

**Outbreak Gastrointestinal Illness Associated with Attendance at a
Conference -- Overland Park, August 2008:
Final Report**



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Background

On August 11, 2008, the Kansas Department of Health and Environment (KDHE), Office of Surveillance and Epidemiology (OSE) was notified by KDHE, Bureau of Consumer Health that six individuals reported becoming ill with gastrointestinal symptoms either during or immediately following a conference that was held on August 5 – August 7 at the Overland Park Convention Center, 6000 College Blvd., Overland Park, KS. Johnson County Health Department was notified on August 11, 2008 and, in conjunction with KDHE-OSE, began an outbreak investigation to determine the source of illness and to implement appropriate control measures.

Methods

Epidemiologic

Staff from OSE conducted preliminary interviews with individuals who initially reported becoming ill during or shortly after the conference was held. A retrospective cohort study was conducted to determine if illness was associated with one of the following: consuming a specific food item served at the conference, staying at one of several hotels being used for the conference, or consuming food from other food establishments during the conference. Because participant e-mails were provided by the conference organizers, an online questionnaire was developed and launched using Perseus Survey Solutions 7.

A case was defined as an individual who attended the conference on August 5 – August 7, 2008 and became ill with vomiting or diarrhea (three or more loose stools within a 24-hour period) either during or after the conference.

Completed questionnaires were imported into Microsoft® Office Excel 2003 and analyzed using SAS® 9.1.3 by OSE. Aggregate descriptive analyses were performed and risk ratios (RR) and 95% confidence intervals (CI) were calculated to assess the association between potential risk factors and subsequent illness.

Laboratory

Stool specimens were collected from three ill conference participants. The Kansas Health and Environmental Laboratories (KHEL) tested all specimens for norovirus and for enteric pathogenic bacteria. Specimens were then sent to the Minnesota Department of Health Public Health Laboratory (MDPHPL) for additional norovirus testing, bacterial toxin testing, and bacterial culture.

Environment

An inspection of the facility was conducted by the Johnson County Environmental Department on August 13. A self-administered questionnaire was distributed to all employees at the facility to assess illness, work history, and food consumption history.

Results

Epidemiologic

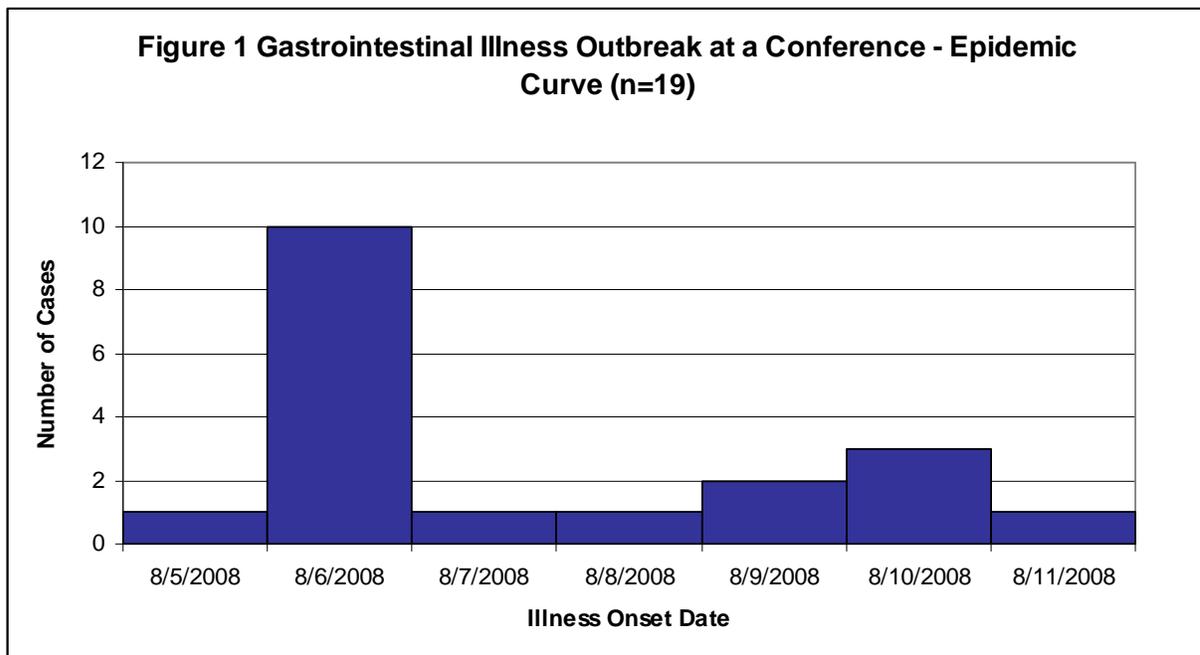
A total of 187 (63%) of the 296 conference participants for whom an e-mail address was known responded to the survey. Twenty-three (12%) respondents reported gastrointestinal illness. Of those reporting illness, 19 (83%) met the case definition. The 19 ill individuals represented 15 different organizations from Kansas and Missouri.

