

# Memphis and Shelby County Health Department

## EPIDEMIOLOGY SECTION

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### Memphis and Shelby County Health Department

Outbreak of norovirus associated with food consumption at 2010 National Association of County and City Health Officials (NACCHO), July 2010

#### **Background**

The Memphis and Shelby County Health Department (MSCHD) conducted an investigation of an outbreak of gastroenteritis among persons who consumed food prepared by Hotel B catering staff and served at the 2010 National Association of County and City Health Official (NACCHO) annual conference at the Memphis Cook Convention Center. The conference was attended by 992 NACCHO participants.

MSCHD launched an investigation after receiving reports of diarrheal disease among several persons who attended the conference between July 13, 2010 and July 16, 2010. MSCHD carried out public health response, environmental assessments and an epidemiological study following data collection.

#### **Introduction**

The Epidemiology Section of MSCHD received reports of ill 2010 NACCHO conference attendees on Monday July 19, 2010. According to reports, there were several ill conference attendees who consumed foods served at the conference starting on Wednesday July 14, 2010. The illnesses reported were gastroenteritis illnesses (GI). NACCHO officials alerted the Epidemiology Section of MSCHD of the reports they had received from conference attendees. An e-mail was sent to NACCHO on July 19, 2010 advising them to direct all illness reports to the Epidemiology Section. On the afternoon of July 19, 2010 a food-borne outbreak investigation was initiated. The State FoodNet Epidemiologist was notified of the outbreak investigation.

#### **Methods**

Cases were initially collected from email reports sent to the Epidemiology Section by way of NACCHO on July 20, 2010. By the end of the day, the epidemiology section had received over thirty illness reports. On July 21st the Epidemiology Section sent out a notification to NACCHO attendees, workers, vendors and exhibitors informing them of the potential outbreak and asking all those who attended to provide food diaries and illness status and history. The Epidemiology Section received over three hundred responses from conference attendees. The responses from the initial survey directed phase I of the public health response.

#### *Phase I*

From phase I analysis, we found 107 people who reported becoming ill as a result of consuming food at the conference. The majority of people became ill starting late July 15<sup>th</sup> and 16<sup>th</sup>. Based on temporality and qualitative data, food items prepared by Hotel B were suspected (table 1). Therefore, a gastroenteritis questionnaire developed by the Tennessee Department of Health was amended to accommodate the specific reports and elements from the 2010 NACCHO conference. This updated survey was administered to all conference attendees via a web-based survey. The questionnaire contained demographic information, symptom history, type of food consumed, stool culture results (if applicable) and clinical information regarding illness 3 days prior to July 14th.

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**Table 1. Food Establishments**

Date	Location	Source of Food	Food Served/Consumed
July 14-16, 2010	2010 NACCHO conference	Cook Convention Center	Breakfast, lunch and dinner. Food items included but not limited to soups, turkey sandwiches, roast beef, chicken, veggie wraps and sandwiches, Tortellini Vinaigrette Salad (Pasta), assorted peppers, chips, assorted fruits (some whole and some sliced), bagels, drinks such as pepsi products, bottled water, coffee, milk,

The epidemiology section also conducted interviews with the Hotel B's food handlers after reports showed conference foods as possible culprits.

### *Analytical study methods*

#### *Phase II:*

#### *Case definition and data collection:*

The case definition for the investigation was as follows: Individuals who consumed food prepared by Hotel B and served at the NACCHO conference between July 14, 2010 and July 16, 2010 and subsequently became ill with nausea, vomiting, and diarrhea with or without laboratory confirmation of exposure to norovirus.

Data was collected through a detailed web-based survey and analyses were performed.

A case-control study was conducted in this investigation because information was obtained for ill persons and non-ill persons, and exposure source was unidentified. Thus, we collected data including food and illness diaries from all ill and non-ill conference attendees.

