

Outbreak of Norovirus Associated with a Wedding Dinner in
Shawnee, KS – Johnson County, October 2011



Background

On October 17, 2011, at 3:00 PM, the Bureau of Epidemiology and Public Health Informatics at the Kansas Department of Health and Environment (BEPHI-KDHE) was notified of a possible foodborne illness outbreak associated with a wedding reception dinner held in Johnson County on October 14, 2011. The wedding party reported at least 30 guests had become ill with gastrointestinal symptoms within 24-48 hours following the wedding reception. The dinner and cake were catered by Hy-Vee grocery store located at 13550 W 63rd, Shawnee, KS 66216. Johnson County Health Department (JCHD) and Kansas Department of Agriculture (KDA) were notified on October 17 and along with BEPHI-KDHE an outbreak investigation was initiated to determine the cause of illness and to implement prevention and control measures.

Methods

Epidemiologic Investigation

A retrospective cohort study was conducted among all wedding reception attendees to determine if illness was associated with any specific food items served during the reception. A questionnaire was developed and interviews were conducted by staff from Johnson County Health Department.

A case was defined as an individual who ate food from the wedding reception on October 14, 2011, and subsequently developed vomiting and/or diarrhea within 72 hours.

Descriptive analysis and logistic regression was conducted using SAS[®] 9.2 to assess food exposures that were significantly associated with illness.

Laboratory Analysis

Two stool specimens were collected and submitted to the Kansas Health and Environmental Laboratories for testing.

Environmental Assessment

KDA conducted an inspection of the Hy-Vee grocery store that prepared the food for the reception on October 19, 2011. Employee surveys were distributed to all employees working in catering at Hy-Vee. On October 27, 2011, KDA conducted an inspection of the Shawnee Town Hall where the dinner was held. On November 11, 2011, JCHD staff interviewed all employees that had direct contact with the preparation of the brisket and cake with a more specific questionnaire to assess food handling procedures and illness.

Results

Epidemiologic Investigation

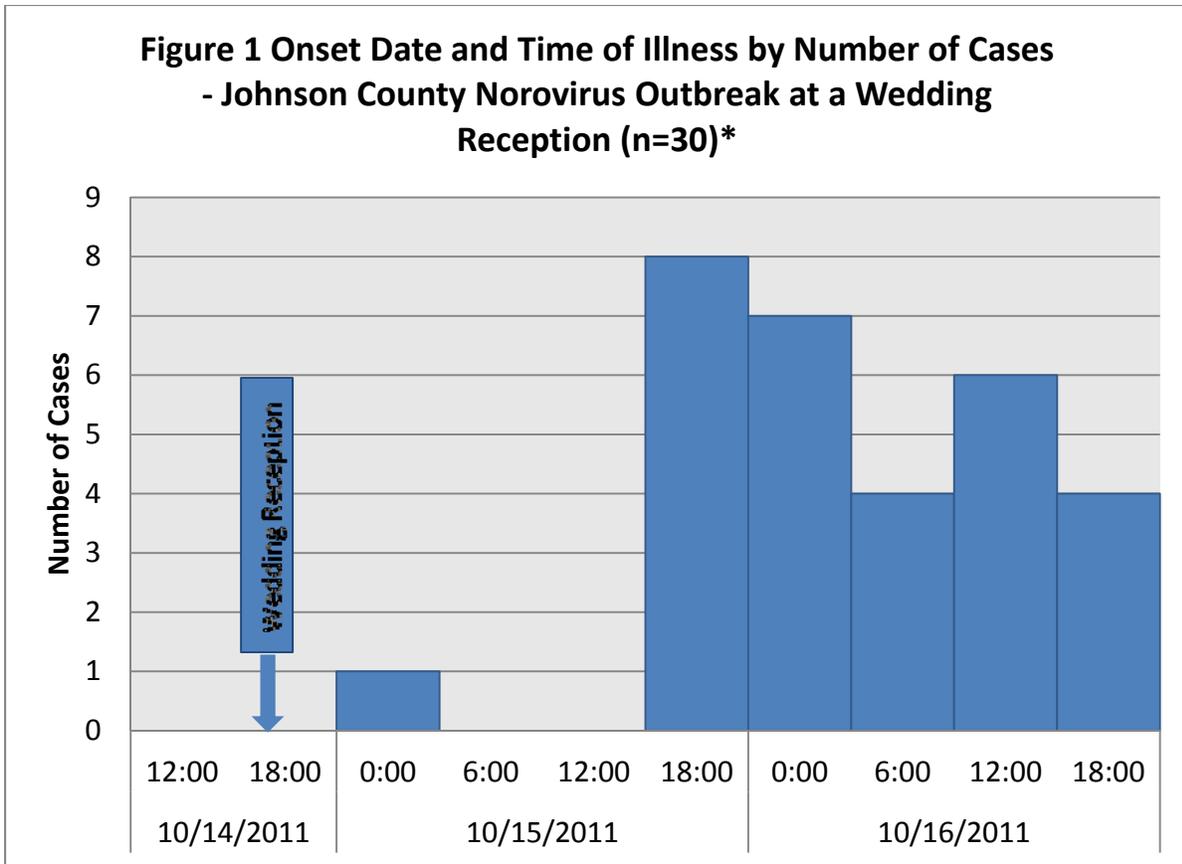
JCHD staff interviewed 43 (93%) of the 46 wedding reception guests. Of those 37 (86%) reported illness and 32 met the case definition. Age was reported by 30 ill individuals and they ranged in age from 3 – 89 years of age (median = 42 years). Sixteen (50%) were female. Twenty-five cases reside in Kansas and live in Johnson and Miami Counties. Seven cases reside outside the state of Kansas, one case each in Colorado, Illinois, and Indiana, and seven cases in Oklahoma.

