Outbreak of Norovirus Associated with a Dinner Banquet — Pawnee County, January 2013

Background

On January 29, 2013 at 3:10 PM, the Pawnee County Health Department (PCHD) notified Kansas Department of Health and Environment's Infectious Disease Epidemiology and Response section (KDHE) of a possible foodborne illness outbreak associated with a dinner banquet held on January 26, 2013. Attendees reported gastrointestinal symptoms following the banquet. An outbreak investigation was initiated on January 29 at 3:25 PM by staff at PCHD and KDHE to determine the cause of illness and to implement prevention and control measures.

Methods

Epidemiologic Investigation

A retrospective cohort study was conducted among individuals that attended the banquet to determine if illness was associated with any specific foods or drinks served at the banquet. A questionnaire was developed and telephone interviews were conducted by staff at the PCHD and KDHE.

A case was defined as an individual who attended the banquet on January 26, 2013 and developed diarrhea (three or more loose stools in a 24-hour period) and/or vomiting within 72 hours.

Descriptive analysis was conducted using SAS® 9.3. Relative risk (RR) and 95% confidence intervals (95% CI) were calculated, and associations between foods and drinks with subsequent illness were assessed using chi-square (P-value).

Volunteers that helped prepare and serve food items at the banquet were interviewed by telephone with a separate questionnaire to assess for illnesses, duties performed, and foods consumed.

Laboratory Analysis

Three stool specimens from three individuals were collected and submitted to the Kansas Health and Environmental Laboratories (KHEL) for testing.

Results

Epidemiologic Investigation

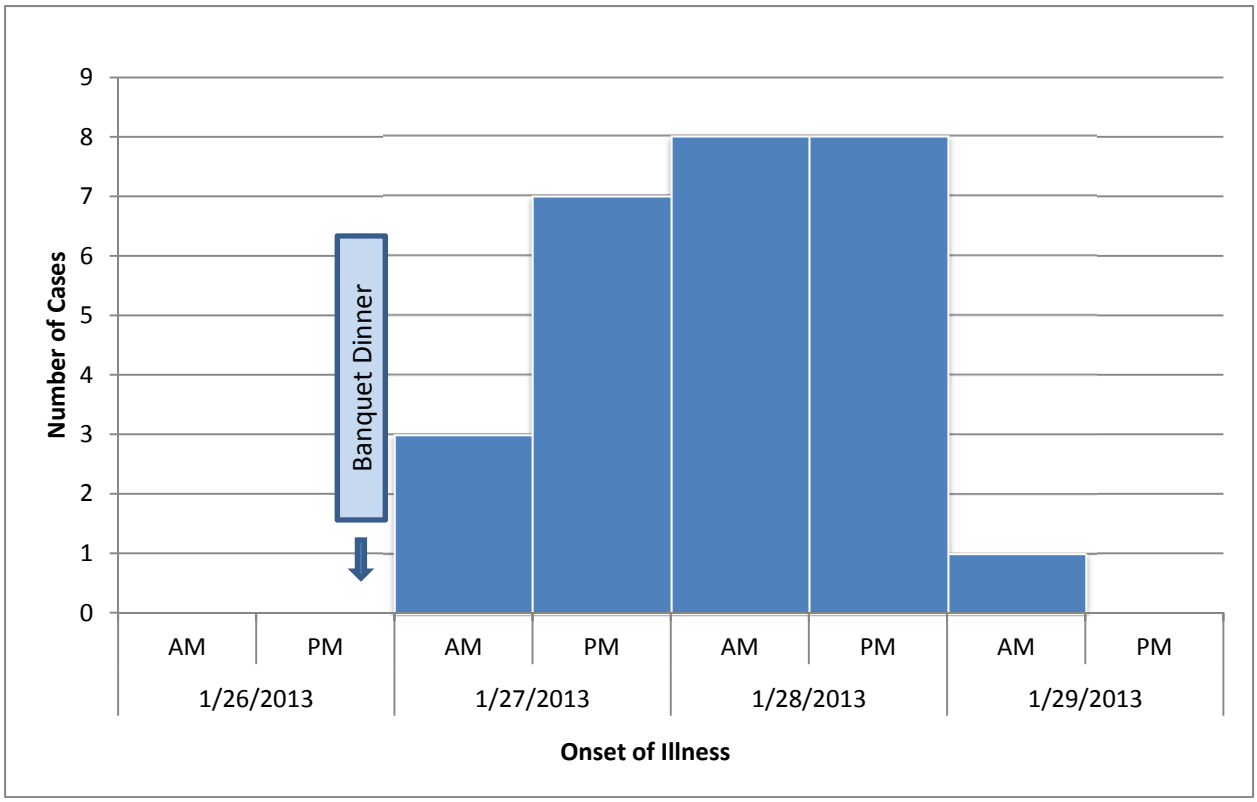
Overall, 109 of approximately 200 individuals that attended the banquet on January 26, 2013 were interviewed. Thirty-six (33%) individuals reported gastrointestinal symptoms and of those, 28 (26%) met the case definition. The predominant symptoms reported included diarrhea, nausea, and abdominal cramps. Other symptoms included muscle aches and vomiting (Table 1). Four cases visited health care providers and there was secondary transmission to a family member that did not attend the banquet. The ages of cases ranged from 17 to 83 years (median, 34 years). Seventeen (61%) cases were male.