**Inclusion criteria:** In this case control study, we included those who reported at least one of the following symptoms of diarrhea, vomiting, nausea and also reported eating food served at the NACCHO conference. Thus, we considered the following:

- Illness reported for July 14, 15, 16, 17 and 18.
- Illness had to include at least one of the following: vomiting, diarrhea, and/or nausea.
- Consumed food items 12 hours to 48 hours prior to illness.
- Recorded eating food served as part of the NACCHO conference.

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### **Laboratory Methods**

A total of eleven stool samples were obtained and tested for norovirus. Stool samples were collected from two MSCHD employees and one Hotel B employee. The stool samples from Shelby County employees who met the case definition were submitted to the Jackson Lab for analysis of norovirus. Eight ill conference attendees from Ohio, Wisconsin, North Dakota, and Michigan offered to submit stool samples to their respective state labs for testing. Results were submitted to the MSCHD's Epidemiology Section.

### **Results**

#### **Descriptive Study**

A total of 347 conference attendees responded to the web-based survey administered between July 26, 2010 and July 28, 2010. Out of the 347 responses, 91 conference attendees reported illness while 233 reported no illness. Out of the 91 ill, 78% (n=71) were included in the study. Of the 20 ill cases that were excluded, 80% did not fall within the time frame, 15% were missing information on date illness occurred, and 5% did not meet the illness symptom criteria.

Patients ranged in age from 11 years to 74 years, with a mean age of 46 years. Further demographics are presented in Table 2. The most common symptoms associated with illness are presented in Table 3. Fatigue was the most common symptom (91.5%), followed by diarrhea (87.3%), nausea (84.5%), stomach cramps (69.0%) and vomiting (62.0%).

**Table 2. Demographics of Conference attendees**

	Total (n=347)	Cases (n=71)	Controls (n=233)
Mean Age (years)	46	45	47
Age Range (years)	(11-74)	(23-70)	(23-74)
Male	107	11	78
Female	240	60	155
African American	34	3	25
White	293	66	192

Missing race data account for the gap in totals for cases, controls and overall



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The conference was attended by 992 NACCHO participants. Of that number 347 responded to the web-based survey administered between July 26<sup>th</sup> and 28<sup>th</sup>. The overall attack rate for the outbreak, based on the response we received from web-based survey was 26%. The attack rates for specific foods are displayed in Table 4. According to the results, the highest attack rate was from the tortellini vinaigrette pasta salad.

**Table 4. Food-Specific Attack Rates**

Specified Food	Number of Persons Who Ate Specified Food				Number of Persons Who Did Not Eat Specified Food			
	Ill	Well	Total	%Ill	Ill	Well	Total	%Ill
Tortellini Vinaigrette Pasta Salad	52	120	172	30.2	5	37	42	11.9
Turkey Wrap	19	52	71	26.8	24	79	103	23.3
Chicken Sandwich	24	66	90	26.7	15	79	94	16.0
Veggie Wrap	5	26	31	16.1	30	93	123	24.4
Roast Beef	10	46	56	17.9	27	78	105	25.7
Apple	24	88	112	21.4	20	60	80	25.0

Odds ratio estimates were calculated for food items consumed at the conference are shown in Table 5. Conference attendees who ate the tortellini vinaigrette pasta salad were three times as likely to have illness satisfying the case definition as compared with those who did not eat the tortellini vinaigrette pasta salad (OR 3.3). The association between consuming the tortellini vinaigrette pasta salad and ill status was statistically significant (p-value 0.016). The odds of getting ill after eating the turkey wrap, chicken sandwich, veggie wrap, roast beef sandwich and apple were not statistically significant.

