Norovirus Outbreak Associated with Meals on Wheels – Neosho, Allen, and Woodson Counties, January 2015

Background

On January 7, 2015 at 9:10 a.m., the Neosho County Health Department (NCHD) notified the Kansas Department of Health and Environment's Infectious Disease Epidemiology and Response Section (KDHE) of a potential foodborne illness outbreak. Initial reports indicated that eight individuals had been treated at the emergency department of a local hospital for gastrointestinal symptoms (GI) and all had eaten food from Meals on Wheels. KDHE notified the Kansas Department of Agriculture (KDA) and NCHD notified Senior Services of Southeast Kansas, Inc. (SSSEK). NCHD, KDHE, and KDA immediately began an investigation to determine the cause of illness and to implement prevention and control measures.

SSSEK oversees the Meals on Wheels program for all of Southeast Kansas, an area encompassing nine counties. Food is prepared and cooked at one of three central kitchens and then distributed to the senior meal centers. Participants in the Meals on Wheels program can receive their meal at the senior meal center or have it delivered to their home. This outbreak affected persons that received meals from Chanute, Erie, Humboldt, Iola, Moran, Neosho Falls, St. Paul, Toronto, Thayer, and Yates Center; all of these centers receive their food from the central kitchen located in Chanute. No other kitchen or meal site was affected.

Methods

Epidemiological Investigation

A retrospective case control study was conducted, and odds ratios with 95 percent confidence intervals were calculated, to assess the potential associations between illness and: 1) individual satellite meal site; 2) home versus congregate meal site; and 3) being a client versus being a Meals on Wheels staff member or volunteer. Odds ratios were considered statistically significant if their respective 95 percent confidence intervals did not contain the value of 1.0. Interviews of clients were performed by the respective county health departments while KDHE

staff interviewed the employees and volunteers from each satellite site and the central kitchen. All interviews were conducted via telephone. A standardized questionnaire was utilized to collect demographic information, clinical information, and exposure history.

For this investigation, a case was defined as diarrhea or vomiting in a person 10 to 60 hours after consuming any part of a meal served by Meals on Wheels that was prepared from the kitchen in Chanute on Monday, January 5th.

Laboratory Analysis

Stool specimens were collected from five ill persons; all specimens were sent to Kansas Health and Environmental Laboratory for testing and genotyping of norovirus and screening for enteric bacteria. Specimens positive for norovirus were sent to the Wisconsin Public Health Laboratory for sequencing.

Environmental Assessment

KDA performed a site inspection of the central kitchen in Chanute on Thursday, January 8th.

Results

Epidemiologic Investigation

A total of 488 clients were reportedly served by Meals on Wheels on January 5th and 6th. Attempts were made to contact all 488 persons. Of those, 159 individuals (32.6%) were successfully interviewed; 123 met criteria for analysis including 61 ill persons and 62 non-ill persons. Persons were excluded if they did not eat from Meals on Wheels on January 5th or January 6th or they did not meet the case definition. Reasons individuals may not have been interviewed included no phone number available, no answer, never returned call, the number was disconnected/out of service, or refusal.

Age was reported by 48 ill persons and ages ranged from 55 to 99 years (median, 72 years) and 44 were female (72.1%).

Primary symptoms included nausea, vomiting, diarrhea, and abdominal cramps (Table 1). Ten individuals sought medical care and 7 were hospitalized; there was one death potentially associated with the outbreak (Table 1).

A majority of persons became ill on January 6 (Figure 1). Incubation period ranged from 10 to 60 hours (median, 32 hours) (Figure 2). Forty-three individuals (70.5%) had recovered by the time of the interview; 23 were able to give an approximate time and date. Recovery time ranged from 1 to 6 days (median, 3 days).