Nausea was the most common symptom reported followed by diarrhea and vomiting (Table 1). Other symptoms included muscle aches, abdominal cramps, headache, and fever. Two cases reported visiting the emergency department and no one was hospitalized.

Table 1: Symptoms Reported Among Cases - Johnson County Norovirus Outbreak at a Wedding Reception, October 2011 (n=32)

Symptom	# of Cases / Total Reporting	% of Cases
Nausea	30/32	94
Diarrhea	27/32	84
Vomiting	26/32	81
Muscle Aches	23/30	77
Stomach Cramps	21/32	68
Headache	17/30	57
Fever	16/30	53

Onset dates of illness ranged from 2:00 AM on October 15 to 8:00 PM on October 16 (Figure 1). The incubation period ranged from 7 to 49 hours (median = 33 hours). By the time of interview twenty-four affected individuals had recovered (75%); eight had not recovered. The duration of illness ranged from one to five days (median = 1.5 days).



*Two onset dates are unknown.

Statistical analysis demonstrated that eating brisket (odds ratio [OR] = 27.0; 95% confidence interval [95% CI] = 2.58-282.98) and salad (odds ratio [OR] = 9.00; 95% confidence interval [95% CI] = 1.22-66.23) were both significantly associated with illness. No other food item was linked to illness (Table 2). Results from the logistic regression are shown in Table 3. Eating brisket was still significantly associated with illness while consuming salad was no longer associated with illness. Therefore, the only food item that remained significantly associated with illness was the brisket. Of the 32 guests that reported eating brisket 27 (84%) became ill.

Table 2: Exposure Information – Johnson County Norovirus Outbreak at a Wedding Reception, October 2011

Food Item	Odds Ratio	95% CI
Any Cake	0.31	0.02-6.31
Brisket	27.0	2.58-282.98
Chicken	1.00	0.16-6.42
Green Beans	2.50	0.36-17.57
Potatoes	7.00	0.76-64.61
Rolls	2.75	0.46-16.52
Salad	9.00	1.22-66.23

Table 3: Logistic Regression – Johnson County Norovirus at a Wedding Reception, October 2011

Food Item	Odds Ratio	95% CI
Brisket	23.69	2.08 - >999.999
Salad	8.18	0.76-98.34

Laboratory Analysis

The two stool specimens that were collected from reception attendees tested positive for norovirus genogroup II.

Environmental Assessment

The kitchen at Hy-vee was inspected on October 19, 2011. Four critical violations were identified: 1) Improper cooling, 2) Dirty food contact surfaces, 3) Dried food debris on utensils, and 4) Dish machine not sanitizing properly. All violations were corrected on site. Eighteen employees were surveyed and no one reported any illness. Shawnee Town Hall was inspected on October 27, 2011. No critical violations were observed during this inspection. No foods are stored between events at the Shawnee Town Hall. All coolers used to hold food during events were functioning properly.

Three employees from Hy-Vee were further interviewed to determine their duties and illness prior to the reception. The brisket was received precooked and sealed in a plastic cooking bag. The brisket was then heated to 220°F in boiling water. Once heated the plastic cooking bag is opened and the brisket was poured into the serving dish and covered with foil. There was no documented bare hand contact with the brisket during preparation. Additionally, no employee reported any illness prior to or after the event.

Conclusions

This was an outbreak of norovirus associated with a wedding reception held in Johnson County, KS. Attendees became ill within seven to 49 hours after eating dinner at the reception. One food item was significantly associated with illness, the brisket. However, no food handlers reported illness either before or after the reception and there was little opportunity for bare hand contact with the brisket prior to service at the wedding reception.

Norovirus is a highly contagious pathogen with a very low infectious dose, estimated to be between 10-100 viral particles¹. Transmitted primarily through 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 can 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.

Although the brisket was significantly associated with illness it is unlikely that the brisket became contaminated during preparation. In addition, a majority of individuals that attended the reception reported eating brisket; this could have lead to an erroneous statistically significant association between brisket and illness. No guests reported illness prior to the event; however, one individual reported illness within seven hours of the wedding reception, 16 hours prior to the onset of symptoms of other individuals that reported illness. It is not known whether this person could have been infected with norovirus during the wedding reception which might have resulted in shedding norovirus during the reception. Given the low infectious dose of norovirus (10-100 viral particles), it is likely that the brisket, other food items, or environmental surfaces could have been contaminated by either a person infected with norovirus that was not yet experiencing symptoms or someone who was asymptomatic but still infected with norovirus.

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