

Outbreak of Norovirus Associated with a School Potluck Barbeque — McPherson, August 2013



Background

On August 14, 2013, the McPherson County Health Department (MCHD) received an inquiry from local media regarding a school postponing the start of the school year due to a large number of ill students. After contacting the school, MCHD notified the Kansas Department of Health and Environment's Infectious Disease Epidemiology and Response section (KDHE) at 12:25 PM of a possible foodborne illness outbreak associated with a school potluck barbeque held on August 11, 2013. Attendees reported gastrointestinal symptoms following the barbeque. An outbreak investigation was initiated on August 14 at 12:50 PM by staff at MCHD 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 potluck barbeque to determine if any foods or drinks were associated with illness. An exposure was defined as any individual that attended the barbeque. An online survey was developed and distributed via email to obtain attendees' demographic information, symptom history, and food history. This potluck was a school-wide event for students, staff members, and their families, and all attendees were asked to bring food items to share. There was no record of each food item served and no record of who prepared each item; therefore, only food items provided by the school were assessed.

A case was defined as an individual who attended the barbeque on August 11, 2013 and developed diarrhea (three or more loose stools in a 24-hour period) or vomiting within 12 to 72 hours. Individuals who reported onset of diarrhea or vomiting after 72 hours following the barbeque were classified as secondary cases.

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).

Individuals that prepared food items provided by the school for the barbeque completed an online survey 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

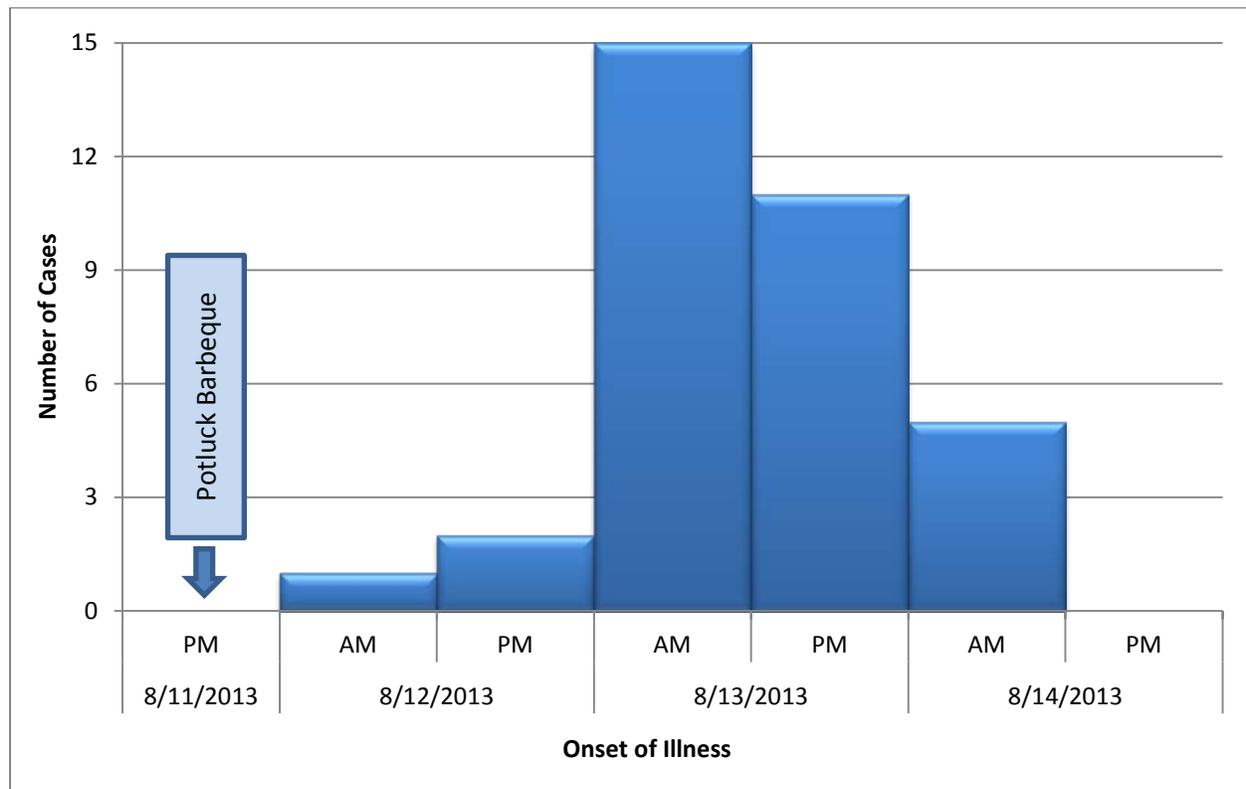
Overall, 91 (63%) of the 145 individuals that completed the online survey attended the potluck barbeque. Forty-two (46%) individuals reported gastrointestinal symptoms and of those, 34 (37%) met the case definition. Three were classified as secondary cases. The predominant symptoms included abdominal cramps, nausea, and vomiting. Other symptoms included diarrhea and muscle aches (Table 1). One case reported visiting a health care provider. The ages of cases ranged from 0 to 50 years (median, 15 years). Eighteen (53%) cases were female and 16 (47%) cases were male. Three individuals were classified as secondary cases.