Table 1: Clinical information for cases (n=61)

Symptom	*# Cases reporting*	*# Cases with information available*	*Percentage*
Nausea	54	61	89%
Diarrhea	51	60	85%
Vomiting	49	60	82%
Abdominal Cramps	30	54	56%
Headache	16	54	30%
Myalgia	13	53	25%
Fever	8	49	16%
Complication			
Saw Health Care Provider	10	59	17%
Hospitalization	7	56	13%
Death	1	61	2%

Figure 1: Number of cases by illness onset date (n=61)

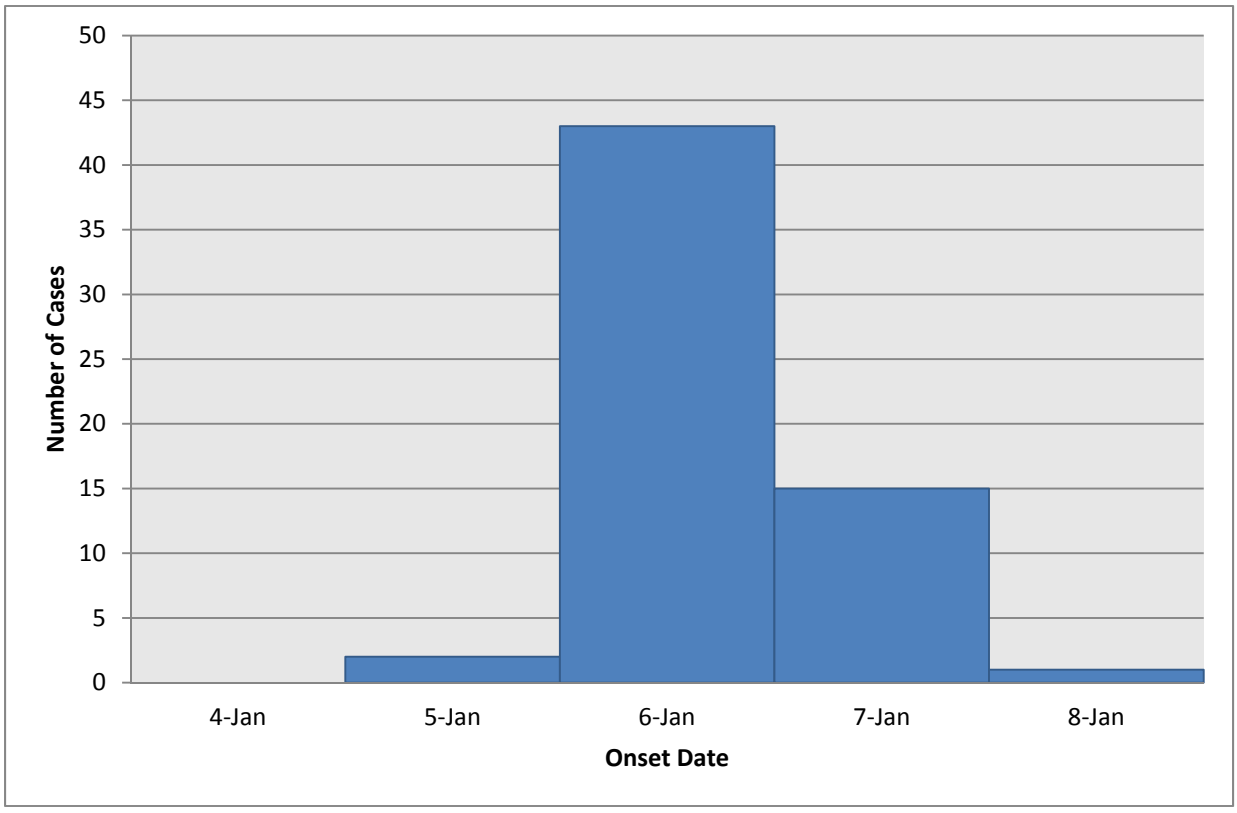
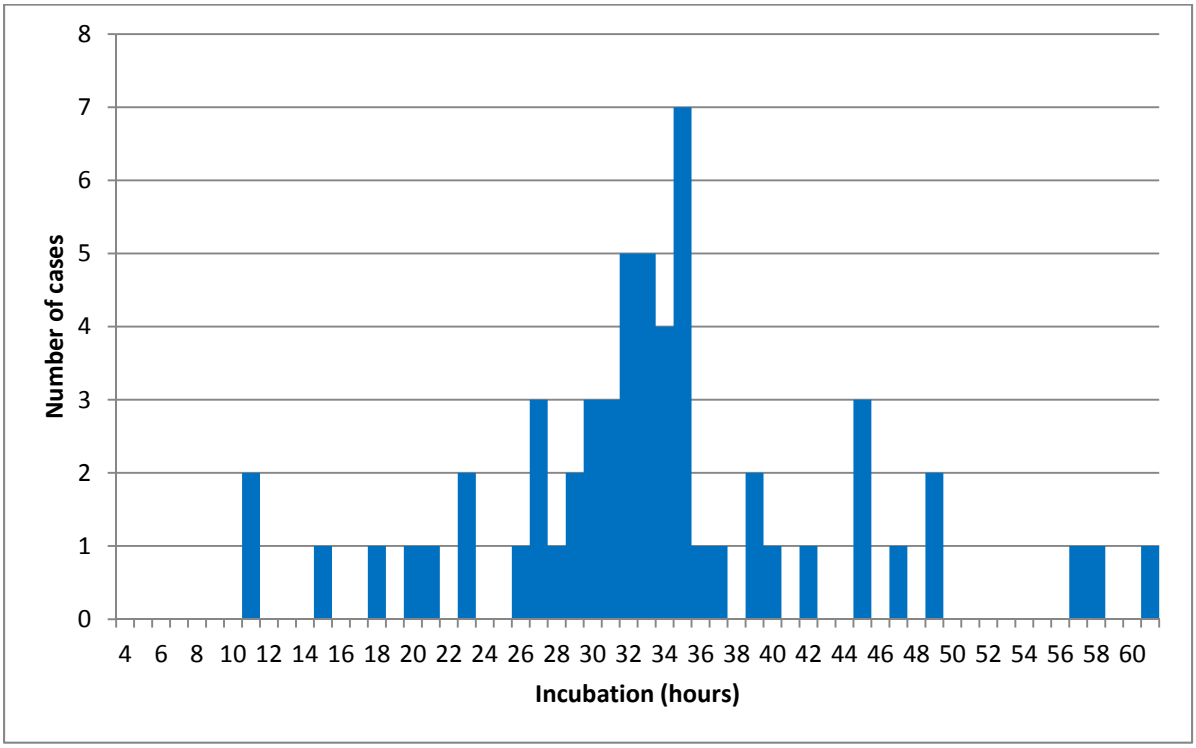