Symptom information is reported in Table 1. Diarrhea was the most common symptom, followed by abdominal cramps, and nausea. Two people reported vomiting and one person reported having bloody diarrhea. No one sought medical care for their illness and no one was hospitalized. Ages of cases ranged from 27 - 64 years (median = 43 years), and 13 of the cases were female (68%).

Table 1: Clinical Information of Cases (n=19)

Symptoms	# with symptom / # of respondent (%)
Diarrhea	18/19 (95%)
Abdominal Cramps	13/17 (76%)
Nausea	9/14 (64%)
Headache	7/14 (50%)
Muscle Aches	5/13 (38%)
Fever	3/12 (25%)

Figure 1 shows that onset dates of illness ranged from August 5 – August 11, with a majority of individuals reporting illness onset on August 6.



The analysis conducted did not identify any statistically significant associations between common exposures and illness among the attendees. No specific hotel was statistically associated with illness (p-

value = 0.55). No food establishments at which attendees ate for lunch (p-value =0.72) or for dinner on August 5 (p-value =0.78) were associated with illness. No meal or specific food item served during the conference was statistically associated with illness; therefore, the possible food vehicle that caused this outbreak could not be identified (Table 2). The only commonality among cases was attendance at the conference.

Table 2: Exposure Information

Meal or Snack	Relative Risk	95% Confidence Interval
Tuesday Afternoon Break	1.02	0.92-1.13
Wednesday Breakfast	2.05	0.71-5.92
Wednesday Morning Break	1.92	0.47-7.91
Wednesday Lunch	4.04	0.56-29.21
Wednesday Afternoon Break	3.80	0.53-27.38

Because no single exposure or food item was identified, the incubation period was not calculated.

Laboratory

One of the three stool specimens tested positive for norovirus genogroup II by polymerase chain reaction (PCR) at KHEL. The other two specimens tested negative for norovirus at both KHEL and MDPHL; however, these specimens were collected five and six days after the onset of illness. All three specimens were negative for *Salmonella*, Shiga-toxin producing *Escherichia coli*, and *Shigella* at KDHEL. *Bacillus cereus*, *Staphylococcus aureus*, and *Clostridium perfringens* toxin testing conducted at MDPHL were also negative for the three specimens.

Environment

The Johnson County Environmental Department conducted an inspection of the main kitchen at the conference center on August 13. Four critical violations were observed during the inspection: 1) date marking - several food items were not dated; 2) date marking disposition - chicken breast and cubed ham were out of date; 3) toxic items stored improperly - cleaners and butane were stored on food preparation tables; and 4) cross contamination - raw poultry was stored over pasteurized eggs. All violations were corrected onsite. No employees reported illness prior to, during, or after the conference.

Discussion

This was an outbreak of a gastrointestinal illness associated with attendance at a conference. The epidemiologic and clinical data collected for this outbreak are consistent with a point-source outbreak. A majority of individuals who became ill had onset dates of illness on August 6, which was one day after the beginning of the conference. Human clinical specimens were collected, and one specimen tested positive for norovirus genogroup II. The two other specimens tested negative for norovirus, but these specimens were collected after both individuals had recovered. This finding may be explained by research, which

indicates that viral excretion of norovirus in stool is greatest during the acute phase of illness, and delays in specimen collection can result in negative test results¹.

Statistical analysis of the data did not implicate a specific risk factor or food vehicle as the source of the outbreak. The small number of ill persons and recall bias may account for the difficulty in identifying a source. Person-to-person transmission is also a plausible explanation, especially considering the slight increase in illness observed two and three days after the conference ended. Though four critical violations were noted during the environmental assessment, none of them were likely to contribute to the norovirus infections.

The symptoms reported for this outbreak are consistent with norovirus gastroenteritis. Because asymptomatic shedding of norovirus in stool can occur among some infected persons, the virus could have been spread through food items that were handled by an asymptomatic employee or conference participant. Illness likely continued throughout the conference through a combination of person-to person contact, foodborne transmission, and contact with contaminated environmental surfaces.

Noroviruses are the most common cause of gastroenteritis in the United States, with an estimated 23 million cases occurring annually. Forty percent of these infections may be attributed to foodborne transmission². Onset of diarrhea and vomiting can occur 10-50 hours after infection and may last from 12 to 60 hours. The primary route of transmission for noroviruses is fecal-oral, including consumption of fecally contaminated food or water, direct person-to-person contact, and contact with environmental surfaces. Investigations of norovirus outbreaks have suggested that infection may also be spread through inhalation of aerosolized vomitus³.

