



# **Norovirus Outbreak Among Wedding Reception Guests, Anthem Country Club, Henderson, Nevada, 2012**

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Public Health Investigation Report

Southern Nevada Health District  
Office of Epidemiology  
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This report represents the findings of the Southern Nevada Health District in the investigation of a gastroenteritis outbreak associated with norovirus among guests of a wedding reception at Anthem Country Club located in Henderson, Nevada.

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## **SUMMARY**

We describe an investigation of a gastroenteritis outbreak among guests of a wedding reception in November 2012 at Anthem Country Club in Henderson, Nevada. Public health investigators confirmed that the outbreak was associated with norovirus infections and that the spread of norovirus was facilitated by person-to-person transmission at the gathering. We conducted a retrospective cohort study, surveillance for additional illnesses, a facility inspection, and testing of clinical specimens. Of the 56 valid responses to the electronic survey, 26 (46%) reported illness. Univariate analysis did not statistically implicate any food item served at the reception. Norovirus genogroup II was detected in four of four stool specimens collected from ill reception guests. Survey responses indicated that at least three wedding guests were already ill with symptoms consistent with norovirus infection prior to the reception, and a reported emetic event there could have aided the spread of norovirus among guests. To prevent such outbreaks, people who are ill with gastroenteritis should avoid attending gatherings to prevent transmitting illness to others. Furthermore, emetic events that occur in public areas must be immediately and properly cleaned with disinfectants that are suitable for eliminating norovirus.

## **BACKGROUND**

On November 26, 2012, the Southern Nevada Health District (SNHD) received reports of gastrointestinal (GI) illness from guests of a wedding reception at Anthem Country Club (CC), located in Henderson, Nevada. Reception guests ate on November

24, 2012 and many people reported symptoms of diarrhea and vomiting after the reception. In response to these illness reports, the SNHD initiated an investigation.

On November 26, 2012, the SNHD initiated a retrospective cohort study, conducted surveillance for additional illnesses, performed an inspection of the Anthem CC, and collected stool specimens from ill reception guests for testing. The SNHD Office of Epidemiology (Epi), Environmental Health (EH), and the Southern Nevada Public Health Laboratory (SNPHL) collaborated on the investigation and response to this outbreak.

## **METHODS**

### ***Epidemiology***

A case was defined as illness in a person who consumed food and/or beverages at the Anthem CC wedding reception on November 24, 2012 and experienced  $\geq 3$  bouts of diarrhea and/or  $\geq 1$  episodes of vomiting within the 72-hour period following the reception (primary case definition) or the 72- to 98-hour period following the reception (secondary case definition), after eating.

We searched the SNHD foodborne illness complaint database to identify other complaints against Anthem CC in the 30 days prior to and since these complaints. We identified additional reception guests via an electronic questionnaire using SurveyMonkey<sup>®</sup> (SurveyMonkey.com). All wedding reception guests were recruited to complete the survey, which queried respondents on illness, symptoms, and specific food and drinks consumed at the gathering. A survey response was valid if it was from a

person who attended the reception, who did not experience illness beforehand, and who consumed food at the reception. Duplicate responses were removed from analyses due to conflicting answers.

Because several affected reception guests were employed at the same workplace, we also conducted surveillance for increased occurrences of GI illnesses at these guests' place of work.

Descriptive statistics (medians, ranges, and percents) were compiled to describe age, gender, gastrointestinal symptoms, duration of illness, and incubation periods. Univariate analysis (relative risk (RR) and 95% confidence intervals) was calculated for each food item served during the reception by using SAS<sup>®</sup> (Version 9.4; Cary, NC). The p-values  $\leq 0.05$  were considered significant.

### ***Environmental Health***

We determined whether Anthem CC was permitted by SNHD to hold a banquet license in Clark County, and performed an investigation of the reception facility on November 27, 2012, including interviewing employees and managers to identify if there was any ongoing illness among them. Anthem CC management was interviewed to determine if there were reports of illness among guests of other recent events held at the same facility, to determine whether staff members were recently ill with symptoms compatible with acute gastroenteritis, and to describe the methods of food preparation and service for the wedding reception.

## ***Laboratory***

Stool specimens were provided by four ill reception guests for testing. The SNPHL performed cultures for enteric pathogens (*Salmonella*, *Shigella*, *Campylobacter*, *Escherichia coli* O157 and non-O157 strains, and *Yersinia*), and enzyme immunoassay for Shiga toxin-producing *E. coli* (STEC). Norovirus (NoV) testing was done by real-time reverse transcriptase-polymerase chain reaction.

