



# Norovirus Disease Outbreak Associated with the Westgate Las Vegas Resort & Casino, June 2018

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## 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 norovirus infections at a hotel & resort located in Clark County, Nevada. June 2018.

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## **Abstract**

On Sunday, July 1, 2018, the Environmental Health Division at the Southern Nevada Health District (SNHD) received reports from the Westgate Las Vegas Resort and Casino involving multiple complaints of gastrointestinal illness among guests and employees. SNHD utilized an online survey tool to assist in case finding for local and out of state cases. A total of 363 cases met an outbreak case definition; 358 suspected and five laboratory-confirmed to have norovirus genogroup II. Approximately, one third of cases ( $n=119$ ) reported an exposure at the buffet. An environmental assessment of the buffet resulted in a closure for the duration of the outbreak. Westgate management implemented extensive facility-wide corrective actions to control for norovirus. The outbreak investigation was closed on Wednesday, July 18, 2018. To prevent similar outbreaks in the future, it is recommended for resorts to follow established food safety guidelines in buffet settings, especially regarding customer utensil usage, follow proper protocols for cleaning emetic events, as well as exclude ill staff from work and encourage guests to follow proper hand hygiene.

## **Background**

On Sunday, July 1, 2018, the Environmental Health Division (EH) at the Southern Nevada Health District (SNHD) received reports from the Westgate Las Vegas Resort and Casino (Westgate) involving multiple complaints of gastrointestinal (GI) illness among guests and employees. A few hours later EH staff arrived on site to gather additional information and provide preliminary recommendations.

During this initial visit, EH staff learned that the first illnesses were reported to Westgate management on June 28, 2018. These reports of ill persons included hotel guests, attendees at an on-site conference, and employees from multiple departments, including food service. EH staff provided guidance for the control of a potential norovirus outbreak to Westgate management including the Norovirus Fact Sheet and SNHD Guidelines for the Prevention and Control of Norovirus in Hotels/Casinos (See Appendices A and B, respectively).

On Monday, July 2, 2018, SNHD's Office of Epidemiology and Disease Surveillance (OEDS) partnered with SNHD's EH Division and the Southern Nevada Public Health Lab (SNPHL) and SNHD's Public Information Office (PIO) and began an outbreak investigation.

## **Suspect Etiologic Agent**

Norovirus is a highly contagious virus recognized as one of the most common causes of acute gastroenteritis outbreaks among all ages throughout the United States.<sup>1</sup> It is estimated, on average, norovirus causes between 19 to 21 million cases of acute gastroenteritis annually.<sup>2</sup> Individuals infected with norovirus can shed billions of copies of the virus and it only requires a few copies to infect an individual.<sup>3</sup> The most common symptoms associated with norovirus are diarrhea, vomiting, nausea, and abdominal cramps. These symptoms usually develop within 12 to 48 hours after an individual is exposed, with a median incubation period of approximately 33 hours.<sup>4</sup> Symptoms of norovirus usually resolve between one and three days. Norovirus can be transmitted directly or indirectly through fecal-oral and/or vomitus-oral routes of exposure. Exposure can occur when an individual comes into direct contact with an infected individual, by touching surfaces or objects contaminated with norovirus, or by consuming food or drink contaminated with norovirus.<sup>1</sup> Those who are at higher risk for severe disease and possible death are elderly individuals (>65 years in age), young children (<5 years in age), and individuals who are immunocompromised.<sup>1</sup>

## **Investigation Methods**

### **Epidemiologic:**

On July 2, 2018, two OEDS staff members and two EH staff members visited the Westgate to interview Westgate staff, review incident response policies for emetic event cleanup, and tour the facility. During this site visit, OEDS reviewed the following documents:

1. Employee call-in logs detailing ill staff and where they worked
2. Security logs with information regarding ambulance transfers of ill guests to local hospitals
3. Biohazard logs outlining when and where emetic and diarrheal events occurred on property

Biohazard logs provided information regarding the location and frequency of illness over time while the other documents assisted in case finding.

In the following days, OEDS obtained line lists from Westgate management of all GI complaints from guests and staff during the months of June and July. Additionally, OEDS obtained and reviewed medical records from the local hospitals listed in the security reports.

Descriptive statistics were used to describe reported age, gender, and GI symptoms. Case definitions were established based on the suspected causative etiologic agent, norovirus.

### **Case Finding:**

In addition to utilizing the information obtained from Westgate management, OEDS utilized multiple methods for case finding: a confidential online survey, SNHD's online foodborne illness reporting portal, SNHD's foodborne illness complaint database, phone interviews, third-party websites (Yelp and I Was Poisoned), and a Health Alert Network (HAN) notification to local health providers.

