



Acute Gastroenteritis Among Attendees of a Wedding Reception at a Local Golf Course, April 2023

PUBLIC HEALTH INVESTIGATION FINAL REPORT

This report represents the findings of the Southern Nevada Health District in the investigation of an acute gastroenteritis outbreak associated with patrons who attended a wedding at a local golf course located in Clark County, Nevada on April 16, 2023.

Acknowledgments

We gratefully acknowledge the staff from the following offices and agencies for their contribution to this investigation and for their continuing collaboration.

- Office of Informatics and Epidemiology
- Office of Acute Communicable Disease Control
- Division of Environmental Health
- Office of Communications

Background:

On April 17, 2023, the Division of Disease Surveillance and Control (DSC) of the Southern Nevada Health District (SNHD) received multiple notifications of illness from the Division of Environmental Health (EH) Food Operations and the Office of Communications within SNHD. These notifications were prompted by complaints made by individuals who had attended a wedding reception held at a local golf course on April 16, 2023. The complainants reported experiencing gastrointestinal symptoms following their attendance at the wedding reception. The DSC, in collaboration with EH, launched an outbreak investigation to identify the source and determine the cause of the reported illness.

Timeline:

The following is a summary of the major events in this investigation:

- 4/17/2023: DSC was notified of gastrointestinal illnesses
- 4/18/2023: Environmental assessment at the facility
- 4/21/23: Self-reporting survey opened
- 5/1/23: Follow-up calls made to those who did not respond to survey
- 5/10/23: Survey was closed

Investigation Methods:

Environmental

An environmental assessment was conducted at the facility on April 18, 2023, with one DSC staff member and two EH staff members. The site visit included interviews with management and staff, a menu and layout review, a food flow analysis, and a comprehensive inspection of all food preparation, food storage, and food service areas including the kitchen, auxiliary freezer storage site, bar, restrooms, and buffet service area in the ballroom.

Case Investigation

DSC employed multiple methods, including reviewing SNHD's foodborne illness complaint database, conducting telephone interviews, and distributing a confidential online survey to wedding attendees. The electronic questionnaire, created using Alchemer, was distributed to all wedding attendees whose contact information was provided through a designated representative. The survey aimed to gather data on recent illnesses, consumption of specific food items during the event, and other relevant factors. Multiple attempts were made to contact attendees at different times of the day (i.e., morning and afternoon) in order to complete the survey.

Epidemiologic

To determine the possible origin of illness among individuals who attended the reception dinner, a retrospective cohort study was performed. Sick attendees were defined as individuals who met the criteria for probable cases of illness. By comparing sick and well attendees, the study aimed to identify potential sources of illness among the food or drink items consumed during the event. Descriptive statistics were used to describe reported age, gender, and gastrointestinal symptoms. A case definition was established, taking into consideration the suspected causative agent, norovirus.

Case Definitions

Probable:

A person who attended the wedding reception on April 16, 2023 at a local golf course, and within 72 hours after the consuming food or drink at the event, experienced clinical symptoms of diarrhea and/or vomiting.

Confirmed:

The specific causal agent for the observed illnesses could not be identified, and as a result, a confirmed case definition could not be established.

The majority of attendees were non-residents of Clark County and had departed Las Vegas before reports of foodborne illness were received. Consequently, the collection of stool samples for laboratory testing was not possible.

Results:

Environmental Health

SNHD EH staff conducted an environmental assessment on April 18, 2023. During the site visit, the concurrent inspection resulted in an A grade citing time and temperature control for safety foods held beyond their shelf life and chemical bottles observed without a label. No prime rib was available to inspect, however a food flow was created based on the person in charge interview to outline the prime rib preparation, cooking, and serving process. The process for preparation is as follows: prime rib is received frozen, thawed under refrigeration a few days prior to the event, marinade (with salt as the main ingredient) is added and then the food is returned to the walk-in cooler for a few days. The prime rib is then cooked at 250°F for about 2 hours with a final internal cook temperature of 120-125°F. Then it is relocated to the hot holding box for 1-2 hours with a final internal hot holding temperature of 130-135°F. Service is conducted buffet style under a heat lamp for a total of one hour.

In the interview with management, it was reported that three emetic events occurred at the facility on the night of the wedding reception. One occurred before food service around 6:30 PM, and the other two occurred at the women's restroom around 8:30 PM and 9:00 PM. There were reports of two additional emetic events on the shuttle bus leaving the event venue. Four staff members were present during the event on April 16th, and the manager stated that all four staff members consumed the food served during the event and did not experience illness.

Epidemiology

A retrospective cohort study was conducted with the wedding attendees at the local golf course with a total of 108 individuals in attendance on Sunday, April 16th, 2023. Out of the 117 responses received from the Alchemer survey, 38 were excluded from the analysis. These exclusions consisted of 28 partial responses, 2 duplicates, and 8 that did not meet the probable case definition. Among the included survey respondents, 79 (73%) were analyzed. Of those included, 51 (65%) met the probable case definition.