## **RESULTS**

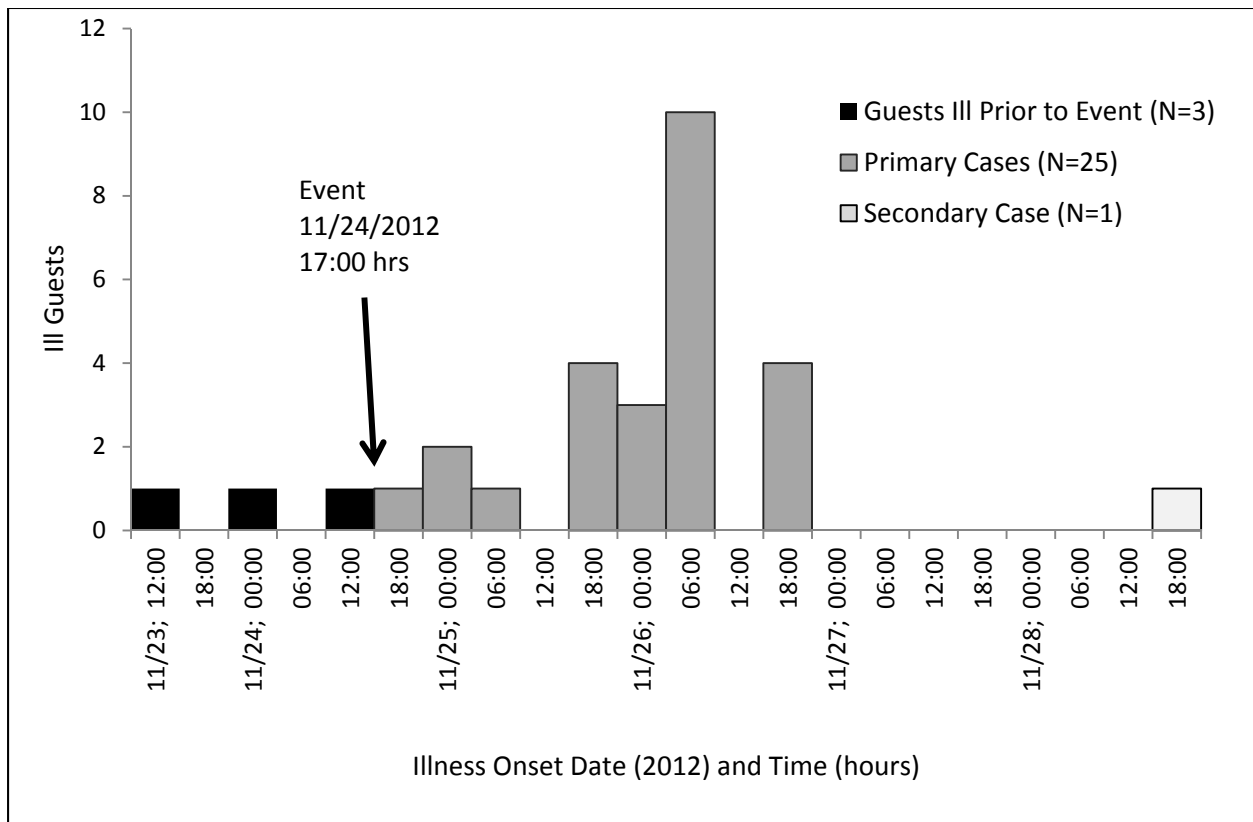
### ***Epidemiology***

The wedding reception at Anthem CC was attended by 128 people. Completed surveys were received from 61 (47%) reception guests, 56 (92%) of which had valid responses and were included in our analyses. Survey responses that were excluded from analyses included three from people who experienced illness prior to attending the reception, one duplicate questionnaire, and one from a respondent who did not consume food at the reception. Of the 56 reception guests who provided valid responses to the survey, 26 (46%) guests' illnesses met the case definition (Figure 1), and 30 (54%) were not ill.

Figure 1 shows the distribution of 26 case-guests and the three survey respondents who reported illness prior to attending the wedding reception. Four case-guests became ill very shortly (within <12 hours) after the commencement of the reception. One guest became ill 98 hours after the event. The median incubation period was 38 hours (range 4-98 hours). Among 26 cases, the median age of ill people

was 42.5 years (range 2-88 years). Ten (38%) were female. All ill people experienced diarrhea, 18 (69%) experienced vomiting, and 8 (31%) reported having a fever.

Almost half (N=12, 46%) of those who experienced diarrhea reported illness duration lasting 24-48 hours. In contrast, three-fourth (N=24, 78%) of those who experienced vomiting reported their illness lasted <24 hours. One ill person sought medical attention from a healthcare provider. No hospitalizations or deaths occurred.



**Figure.** The distribution of ill wedding reception guests (n=29) by onset date and time. Three guests reported illness prior to and 26 guests reported illness after the event (including 4 whose illness onsets occurred <12 hours and 1 whose onset was 98 hours after the event). Anthem Country Club outbreak, Henderson, Nevada. November 23-28, 2012.

