



***Norovirus Gastroenteritis Outbreak
Among Patrons of Buca di Beppo Restaurant
Excalibur Location – Las Vegas, Nevada
Final Report***

June 24, 2013

Public Health Investigation Report

Southern Nevada Health District
Office of Epidemiology
Las Vegas, Nevada

This report represents the findings of the Southern Nevada Health District in the investigation of a norovirus gastroenteritis outbreak among patrons of Buca di Beppo restaurant located in Las Vegas, Nevada in May, 2013.

Author

Patricia Rowley, BS, CPH
Manager, Disease Surveillance
and Vital Statistics

Contributors

Mark Bergtholdt, MPH, REHS
Supervisor
Environmental Health

Nancy Williams, MD, MPH,
Medical Epidemiologist

Acknowledgments

The staff from the following work units are gratefully acknowledged for their contributions to this investigation and for their continuing collaboration:

- The SNHD Office of Epidemiology.
- The SNHD Environmental Health.
- The Office of Public Health Preparedness.
- The Southern Nevada Public Health Laboratory and Nevada State Public Health Laboratory.
- The Southern Nevada Public Information Office.

BACKGROUND

On May 14, 2013, the Southern Nevada Health District (SNHD) received a report via the SNHD online foodborne illness reporting system of gastrointestinal (GI) illnesses in 20 of 47 local high school students and their friends, subsequent to their having eaten a group meal at Buca di Beppo Restaurant located within the Excalibur Hotel and Casino at 3850 Las Vegas Boulevard South, Las Vegas, Nevada.^a The meal was served on May 11 at 5:00 pm prior to a prom celebration at a different establishment. The majority of participants were students from a single local high school.

Review of recent foodborne illness complaints in our database identified a previous GI illness complaint from a group of four out-of-state persons, unrelated to the student group, who reported consuming food at the same Buca di Beppo during the 72 hours prior to their illnesses. This group of four dined at Buca di Beppo on May 10 at 7:30 pm. On May 14, in response to these illness reports, we initiated an epidemiological investigation. We also notified the Nevada State Health Division of the illness cluster and initiation of the investigation.

METHODS

Epidemiologic Methods

We conducted a cohort study on the student group. We attempted to administer a standardized questionnaire to all 47 ill or well students who ate at Buca di Beppo before the prom to elicit information about illness symptoms, illness in students or their contacts before the prom, illness in students who did not attend the dinner but attended the prom, foods eaten at Buca di Beppo, and whether they visited the public restroom at the Excalibur. We used Fisher's Exact test to assess for statistical associations between food or other exposures and subsequent illness.

Case Definition:

A probable case was defined as illness in a person who ate at Buca di Beppo from May 10 through 18 and developed vomiting and/or diarrhea (≥ 3 loose stools in a 24 hour period) within 72 hours of eating or an employee who worked at Buca di Beppo from May 10 through 18 and subsequently developed vomiting and/or diarrhea within 72 hours of having worked.

A confirmed case was defined as illness in a person who ate or worked at Buca di Beppo on or after May 10 and whose stool specimen tested positive for norovirus G-I.

Case Finding:

We monitored the online foodborne illness complaint system as well as complaints received via telephone and further investigated complaints naming Buca di Beppo. We obtained a list of those students and their guests who had attended the event at Buca di Beppo from their school and asked the restaurant to provide contact information of any patrons who had complained directly to the restaurant about foodborne illness, as well as for any recently ill employees. We also asked the Excalibur Hotel to provide a list of recent GI illness complaints made by hotel guests.

Laboratory Methods

The Southern Nevada Public Health Laboratory (SNPHL) analyzed stool specimens for norovirus, shiga toxin-producing *E. coli* (STEC) O157 and non-O157 as well as *Salmonella*,

^a Hereafter, "Buca di Beppo" refers to this restaurant location, unless otherwise indicated.

Shigella, *Campylobacter*, and *Yersinia enterocolitica*. We arranged for testing of out-of-state patrons at a public health lab in their state of residence. These specimens were only tested for norovirus.