The median age of probable case attendees was 44 years (range: 32-74), and 21 (41%) were male (Table 1). Diarrhea was the most commonly reported symptom, affecting 50 (98%) of the probable case attendees (Table 2).

Table 1. Attendee characteristics.

Characteristic	Attendee Responses* (n=79)	Sick-Attendees*(n=51)
Median Age	44 [5-75] years	44 [32-74] years
Female	43 (54%)	30 (59%)
Male	32 (41%)	21 (41%)

*Attendees who were included in the analysis and responded to surveys demographic section.

Table 2. Symptoms reported by sick-attendees.

Symptom	Sick-attendees* (n=51)
Diarrhea	50 (98%)
Nausea	42 (82%)
Abdominal cramps	39 (76%)
Vomiting	33 (65%)
Chills	30 (51%)

*Sick attendees who were included in the analysis and responded to surveys symptom section

The median onset time of symptoms among the probable cases was 9.5 hours (range: 1-47) (Figure 1). Within the first 24 hours after self-reported dining time, 48 (94%) probable case attendees reported the onset of symptoms.

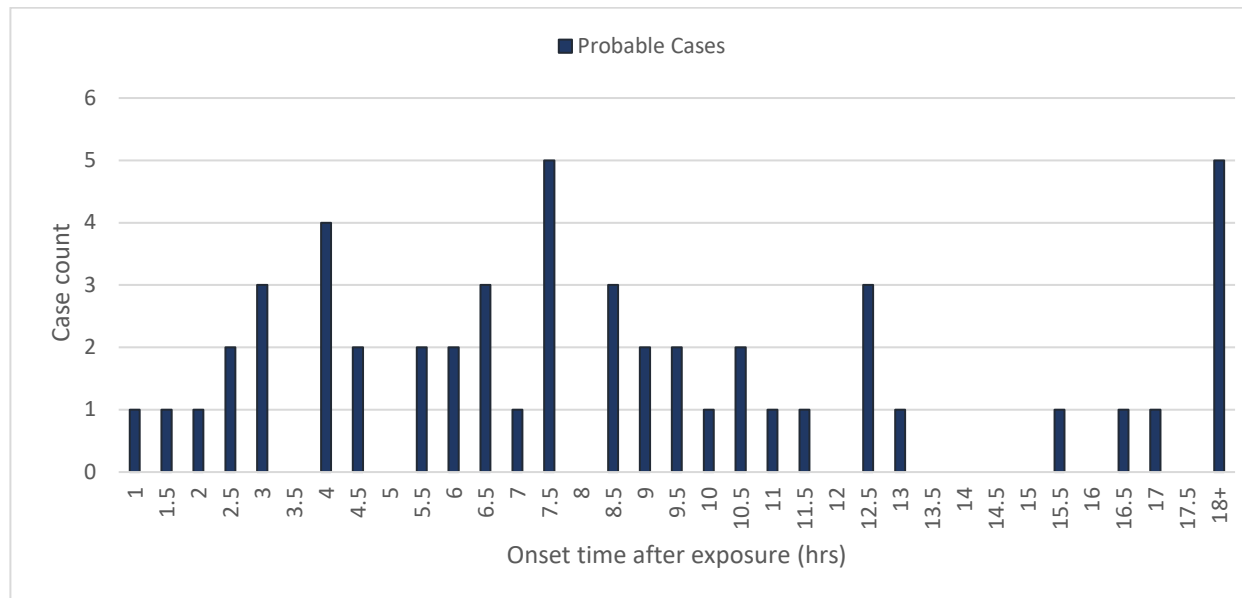


Figure 1. Self-reported symptom onset time of probable case-attendees (n=51)

The food item significantly associated with illness was the prime rib. Probable cases who consumed prime rib had greater odds (OR: 5.11, 95% CI: 1.53, 17.03) of reporting illness compared to those who did not consume prime rib from the carving station.

Table 3. Food items analyzed for association with becoming ill.

Food Item	Ate Food*		Did Not Eat Food		OR	P-value
	Ill	Not Ill	Ill	Not Ill		
Prime rib carving station (medium rare)	46	18	5	10	5.11	0.005
Mashed potato martini bar	44	19	7	9	2.98	0.053
Cake	29	10	22	18	2.37	0.074
Tiramisu	9	1	42	27	5.79	0.074
Almond jasmine rice	38	17	13	11	1.89	0.205
Beef wellington, Garlic aioli	33	14	18	14	1.83	0.206
Mediterranean bruschetta	41	19	10	9	1.94	0.215
Brownies	10	3	41	25	2.03	0.311
Seabass with a honey miso glaze	36	17	15	11	1.55	0.375
Bread rolls	29	13	22	15	1.52	0.377
Added butter to rolls	22	9	29	19	1.6	0.341
Apple tarts	7	2	44	26	2.07	0.381
Pineapple chicken skewers	17	8	34	20	1.25	0.665
Mini pies	5	2	46	26	1.41	0.692
Salad	41	22	10	6	1.12	0.848
Fresh berries	28	14	23	14	1.22	0.678
Mandarin	20	13	31	15	0.74	0.537
Oranges	11	3	40	25	2.29	0.23
Blue Cheese	23	9	28	19	1.73	0.265
Balsamic Vinaigrette	35	18	16	10	1.22	0.696
Grilled garlic butter asparagus	37	20	14	8	1.06	0.916

* Exposure (based on food reported) was used to calculate odds ratios.