Table 1: Symptoms Reported Among Cases (n=28)

Symptom	# of Cases	% of Cases
Diarrhea	27	96%
Nausea	24	86%
Abdominal Cramps	21	75%
Muscle Aches	20	71%
Vomiting	14	50%

Onset dates and times of illness ranged from 7:30 AM on January 27 to 6:00 AM on January 29 (Figure 1). The incubation period ranged from 12 to 58 hours (median, 34 hours). Sixteen (57%) cases had recovered by time of interview and duration of illness for those ranged from 3 to 70 hours (median, 29 hours).

Figure 1: Onset Date and Time of Illness by Number of Cases (n=27)*



**Onset date and time is unknown for one case*

Food and drink items served at the banquet were analyzed for association with illness. Consumption of a mixed drink and ice from the bar were significantly associated with illness (Table 2). All but two individuals that had a mixed drink had ice from the bar in their mixed drink. Individuals that drank water or tea were excluded from the ice variable for analysis because the water and tea were prepared and served separately from the bar.

Table 2: Exposure Information

Food Item	Relative Risk	95% Confidence Interval	P-value
Mixed Drink	*2.4*	*1.3 – 4.5*	*0.012*
Ice (from bar)	*2.7*	*1.5 – 4.8*	*0.004*
Smothered Steak	2.3	0.2 – 31.0	0.282
Mashed Potatoes	2.3	0.2 – 31.0	0.282
Brown Gravy	1.7	0.1 – 22.1	0.375
Green Beans	0.9	0.3 – 2.4	0.807
Bread	0.5	0.3 – 1.0	0.063
Butter	0.6	0.3 – 1.1	0.090
Chocolate Cake	1.1	0.6 – 2.0	0.796
Water	0.9	0.4 – 2.1	0.880
Tea	0.9	0.4 – 2.2	0.903
Beer	1.4	0.7 – 2.7	0.372

Approximately 13 volunteers helped prepare and serve food and drinks at the banquet and nine were surveyed for gastrointestinal illness, duties performed, and food consumed. No volunteers reported illness.

Laboratory Analysis

All three stool specimens that were tested by polymerase chain reaction at KHEL were positive for norovirus genogroup II.

Conclusions

This was an outbreak of norovirus associated with a dinner banquet held in Pawnee County on January 26, 2013. Twenty-eight individuals became ill with diarrhea and/or vomiting after attending the banquet.

Consuming a mixed drink and having ice in a mixed drink were significantly associated with illness. Mixed drinks were prepared by multiple bartenders, with canned soda provided as mixers. The ice used was purchased in bags from a grocery store and put into a holding container, which was then added to the individual mixed drinks. The ice may have been contaminated by bartenders via bare hand contact. It is not known if all volunteer bartenders were surveyed regarding their illness; those who were surveyed were asymptomatic.

However, some of the ill individuals at the banquet did not consume ice from the bar. Additionally, two individuals reported gastrointestinal illness prior to attending the banquet. If these individuals were shedding norovirus, transmission could have occurred through contamination of environmental surfaces.

Norovirus is a highly contagious pathogen with a very low infectious dose, estimated to be between 10-100 viral particles[i]. Transmitted primarily through fecal-oral route, norovirus particles may be spread through direct contact or through consuming fecally-contaminated food, drinks, or ice. 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 onset of clinical symptoms and can be detected for 13 to 56 days after exposure to the virus[ii]. Approximately 20% of norovirus infected individuals do not have clinical symptoms[iii]. However, these individuals can still shed norovirus and can be potential sources of contamination.

Simple prevention measures, including thorough hand washing after using the bathroom and before handling food items, and excluding volunteers with gastrointestinal illness from food handling can substantially reduce transmission of noroviruses[iv].

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