**Table 5. Odds of illness by food item consumed at 2010 NACCHO Conference, July 2010**

Food Item	Cases # ate/total (%)	Control # ate/total (%)	Odds Ratio	95% Confidence Interval	P-value
Tortellini Vinaigrette Salad (Pasta)	52	120	3.2	(1.2-8.6)	0.016
Turkey Wrap	19	52	1.2	(0.6-2.4)	0.683
Chicken Sandwich	24	66	1.9	(0.9-3.9)	0.104
Veggie Wrap	5	26	0.6	(0.2-1.7)	0.326
Roast Beef	11	46	0.6	(0.3-1.4)	0.357
Apple	25	88	0.8	(0.4-1.6)	0.641

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### Clinical Laboratory Data

To date, *Norovirus* has been isolated from the stool sample of ten conference attendees residing in five states (MI, ND, WI, OH and TN) and one Hotel B kitchen worker. The eleven isolates were characterized as *Norovirus GII*. Further laboratory testing performed at the Centers for Disease Control and Prevention (CDC) National Calicivirus Laboratory found that all the stool samples clustered 100% together with GII. 4 New Orleans.

### Environmental Health Assessment

The MSCHD's Environmental Sanitation Department (ESD) conducted comprehensive inspections of the two kitchens managed by Hotel B as a result from a suspected food-borne illness outbreak associated with the NACCHO conference held at the above locations July 14-16, 2010. These kitchens will be referred to as site 1 and 2 in this report. Both sites were inspected because it was unknown which kitchen prepared the food implicated in the outbreak. The actions and subsequent results of the MSCHD's ESD are detailed in Table 6.

**Table 6. Environmental Assessment Results**

Timeline	Action	Result
July 22-23	Epidemiologic interview of food handlers at Hotel B	Seven food handlers were interviewed separately. All seven food handlers reported no illness symptoms. None of the food handlers reported knowing a sick relative or coworker during the interviews.  Of the seven food handlers, only one offered a stool sample for testing. The result on the stool sample was positive of Norovirus GII
July 22	Inspection of Site 1	A score of 56% was posted with six critical violations including: <ul style="list-style-type: none"> <li>• Improper handling and storage of raw chicken</li> <li>• Molded fruits stored in cooler</li> <li>• Improper storage of food: Foods stored in same location as cleaning supplies</li> <li>• Faulty plumbing system: 1) no available hot and cold water at mop sink, and 2) clogged drain in the mop sink</li> </ul>
July 22	Inspection of Site 2	A score of 78% was posted with two critical violations. The two violations were <ul style="list-style-type: none"> <li>• Absence of soap and paper towels at two hand sinks</li> <li>• Unsanitary cooking and food preparation equipments such as the meat slicer, tomato slicer and can opener.</li> </ul>



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		There were also several non-critical but significant violations observed.
July 30	Food preparation review of menu items	<p>No actual food preparation was observed during the review because the implicated foods were not being prepared on this particular day. The food preparation review was conducted by interviewing the facility's executive chef.</p> <p>It was found that the tortellini vinaigrette salad (pasta salad), turkey and veggie wrap were prepared a day prior to the day they were served.</p> <p>According to Hotel B, the food handler positive for Norovirus GII had no direct contact with the implicated food.</p>
August 3	Follow-up inspections conducted at Site 1	All critical violations were corrected. A score of 85% was posted.
August 3	Follow-up inspections conducted at Site 2	All critical violations were corrected. A score of 87% was posted
Future Date	Follow-up inspections/enforcement	A comprehensive inspection will be conducted at the Site 1 within 30-45 days of August 3, since the establishment failed the inspection conducted on July 22. This inspection is required by law.

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### Discussions

It was hypothesized that norovirus was the agent causing conference attendees to become ill. This was confirmed clinically from the eleven labs. Though we identified the norovirus outbreak was associated with the consumption of food items served at the 2010 NACCHO conference, we were unable to identify the contamination source for the tortellini vinaigrette pasta salad due to inability to test all food handlers for norovirus. Also, circumstances surrounding the storage, preparation and serving of foods could have contributed in the spread of the norovirus, though we are unable to scientifically determine that at this moment.

None of the food handlers interviewed reported illness, though one food handler submitted a stool sample that tested positive for norovirus GII. It is unclear whether there were any sick or asymptomatic food handlers before or during the conference period.

### Recommendations

The following recommendations were made after the investigation:

To Hotel B

- Use certified food protection managers
- Frequently train and refresh food handlers
- Monitor employee health
- Develop and implement standard operating procedures for food storage, preparation, and holding.