Environmental Methods

On May 14, SNHD staff performed an investigation into the food processing and conducted inspection of the pantry and kitchen of Buca di Beppo. On May 16, we returned to provide the restaurant with norovirus-specific control guidance, obtain the locations of where various patrons reporting illness ate, and determine what, if any, response occurred when individuals became ill within the restaurant. We also contacted the management of the Excalibur on both days to determine the number of emetic events that had occurred in the public areas of the hotel and casino and what, if any, response occurred, going back to May 1.

Public Health Interventions

We excluded ill persons working in sensitive occupations (such as food handling) from work until 72 hours after their symptoms had subsided (the standard recommendation for people with norovirus infection).¹ Because we determined that at least two emetic events had occurred at Buca di Beppo, we instructed the restaurant to disinfect environmental surfaces, (per norovirus guidelines), report any ill employees to OOE immediately, and not allow ill employees to work until released by SNHD OOE. Because both employees and patrons used a restroom outside the restaurant, out of an abundance of caution, we instructed the management of the Excalibur to clean the public restroom nearest Buca di Beppo using disinfectants effective against norovirus. We provided norovirus education to students and faculty at the school attended by the affected students. After learning that case-patients had been sick in their hotel rooms, we contacted those two hotels to ensure that the rooms where they stayed were cleaned using disinfectants effective against norovirus. We also educated the staff at the daycare center attended by a child with illness linked to this outbreak on norovirus control and ensured that proper disinfection practices were in place to control norovirus.

RESULTS

Epidemiologic

As a result of case finding efforts and passive surveillance, we identified 41 cases of illness in restaurant patrons (29 probable cases and 12 confirmed) and 5 in Buca di Beppo employees. The ill patrons identified were from seven unrelated groups who had dined during May 10– 18. Characteristics of case-patrons are shown in Table 1.

Table 1. Characteristics of case-patrons

| <u>Characteristic</u> | <u>Case-patrons (n=46)</u> |
|-----------------------|----------------------------|
| Median age | 18* |
| Male | 16 (35%) |
| Female | 30 (65%) |

*age unknown for 9 of 46 case-patrons.

The epidemic curve is presented below (Figure) and shows a total of 46 people whose illnesses met the case definition. The peak date of illness onset was May 13. The most common symptoms experienced were vomiting and diarrhea (Table 2).

Table 2. Symptoms reported by case-attendees

| <u>Symptoms</u> | <u>Case-patrons (n=46)</u> |
|-----------------|----------------------------|
| Diarrhea | 34 (74%) |
| Vomiting | 39 (85%) |

While gathering information from an ill patron who dined on May 10, the patron reported having witnessed a child vomit at a table in Buca di Beppo near where his group was seated. Buca di Beppo management confirmed the report and advised us that an employee cleaned the area. We were unable to obtain additional details about the child's illness. Additionally, one of the employees reported having vomited in a trash can in a side station while at work on May 16. Arrows in the chart below (Figure) indicate the dates of two known emetic events in the restaurant.

Forty-seven students from the high school prom group were identified for the cohort study. Of them, we successfully interviewed a total of 36 (77%) individuals of whom 28 were ill and 8 were well. We were unable to make contact with the remaining 11 students. The study revealed no significant statistical associations with individual foods served at the restaurant or with visits to the public restroom outside the restaurant in the Excalibur. Based on results of the 36 interviews, we know that the illness attack rate within the cohort of 47 was between 60% and 83%. Interviews also revealed that one ill patron who dined at Buca di Beppo on May 11 had had contact with a household member who had been ill on May 9. This patron developed symptoms around 4 hours after having consumed the meal at Buca di Beppo.

We also received reports from the student group's school nurse of additional GI illnesses in students who had not attended the May 11 Buca di Beppo dinner. Their illness onsets were several days after the prom group's. These could have been secondary illnesses as a result of person-to-person spread. We did not contact, interview, or collect stool specimens from any of these students and did not count their illnesses in our case count.