Outbreaks attributed to noroviruses have numerous characteristics that facilitate their spread, including the low dose required for infection (<10 viral particles); prolonged, asymptomatic shedding that can occur in some infected persons; environmental stability of the virus; and lack of lasting immunity in persons who have been infected previously¹.

Relatively simple measures, such as correct handling of ready to eat foods, thorough hand washing after using the bathroom and before handling food items, and proper environmental disinfection, can substantially reduce the transmission of noroviruses in public settings.

References

1. CDC, National Center for Infectious Diseases, 2001, Norwalk-Like Viruses: Public Health Consequences and Outbreak Management, MMWR, 50(RR09):1-18.
2. Mead PS, Slutsker L, Dietz V, et al. Food-related illness and death in the United States. *Emerg Infect Dis* 1999;5:607--25.
3. Marks PJ, Vipond IB, Carlisle D, Deakin D, Fey RE, Caul EO. Evidence for airborne transmission of Norwalk-like virus (NLV) in a hotel restaurant. *Epidemiol Infect* 2000;124:481-7.

Attachments

Appendix A - Environmental Conference - Overland Park, KS August 2008 Questionnaire
Appendix B - Food Service Establishment Inspection Report

Acknowledgements

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Our Vision and Mission

As the state's environmental protection and public health agency, KDHE promotes responsible choices to protect the health and environment for all Kansans.

Through education, direct services, and the assessment of data and trends, coupled with policy development and enforcement, KDHE will improve health and quality of life. We prevent injuries, illness, and foster a safe and sustainable environment for the people of Kansas.

APPENDIX A

Environmental Conference - Overland Park, KS August 2008

The Kansas Department of Health and Environment and the Johnson County Health Department are investigating reports of illness among attendees at the 2008 Kansas Environmental Conference held in Overland Park, KS on August 5 - 7, 2008. To determine the cause of illness, it is important for us to get information from those who became ill as well as those that did **NOT** become ill. The survey will take about 5 to 10 minutes. All information will be kept strictly confidential.

1. Name:

Last: _____ First: _____

2. Contact Information:

Phone _____

Email Address _____

City _____

County _____

State _____

3. What organization are you with?

Organization name: _____

4. Sex:

Male

Female

5. Age:

Years: _____

6. What hotel did you stay at during the conference?

Holiday Inn - Nall Ave

Chase Suites - West 110th

Marriott - Woodson St

Hilton Garden Inn - College Blvd

Did not stay at a hotel.

Other, Specify _____

7. What date did you check in?

Month: _____ Date: _____

8. What date did you check out?

Month: _____ Date: _____

9. Where did you eat dinner on Monday, August 4?

Name of Location/Restaurant _____

10. Where did you eat breakfast on Tuesday, August 5?

Name of Location/Restaurant _____

11. Where did you eat lunch on Tuesday, August 5?

Name of Location/Restaurant _____

12. Did you eat or drink any foods that were served during the afternoon break on Tuesday, August 5.

- Yes [if yes, go to question 13]
- No [if no, go to question 14]

13. Please mark whether you ate or didn't eat each individual food and drink item that was served during the afternoon break on Tuesday, August 5 [go to question 14]

- Frozen Vanilla Custard Yes
- Strawberries No
- Hot Fudge Can't Remember
- Chopped Walnuts
- Whipped Cream
- Coffee
- Decaffeinated Coffee
- Hot Tea
- Iced Tea
- Water

14. Where did you eat dinner on Tuesday, August 5?

Name of Location/Restaurant _____

15. Did you eat the continental breakfast that was served at the conference on Wednesday, August 6?

- Yes [if yes, go to question 16]
- No [if no, go to question 17]

16. Please mark whether you ate or didn't eat each individual food and drink item that was served for breakfast on Wednesday, August 6.

- Sliced Fresh Fruit Sampler Yes
- Mini Muffins No
- Mini Danish Can't Remember
- Bagel
- Cream Cheese
- Coffee
- Decaffeinated Coffee
- Hot Tea
- Fruit Juice
- Water

17. Where did you eat breakfast on Wednesday, August 6?

Name of Location/Restaurant _____

18. Did you eat or drink items that were served during the morning break on Wednesday, August 6?

- Yes [if yes, go to question 19]
- No [if no, go to question 20]

19. Please mark whether you ate or didn't eat each individual food and drink item that was served during the morning break on Wednesday, August 6.

- Granola Bar Yes
- Whole Fruit No
- Soda Can't Remember
- Coffee
- Decaffeinated Coffee
- Hot Tea
- Water

20. Did you eat or drink items that were served for lunch on Wednesday, August 6?

- Yes [if yes, go to question 21]
- No [if no, go to question 22]

21. Please mark whether you ate or didn't eat each individual food and drink item that was served for lunch on Wednesday, August 6.