Figure 2: Incubation time of gastrointestinal illness cases (n=61)



No individual satellite location where the food was served was significantly associated with illness (Table 2). Having the food home-delivered was also not significantly associated with illness (Table 2). Clients did not have higher odds of becoming ill when compared with employees and volunteers (Table 2).

Table 2: Odds Ratios and 95% Confidence Intervals

Variable	***Odds Ratio (OR)***	***95% CI***
Site*		
Chanute	0.78	0.370 – 1.660
Erie	0.37	0.070 – 2.000
Humboldt	0.63	0.160 – 2.360
Iola	1.97	0.680 – 5.730
Moran	0.10	0.005 – 1.900
Neosho Falls	0.10	0.005 – 1.900
St Paul	0.98	0.130 – 7.200
Toronto	0.98	0.130 – 7.200
Thayer	2.60	0.480 – 13.900
Yates Center	2.10	0.490 – 8.700
Home Delivery	0.74	0.360 – 1.510
Clients	0.64	0.160 – 2.540

*Each individual site was compared to all other sites as a whole to determine ORs.

Laboratory Analysis

Stool specimens were collected from five individuals who were hospitalized. All specimens tested positive for norovirus genogroup II (GII_4_Sydney) and were negative for enteric bacteria.

Environmental Assessment

The inspection conducted by KDA noted one hand washing violation, one temperature abuse violation (cold-holding temperature), and one cross-contamination violation (raw eggs stored in contact with ready-to-eat juice boxes). All violations were corrected on site. No previously ill employees were identified during the inspection or during an interview with the kitchen manager conducted by KDHE staff.

Conclusions

This was an outbreak of norovirus associated with eating food from SSSEK Meals on Wheels program on January 5th. Clients became ill between 10 and 60 hours from eating the meal that was served or delivered on January 5th. Individual food items were not assessed for association with illness because all persons were served the same meal. No employee or volunteer that prepared food at the central kitchen in Chanute reported illness prior to and including January 5th. Norovirus genogroup II (GII_4_Sydney) was identified in all patients tested, suggesting a common source. However, there was no significant association found between consuming food prepared at the Chanute Kitchen and illness. Although the inspection did reveal a hand washing violation it is unknown whether this violation was a direct factor contributing to the norovirus outbreak.

Norovirus is the most common cause of acute gastroenteritis and foodborne disease outbreaks in the United States, causing an estimated 19-21 million illnesses and 56,000 to 71,000 hospitalizations each year[1]. Transmission can occur via person-to-person routes including fecal-oral and ingestion of aerosolized vomitus; it can also be transmitted indirectly via contaminated surfaces or fomites, or by contaminated food or water[2]. Infected food workers are frequently identified as the source of outbreaks, where contamination likely occurs via bare-handed contact with ready-to-eat foods[3]. 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 virus[4]. Approximately 20% of norovirus infected individuals do not have clinical symptoms[5]. However, these persons can still shed norovirus and can be potential sources of contamination. Prevention includes excluding ill food workers and ensuring proper hand hygiene and proper food handling practices to reduce contamination[3].

The investigation was limited by several factors. Not all clients, employees, or volunteers of the SSSEK Meals on Wheels program were interviewed. Also, separate interviews were not conducted for all reported potential secondary cases. Therefore, additional cases may exist. The clinical information collected is likely subject to recall bias, as not all participants could remember when symptom onset occurred or when symptoms resolved. Conducting the interviews in person could have improved the quality of information collected by investigators. Finally, although no statistically significant association was found between illness and individual satellite meal sites, home delivery versus congregate meal service, or being a client versus being a Meals on Wheels staff member or volunteer, small numbers involved in the analyses likely limited statistical power. Because the 95 percent confidence intervals of all of the calculated odds ratios contained the value of 1.0, statistical significance could not be determined.

This norovirus outbreak was associated with meals served to ten senior meal centers exclusively from the central kitchen in Chanute. Ill people either ate at or had food delivered from one of the ten senior meal centers that received food from the Chanute kitchen. None of the other senior meal centers served by the two other central kitchens operated by SSSEK reported any illnesses. All central kitchens operated by SSSEK receive their food from the same distributor. Thus, the likely source of this outbreak was at the Chanute central kitchen. An unidentified ill food handler or a person who was asymptomatically shedding the virus may have been the source for this outbreak. Educational materials on prevention of foodborne illnesses and proper food handling were distributed to the facility by the KDA during the food inspection.

Citations:

[1]Centers for Disease Control and Prevention. *Norovirus.* Accessed January 2015 at http://www.cdc.gov/norovirus/about/overview.html
[2]Hall AJ, Vinje J, Lopman B, Park GW, Yen C, Gregoricus N, et al. (2011). Updated Norovirus outbreak management and disease prevention guidelines. *MMWR* 60(RR03):1-15.
[3]Centers for Disease Control and Prevention. *Norovirus.* Accessed January 2015 at http://www.cdc.gov/norovirus/about/transmission.html
[4]Atmar RL, Opekum AR, Gilger MA, et al. Norwalk virus shedding after experimental human infection. Emerg Iinfect Dis **2008**; 14:1553-1557.
[5]Moe CL. Preventing norovirus transmission: How should we handle food handlers? Clin Infect Dis 2009; 48:38-40.

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