Table 1: Symptoms Reported Among Cases (n=34)

Symptom	# of Cases	% of Cases
Abdominal Cramps	30/33	91%
Nausea	30/33	91%
Vomiting	25/33	76%
Diarrhea	23/32	72%
Muscle Aches	19/29	66%

Onset dates and times of illness ranged from 8:00 AM on August 12 to 10:00 AM on August 14 (Figure 1). The incubation period ranged from 13 to 64 hours (median, 40 hours). Thirty-two (94%) cases had recovered by time of interview and duration of illness for those cases ranged from 2 to 64 hours (median, 26 hours).

Figure 1: Onset Date and Time of Illness Among Cases- Outbreak of Norovirus Associated with a School Potluck Barbeque, McPherson County, August 2013 (n=34)



Food and drink items provided by the school at the potluck barbeque were analyzed for association with illness. Consumption of lemonade was significantly associated with illness (Table 2).

Table 2: Exposure Information

Food Item	Relative Risk	95% Confidence Interval	P-value
<i>Lemonade</i>	<i>2.1</i>	<i>1.0 – 4.3</i>	<i>0.027</i>
Hot Dog	1.2	0.5 – 2.5	0.689
Hot Dog Bun	1.3	0.6 – 2.6	0.497
Ketchup	0.7	0.4 – 1.2	0.220
Mustard	1.1	0.6 – 2.0	0.862
Water	0.8	0.4 – 1.5	0.524

Of the individuals that helped prepare and serve food and drinks provided by the school at the barbeque, no one reported illness prior to or during the barbeque, but one individual reported illness after the barbeque.

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 school potluck barbeque held in McPherson County on August 11, 2013. The school did not have a comprehensive list of attendees, so all staff members, students, and their families were asked to complete a survey. Of the respondents to the survey, 34 individuals became ill with diarrhea or vomiting after attending the barbeque. Three individuals were classified as secondary cases, as their incubation times were greater than 72 hours.

Drinking lemonade was significantly associated with illness. The lemonade was provided in a central dispenser and attendees filled their own cups. None of the individuals that reported preparing the lemonade were ill prior to the barbeque. However, it is not known whether all the individuals that helped prepare the lemonade completed the survey. One attendee reported consuming lemonade and became ill shortly after the barbeque; therefore, this person may have been shedding norovirus at the time of the barbeque and may have contaminated the lemonade dispenser.

There were no designated servers for food items brought by the attendees so the attendees served themselves. As a result, most of the attendees came into contact with all the different dishes/utensils. Given the low infectious dose of norovirus, it is possible that various environmental surfaces, including these dishes/utensils could have been contaminated with norovirus either by ill individuals or those infected but asymptomatic.

There were several limitations in this investigation. All food items that were served at the potluck were not assessed for association with illness. Additionally, not all individuals that attended the potluck filled out surveys and this could have affected the statistically significant association with lemonade or other food items.

Norovirus is a highly contagious pathogen with a very low infectious dose, estimated to be between 10-100 viral particlesⁱ. Transmitted primarily through fecal-oral route, norovirus particles may be spread through direct contact or through consuming fecally-contaminated food or drinks. 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 virusⁱⁱ. Approximately 20% of individuals infected with norovirus do not have clinical symptomsⁱⁱⁱ. 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 individuals with gastrointestinal illness from food handling can substantially reduce transmission of norovirus^{iv}.

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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} Centers for Disease Control and Prevention. "Norovirus: Technical Fact Sheet", Accessed on January 20, 2012 at: <http://www.cdc.gov/ncidod/dvrd/revb/gastro/norovirus-factsheet.htm>.