- Roasted Pork Loin Yes
- Vegetarian Meal No
- Gluten Free Meal Can't Remember
- Kosher Meal
- Garden Salad
- Ranch Dressing
- Balsamic Vinaigrette
- Sweet Mashed Potatoes
- Seasoned Vegetables
- Rolls
- Butter
- New York Style Cheesecake with Raspberry Sauce
- Coffee
- Decaffeinated Coffee
- IceTea
- Water

22. Where did you eat lunch on Wednesday, August 6?

Name of Location/Restaurant _____

23. Did you eat or drink items that were served during the afternoon break on Wednesday, August 6?

- Yes [if yes, go to question 24]
- No [if no, go to question 25]

24. Please mark whether you ate or didn't eat each individual food and drink item that was served for afternoon break on Wednesday, August 6.

- Cookies Yes
- Brownies No
- Tortilla Chips Can't Remember
- Picante Sauce
- Rotel Dip
- Soda
- Coffee
- Decaffeinated Coffee
- Hot Tea
- Water

25. Did you eat or drink items that were served during the evening reception on Wednesday, August 6?

- Yes [if yes, go to question 26]
- No [if no, go to question 27]

26. Please mark whether you ate or didn't eat each individual food item that was served for the reception on Wednesday evening, August 6 [go to question 27].

- Chicken Satay Yes
- Beef Satay No
- Thai Peanut Dipping Sauce Can't Remember
- Sweet Chile Garlic Sauce
- BBQ Meatballs
- Italian Meatballs
- Swedish Meatballs
- Quiche Lorraine
- Spinach with Swiss Cheese and Garden
- Vegetable Quiche
- Fruits
- Berries
- Strawberry Yogurt Sauce
- Cheese
- Crackers

27. Where did you eat dinner on Wednesday, August 6

Name of Location/Restaurant _____

28. Did you eat the breakfast that was served at the conference on Thursday, August 7?

- Yes [if yes, go to question 29]
- No [if no, go to question 32]

29. Please mark whether you ate or didn't eat each individual food and drink item that was served for breakfast on Thursday, August 7.

- Sausage Yes
- Bacon No
- Potatoes O'Brien Can't Remember
- Fruit
- Biscuits
- Gravy
- Cinnamon Rolls
- Fruit Danish
- Orange Juice
- Coffee
- Decaffeinated Coffee
- Hot Tea
- Water

30. Did you have an omelet for breakfast on Thursday, August 7?

- Yes [If yes please go to question 31]
- No [if no, please go to question 32]
- Can't Remember

31. Please mark each ingredient you had or didn't have on your omelet?

- Ham Yes
- Bacon No
- Sausage Can't Remember
- Red Peppers
- Green Peppers
- Mushrooms
- Scallions
- Tomato
- Salsa
- Cheddar Cheese

32. Where did you eat breakfast on Thursday, August 7?

Name of Location/Restaurant _____

33. Did you eat the lunch that was served at the conference on Thursday, August 7?

- Yes [If yes please go to question 34]
- No [if no, please go to question 35]
- Can't Remember

34. Please mark whether you ate or didn't eat each individual food and drink item that was served for lunch on Thursday, August 7.

- Pecan Crusted Chicken Yes
- Vegetarian Meal No

Kosher Meal
Garden Salad
Ranch Dressing
Raspberry Vinaigrette
Green Rice
Vegetable Medley
Roll
Butter
Carrot Cake
Coffee
Decaffeinated Coffee
Ice Tea
Water

Can't Remember

35. Where did you eat lunch on Thursday, August 7?

Name of Location/Restaurant _____

36. Have you been ill with gastrointestinal symptoms since Tuesday, August 5?

- Yes
- No (If no go to question 48)

37. When did you start feeling ill?

Month: _____ Date: _____

Time: _____

38. What was your first symptom?

Symptom: _____

39. Did you have any of the following symptoms?

- Nausea Yes
- Vomiting No
- Stomach cramps Don't Know
- Diarrhea (3 or more loose stools in a 24 hour period)
- Bloody diarrhea
- Headache
- Muscle Aches
- Fever

40. If you answered yes to fever, what was your highest temperature?

Temperature: _____

41. Please indicate any other symptoms:

42. Did you see a doctor for this illness?

- Yes
- No

43. If yes, provide the name and phone number:

Name: _____

Phone Number: _____

44. Were you hospitalized?

- Yes If yes, where? _____
- No

45. Was a stool specimen collected?

- Yes
- No

46. Are you still ill?

- Yes
- No

47. If no, when did you recover?

Month: _____ Date: _____

Time: _____

48. Do you have other comments or information you would like to share?

Thank you for completing the survey.

APPENDIX B

