
Headache	70/99 (71)
Vomiting	64/101 (63)
Muscle aches	54/96 (56)
Fever	27/76 (36)
Bloody stools	3/95 (3)

- Onset of illness ranged from April 24 to April 27 (Figure 1). The incubation period for adults and children older than 5 years was calculated from the time lunch was served on April 24th until their reported onset date and time of illness.

- The incubation period ranged 10 to 78 hours with a median of 32 hours.



- Recovery date and time was reported by 67 individuals, and duration of illness ranged from 3 hours to 136 hours with a median of 67 hours.
- Ages of cases ranged from 6 - 96 years (median = 48 years) and 95 (93%) were female.
- Seventy-eight cases reside in Kansas and twenty-three cases reside in Oklahoma.
- The 78 cases from Kansas live in Finney, Ford, Grant, Harvey, Haskell, Kearney, Meade, Morton, Sedgwick, Seward, Stanton, and Stevens Counties.
- Two menu items were significantly associated with illness: the baklava (relative risk [RR] = 1.85, 95% confidence interval [CI] = 1.21-2.82, P- value = 0.001) and the kartoshka (RR = 1.55, 95% CI = 1.10-2.19, P- value = 0.007).
- The breakfast that was served at the event included cinnamon rolls, fruit, coffee, and orange juice. The cinnamon rolls and the fruit were prepared by the Seward County Community College, Great Western Plains Dining Hall.
- The lunch that was served to the adult attendees and to the children over 5 years was lemon pepper pork, onion casserole, green beans, pasta salad, fruit leftover from breakfast, rolls, baklava, kartoshka, red velvet cake balls, coffee, tea, and water.
- The lunch food items were prepared by an unlicensed caterer.
- An inspection of the community college dining hall was conducted on April 29. Three critical violations were observed: 1) inadequate cold holding temperatures; 2) package integrity (dented can of soup; and 3) dish soap stored above food prep table. One noncritical violation was observed: ice scoop stored above the food prep table. All food that was above proper temperature was voluntarily destroyed, and all other violations were corrected at the time of the inspection.
- All employees and the caterers that prepared food for this event were interviewed April 28 by the Seward County Health Department and none reported any illness prior to or after April 24.
- Leftover food from this event has been collected and forwarded to the Kansas Health and Environmental Laboratories where the feasibility of testing the baklava and kartoshka for norovirus is being determined.

- Three stool specimens from ill attendees have been collected and all three tested positive for norovirus, genogroup II.

Preliminary Discussion and Conclusions

This was an outbreak of norovirus associated with an event held at a church in Liberal, KS. Attendees became ill within 10 to 78 hours of eating lunch at the event. No food from breakfast was significantly associated with illness. Only two food items were significantly associated with illness: the baklava and the kartoshka. Leftover food from the event has been collected and the feasibility of testing the baklava and kartoshka for norovirus is being determined.

Nine children under six years reported gastrointestinal illness following this event. These children did not consume the lunch that was served but instead either ate food brought from home or a Lunchable® that was provided by the church. These children became ill 33 to 70 hours after exposure to a vomiting incident that had occurred in the afternoon in one of the daycare rooms.

Norovirus is a highly contagious pathogen with a very low infectious dose, estimated to be between 10-100 viral particlesⁱ. Transmitted primarily through the fecal-oral route, norovirus particles may be spread through direct contact or through consuming fecally-contaminated food or water. Spread via aerosolized vomitus is also possible. Once infected, norovirus shedding can begin prior to the onset of symptoms and can persist for weeks after clinical symptoms have ceased. Norovirus has been detected in fecal specimens 3 to 14 hours before the onset of clinical symptoms and could be detected for 13 to 56 days after exposure to the virusⁱⁱ. Approximately 20% of norovirus infected individuals do not have clinical symptomsⁱⁱⁱ. However, these individuals can still shed norovirus and can be potential sources of contamination.

Investigations of foodborne norovirus outbreaks have implicated multiple food items, including oysters, salads, sandwiches, cakes, frosting, raspberries, drinking water, and ice^{iv}. The risk for contamination is increased with ready to eat foods (food items consumed without further cooking) and when a semi-liquid food such as cake frosting is contaminated, the potential to infect many individuals is possible^v.

The only two food items that were statistically associated with illness, the baklava and the kartoshka, were prepared at the home of an unlicensed caterer. The rest of the meal served for lunch was prepared at two different churches with kitchen facilities. Unlicensed caterers can operate in Kansas without a license. However, according to KDA regulations they may only operate as a caterer for 6 days in a calendar year without a license. Educational materials about preparing foods for large groups were provided to the church and to the caterer.

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ⁱ Teunis PFM, Moe CL, Liu P, et al. Norwalk virus: how infectious is it? *J Med Virol* **2008**; 80:1468-76.

ⁱⁱ Atmar RL, Opekum AR, Gilger MA, et al. Norwalk virus shedding after experimental human infection. *Emerg Infect Dis* **2008**; 14:1553-1557.

ⁱⁱⁱ Moe CL. Preventing norovirus transmission: How should we handle food handlers? *Clin Infect Dis* **2009**; 48:38-40.

^{iv} CDC. Norwalk-like viruses, Public health consequences and outbreak management. *MMWR* **2001**; 50(RR09):1-18.