There were no reported illnesses related to Anthem CC from people unassociated with the wedding reception in the SNHD foodborne illness complaint database in the 30 days prior to or 30 days since November 24, 2012 (the date of the event). Post-event surveillance for increased occurrence of GI illness at the workplace of some of the affected reception guests detected no additional cases.

We were unable to determine which staff members provided which services to guests. No food item served at the reception was significantly associated with illness (data not shown).

### ***Environmental Health***

Anthem CC was permitted by SNHD to operate a banquet facility in Clark County. Because NoV was already strongly suspected at the time of the initial inspection as being the cause of illness among reception guests, we advised the facility of NoV infection and cleaning prior to obtaining laboratory confirmation.

Anthem CC management reported that no staff members had been ill in the past two weeks and no employee was currently ill. The facility has an ill employee policy and employees must abstain from reporting to work when sick. There were no other customer complaints of illness from any other group that was also held at the Anthem CC reception facility.

Anthem CC staff observed that during the reception one ill reception guest vomited in the banquet hallway and in the banquet bar area. Affected areas were



immediately cleaned by bleach water, and later by a professional cleaning company familiar with NoV disinfection prior to the next scheduled event at Anthem CC.

### ***Laboratory***

NoV genogroup (G) II was detected in all four stool specimens. The etiology of this outbreak was confirmed when two or more specimens tested positive for NoV GII. Two of these NoV positive specimens were forwarded to the Nevada State Public Health Laboratory for genetic sequencing and submission to CaliciNet (Centers for Disease Control and Prevention, Atlanta, GA), a national database of sequenced NoV used to link NoV outbreaks.

All stool cultures and STEC test results were negative.

### **DISCUSSION**

This NoV outbreak affected at least 26 people, all of whom were guests at a wedding reception at Anthem CC on November 24, 2012. All ill guests had similar symptoms, diarrhea and vomiting, typical of NoV infections [1, 2] and the outbreak etiology was confirmed through laboratory testing to be NoV GII. One ill person sought medical care. No hospitalizations or deaths occurred.

The median incubation period and peak timing of illness onset were approximately 37-38 hours after the reception banquet, which is consistent with the most commonly reported incubation periods associated with NoV infections (24-48 hours, with an outside range of 10-50 hours) [3]. We observed that some guests had

illness onsets prior to the start of the reception or shortly (< 10 hours) after the banquet meal. This implies that their exposures to NoV probably occurred prior to, rather than at, the reception. Although NoV has a high propensity for person-to-person spread [4, 5], and some person-to-person NoV transmission likely occurred prior to and during the reception, we also considered the reception itself to have been a point-source for illness, with attendance at the reception having been the common exposure (Figure).

Because we were unable to determine which Anthem CC staff members provided which services to guests, we were unable to assess for associations between illness and having been served by specific staff members. However, an Anthem CC staff member was unlikely to be the source of the outbreak. Several reception guests were already ill or incubating illness during the event and it is more plausible that they were the source of NoV. We found no statistically significant associations with food items served at the event, which is also consistent with the hypothesis that illness was introduced to the reception by one or more guests rather than by Anthem CC staff.

There were numerous opportunities for NoV transmission during the reception. NoV can spread via direct contact with NoV-containing aerosolized vomitus or fecal matter or by indirect contact with them via environmental surfaces [6]. Furthermore, an emetic event in highly trafficked places including the hallway and bar areas at the facility could have exposed other reception guests to aerosolized vomitus containing NoV. People who are ill with diarrhea and/or vomiting should avoid attending gatherings or having contact with others to prevent transmitting illness to them.

Furthermore, emetic events that occur in public areas must be immediately cleaned with bleach-based or other disinfectants that are suitable for eliminating NoV [7].

There are several limitations to our investigation. We were unable to determine if infection had spread from ill reception guests to the general community via secondary spread of NoV, because reception guests were not surveyed about gatherings other than the Anthem CC reception. However, surveillance for increased occurrences of GI illnesses at a workplace common to some of the affected reception guests did not reveal any additional cases. Also, although the testing of Anthem CC employee stool specimens might have identified infected staff members who could have transmitted NoV to reception guests [8, 9], we did not collect specimens from employees because we determined early in our investigation that a reception guest, rather than Anthem CC staff member, was most likely to have introduced the illness.

The public health investigation led to the rapid identification and management of the NoV outbreak. Testing of ill people and interviews of reception guests allowed us to determine the outbreak etiology and timeline. People who are ill with diarrhea or vomiting should avoid attending gatherings. Affected facilities must take aggressive cleaning measures after an emetic event to halt the spread of NoV.

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