Seven persons were excluded from working as food handlers. Of these, five were employed by Buca di Beppo and two were patrons who worked elsewhere as food-handlers. Prior to our staff instituting work exclusions, some ill employees who had called out sick had already returned to work when they started to feel better.

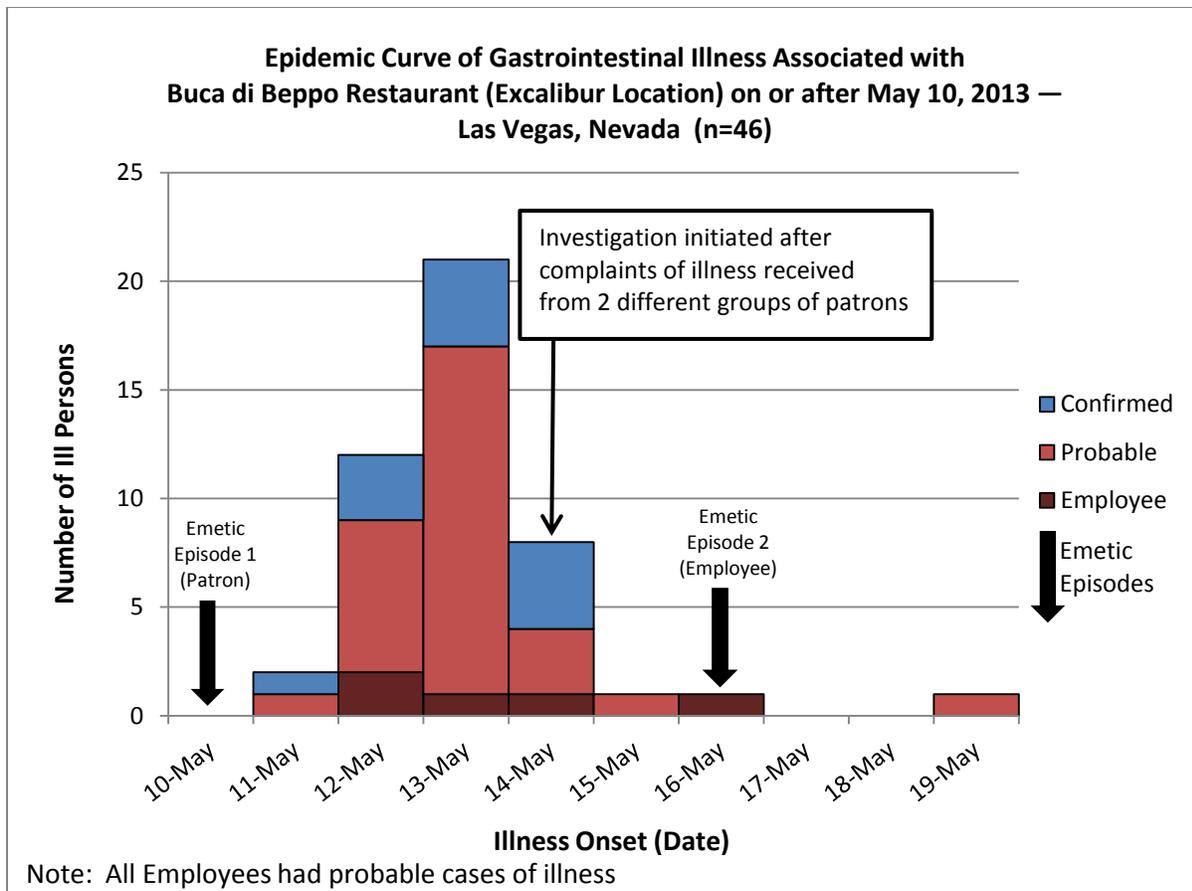


Figure. Illness Onset, Buca di Beppo GI Outbreak
Emetic Episode 1 occurred in the dining area and Emetic Episode 2 occurred away from the dining area and kitchen in the 'side station' (where computers and soda machines are located)

Laboratory

The SNPHL received and analyzed nine stool specimens from two groups. All nine were positive for norovirus G-I. These represented results from patrons who dined on May 11 and 12. An additional three specimens from a third group were submitted to an out-of-state public health laboratory and were also positive for norovirus G-I. This group dined on May 10.