Conclusion

Among (N=108) attendees of a wedding reception at the local golf course on April 16, 2023, 51 attendees experienced acute gastroenteritis. Despite extensive investigation efforts, a specific pathogen could not be identified as the causative agent for these illnesses.

In the United States, the most common cause of vomiting and diarrhea from acute gastroenteritis is norovirus¹, with symptoms that typically develop 12-48 hours after exposure. Norovirus is a highly contagious virus recognized as a leading cause of acute gastroenteritis outbreaks across all age groups in the United States¹. It is estimated to be responsible for an average of 19 to 21 million cases of acute gastroenteritis annually². Notably, even a small number of viral copies can successfully infect an individual, and infected individuals can shed billions of viral particles³. Common symptoms associated

¹ *About Norovirus*. (2023, May 10). Centers for Disease Control and Prevention. Retrieved from <https://www.cdc.gov/norovirus/about/index.html>

² *Norovirus Burden and Trends*. (2023, May 8) Centers for Disease Control and Prevention. Retrieved from <https://www.cdc.gov/norovirus/burden.html>

³ *How Norovirus Spreads*. (2023, May 10). Centers for Disease Control and Prevention. Retrieved from <https://www.cdc.gov/norovirus/about/transmission.html>

with norovirus include diarrhea, vomiting, nausea, and abdominal cramps. Typically, these symptoms appear within 12 to 48 hours after exposure, with a median incubation period of approximately 33 hours⁴. The duration of symptoms typically ranges from one to three days. Norovirus transmission can occur through direct or indirect exposure via the fecal-oral or vomitus-oral routes. Direct contact with an infected individual, touching surfaces or objects contaminated with norovirus, or consuming contaminated food or beverages can all lead to exposure.

In this investigation, the majority of symptomatic individuals reported symptom onset of less than 12 hours after eating at the reception with a median of 9.5 hours. Other causative pathogens considered included *Staphylococcus* toxin and *Bacillus cereus*. Illness associated with *Staphylococcus* toxin typically starts 1-6 hours after exposure, and many of those affected in this incident had a longer duration to symptom onset. Onset of illness from *B.cereus* is typically 6-15 hours for diarrheal disease, and more rapid (30 minutes-6 hours) for emetic illness. The majority of cases associated with this event reported emetic events with longer onset times than would be expected for illness caused by *B.cereus*. The possibility of multiple organisms being involved in this outbreak cannot be ruled out

Epidemiologic analysis identified a statistical association between consuming a food item and subsequent illness, but no additional evidence could explain this association. Notably, three individuals reported symptom onset within 2 hours of dining, and 39 individuals had onset of symptoms within 12 hours. Additionally, there was a report of one individual falling ill prior to the reception. These findings suggest the possibility of transmission occurred via person-to-person contact among a wedding attendee who was previously infected, or from a shared exposure prior to the wedding reception, rather than the event reception.

Several limitations were encountered during our investigation. First, the inability to obtain stool samples for testing hindered the identification of the specific organism responsible for the illness. Second, the epidemiologic analysis was limited by the inclusion of only 73% of attendee survey responses, resulting in a smaller sample size for the analysis of consumed foods and corresponding odds ratios. Finally, we did not have complete information on other wedding events prior to the reception that may have involved a shared exposure.

To prevent future outbreaks, the following recommendations are proposed:

1. Personal Hygiene: Emphasize the importance of proper hand hygiene, including frequent handwashing with soap and water for at least 20 seconds. Guests should be encouraged to wash their hands **before handling food**, after using the restroom, and before eating.
2. Isolating When Sick: Instruct event attendees to stay home if experiencing symptoms of illness. Consider providing a virtual option such as a live stream to make it easier for ill guests to follow the isolation protocol while still feeling included in the special event.
3. Illness Reporting: Encourage guests who experience symptoms of acute gastroenteritis, such as diarrhea and vomiting, to report their illnesses to the event staff, wedding organizers, and/or local health authorities. This information will assist in implementing necessary control measures and tracking the extent of the outbreak.

⁴ *Symptoms*. (2023, May 10). Centers for Disease Control and Prevention. Retrieved from <https://www.cdc.gov/norovirus/about/symptoms.html>

4. Venue Sanitation: Thoroughly clean and disinfect the wedding venue, paying special attention to high-touch surfaces such as doorknobs, tables, and restrooms. Use disinfectants effective against norovirus and follow manufacturer's directions on the label. Follow proper protocols for cleaning and disinfecting after a biohazard event such as a vomiting incident to prevent transmission of illness.

By isolating ill guests, emphasizing hygiene practices, and implementing appropriate control measures, the likelihood of outbreaks can be minimized, ensuring the health and safety of attendees. This investigation was closed on May 10, 2023.