Environmental

The May 14 inspections and investigation found that the kitchen and pantry were in compliance and received "A" grades. The pantry where the salads were prepared received eight demerits. The kitchen where the hot food was prepared and dishes wash received eight demerits. As is true for many restaurants, these areas are separately permitted. The remaining two permitted areas, a bar and a restaurant service bar, were not inspected because they were not involved in serving most of the ill patrons. The investigation identified no failures of critical control points that would have contributed to an outbreak of disease. During the May 16 inspection, we found that the facility was in possession of an appropriate kit to clean up emetic events but that it had not been recently used. The facility subsequently reported having had its carpets steamed cleaned and fomites^b in the restaurant appropriately disinfected.

^b A fomite is an inanimate object (such as a door knob, table surface, or menu) that can be contaminated with infectious organisms and serve in their transmission to people.

DISCUSSION

Norovirus is acknowledged as the leading cause of viral gastroenteritis, with an estimated 23 million people in the US affected annually, and is also the leading cause of foodborne illness in the US^{2,3,4}. It is common for no single food to be identified as the source of illness in norovirus outbreaks. Between 2000 and 2008, in 56% of norovirus foodborne outbreak investigations, no specific food vehicle was implicated⁴.

According to the Centers for Disease Control and Prevention (CDC), there are six recognized norovirus genogroups, three of which affect humans, G-I, G-II and G-IV. There are 25 genotypes within these three genogroups. The genogroup identified in this outbreak was G-I. No further testing was performed to determine the genotype.

The time of illness onset after exposure to the virus (incubation period) is typically 12-48 hours, and symptoms usually last 24-72 hours. Common symptoms include sudden onset of severe vomiting and diarrhea. Thus, it is not uncommon for persons with norovirus to vomit in public places, immediately exposing persons in the near vicinity. Infected individuals shed copious amounts of virus in their feces and vomitus⁴. The virus can continue to be shed even after symptoms subside⁵.

Transmission can occur through ingesting particles of vomitus that have been aerosolized or through hand contact with contaminated environmental surfaces followed by hand-to-mouth contact, or by consumption of food or beverages contaminated by vomitus or feces of infected individuals⁴. A low number of viral particles can cause illness. Prolonged viral shedding by infected persons can occur. Some people have asymptomatic infections. Also, norovirus is resistant to many common disinfectants. These factors make it very difficult to control the spread of norovirus^{4,6}.

It is unclear as to how norovirus entered Buca di Beppo. Although the public emetic event in the restaurant on May 10 is suspected, we were unable to either prove or disprove that it was the initial source of the outbreak. That ill person was not identified, which precluded our ability to classify that illness as a case of norovirus through an interview or stool-testing. However, we can conclude that at least one group of patrons and likely some employees were exposed to norovirus in the restaurant on May 10, and that other groups of patrons became infected with the same genogroup of norovirus on later dates. Based on findings of the initial lack of appropriate disinfection of environmental surfaces and employees with gastrointestinal illness working while potentially still shedding virus, subsequent groups of ill patrons and employees could have been exposed in any number of ways, including contact with contaminated environmental surfaces, exposure to ill employees or ingestion of foods contaminated with norovirus.

The cohort study did not identify specific foods associated with illness, but this does not prove that food was not a vehicle. For example, multiple food items could have become sporadically contaminated by contact with a contaminated surface or an infected employee. Statistical methods typically used to identify single food vehicles rarely yield conclusive results in norovirus outbreaks.

We included in our epidemic curve the case-patron who had had contact with an ill household member 2 days before eating at Buca di Beppo and had illness onset about 4 hours after the meal. That patron's stool testing confirmed norovirus G-I, the outbreak genogroup. It is plausible that this patron acquired the illness either from the family member or from an exposure

that occurred at the restaurant, although the incubation period was shorter than typical. We cannot know for certain whether this case was directly linked to our outbreak without further laboratory characterization and comparison with other outbreak specimens. We can conclude that this patron did not introduce norovirus into the Buca di Beppo restaurant because another group whose members reported illness had had an earlier meal date (May 10) and their stool specimens were also lab confirmed for norovirus G-I.

The report from a patron who developed symptoms of illness meeting our probable case definition after having eaten on May 17 could be an indication that the May 16 sanitization of fomites and steam-cleaning of carpeting to rid the restaurant of norovirus were either incomplete or not performed correctly. It is also possible that norovirus was reintroduced to the facility by an employee still infected with norovirus, who might or might not have had symptoms, was shedding virus, and did not perform adequate personal hygiene, especially hand-washing. Exclusion of ill persons working in sensitive occupations (such as food handling) from work until 72 hours after their symptoms have subsided is an important step in halting transmission of norovirus.

RECOMMENDATIONS

Restaurants should abide by SNHD regulations, which require food facilities to have health policies and to exclude any employee who is suffering from any gastrointestinal symptoms until symptoms resolve^{7,8}. Furthermore, specifically during norovirus outbreaks, SNHD requires abidance to CDC's recommendation for employees with norovirus infection to be excluded until 72 hours after symptoms have resolved^{1,9}. These policies should be enforced by management of the food facilities to ensure that norovirus is not transmitted from the employee to the patron or other employees. Additionally, food facility management should educate all of their staff on appropriate responses to emetic events that occur either in the dining area or the permitted area of the facility. This response should include who should be notified, who should respond and how the facility responds. The disinfectants used must be effective against norovirus or feline calicivirus and instructions on the label of the disinfectant must be followed explicitly to ensure that any norovirus present is removed.

-
- ¹ Centers for Disease Control and Prevention. Updated Norovirus Outbreak Management and Disease Prevention Guidelines. March 2011.
<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6003a1.htm>
 - ² Fankhauser RL, Monroe SS, Noel JS, Humphrey CD, Bresee JS, Parashar UD, Ando T, Glass RI. Epidemiologic and molecular trends of "Norwalk-like viruses" associated with outbreaks of gastroenteritis in the United States. *J Infect Dis* 2002; 186:1-7.
 - ³ Mead PS, Slutsker L, Dietz V. Food-related illness and death in the United States. *Emerg Infect Dis* 1999; 5:607-625.
 - ⁴ Hall, AJ, Eisenbart VG, Lehman-Etingue A, Gould HL, Lopman BA, Parashar UD. Epidemiology of Foodborne Norovirus Outbreaks, United States, 2000-2008. *Emerg Infect Dis*, 2012; 18:1566-1573.
 - ⁵ Centers for Disease Control and Prevention. Norovirus – Clinical Overview.
<http://www.cdc.gov/norovirus/hcp/clinical-overview.html>
 - ⁶ Glass RI, Parashar UD, Estes MK. Norovirus gastroenteritis. *N Engl J Med* 2009; 361:1776-1785.
 - ⁷ Southern Nevada Health District. Food Establishment Regulations. Chapter 2: Management and Personnel; Section 2-201.11(C)(3), Responsibilities and Reporting Symptoms and Diagnosis. <http://southernnevadahealthdistrict.org/food-regulations/chapter2.php#220111>.
 - ⁸ Nevada Administrative Code. NAC 441A.530(3)(d) Communicable Diseases: Foodborne Disease Outbreak. <http://www.leg.state.nv.us/nac/NAC-441A.html>.
 - ⁹ Southern Nevada Health District. Guidelines for the Prevention and Control of Norovirus in Hotel/Casinos Section 7: Dealing with Employees During Outbreaks.
<http://www.southernnevadahealthdistrict.org/download/epi/norovirus-recommendations.pdf>.