Cases were primarily identified through a confidential online survey developed with Survey Monkey (Appendix C). This allowed OEDS to reach potentially ill guests who had visited Las Vegas and already returned home. The survey was launched on July 3, 2018 to assist SNHD in determining the extent of illness and causative etiologic agent. The link was provided to Westgate management, published on SNHD's website homepage, and provided on multiple media outlets (KTNV Las Vegas and Las Vegas Now). OEDS staff followed up on incomplete surveys with phone interviews or email to obtain complete information.

OEDS staff also reviewed SNHD's foodborne illness complaint database, Yelp, and I Was Poisoned to identify additional complaints of GI illness subsequent to eating at any of the food establishments on Westgate property within 30 days prior to the initial report. OEDS staff conducted telephone interviews with ill persons to obtain more information regarding symptoms, food history, and additional illness among social contacts.

On July 6, 2018, OEDS drafted and sent a HAN to community healthcare providers alerting them of the outbreak and providing background information and screening recommendations.



## **Case Definitions:**

### **Suspect:**

A person who visited the Westgate Las Vegas Resort & Casino resulting in clinical symptoms within 48 hours of their visit between June 16, 2018 to July 12, 2018

OR

An employee who works for or in the Westgate Las Vegas Resort & Casino reporting clinical symptoms between June 16, 2018 to July 12, 2018 characterized by:

1. Diarrhea and/or
2. Vomiting

### **Confirmed:**

A person who meets the suspect case definition of norovirus infection and had a positive laboratory result from at least one of the following:

1. Detection of norovirus by real-time two-step quantitative Polymerase Chain Reaction (rt-qPCR)
2. Detection of norovirus by enzyme immunoassays (EIAs)
3. Detection of norovirus by conventional real-time Polymerase Chain Reaction (rtPCR) assay for genotyping

## **Microbiological:**

A sample of ill persons were asked to provide stool specimens for testing. Specimens were collected and submitted to the SNPHL. The following tests were performed on stool specimens for enteric pathogens:

1. Stool cultures (*Shigella*, *Salmonella*, *Yersinia*, *Campylobacter*, and Shiga toxin producing *E. coli* [STEC])
2. STEC enzyme immunoassay (EIA)
3. Norovirus nucleic acid (rtPCR)
4. Gastrointestinal panel, film array (*Campylobacter*, *Clostridium difficile* toxin A/B, *Plesiomonas shigelloides*, *Salmonella*, *Vibrio* species, *Vibrio cholerae*, *Yersinia enterocolitica*, Enteroaggregative *E. coli* (EAEC), Enteropathogenic *E. coli* (ETEC), Shiga toxin producing *E. coli* (STEC), *Shigella*/Enteroinvasive *E. coli* (EIEC), *Cryptosporidium*, *Entamoeba histolytica*, *Giardia lamblia*, Adenovirus F40/41, Astrovirus, Norovirus GI/GII, Rotavirus A, and Sapovirus)

OEDS requested lab results for ill individuals living outside of Clark County, NV who submitted stool samples to their local healthcare provider for laboratory testing. Results were provided voluntarily and received by OEDS through secure fax or secure email.

## **Environmental:**

SNHD EH staff performed 11 site visits to the Westgate property in addition to communicating through multiple phone calls and emails to identify contributing factors for illness transmission and to implement and oversee corrective actions. Table 1 summarizes the site visits. Staff from EH's Food Operations, Aquatic

Health, and Public Accommodations programs assisted in the response to ensure all potential modes of illness transmission were addressed. A full environmental assessment was conducted in the buffet area in response to information received from OEDS. The findings from the buffet prompted Food Operations staff to conduct repeated food safety surveys for all food permits over the course of multiple days. Meanwhile, Aquatic Health staff surveyed the pool and spas to review disinfection records. Additionally, Public Accommodations staff surveyed housekeeping and guest rooms to observe disinfection protocols.

<b>Date</b>	<b>Activity</b>	<b>Westgate Outlets Addressed</b>
7/1/18	Initial contact to obtain information and provide preliminary recommendations	Sit down meeting with Westgate management
7/2/18	Walkthrough of facility with OEDS to identify areas where illness had been reported and to understand policies for disinfection	Banquet spaces, banquet kitchen, garde manger (vegetable prep), bakery, main kitchen, bars, environmental services areas with disinfectant storage, housekeeping, biohazard disposal areas
7/3/18	First attempt to inspect buffet, met with chefs instead since it was not in operation	Buffet
7/4/18	Environmental assessment of buffet	Buffet
7/5/18	Surveys of all food outlets to assess potential foodborne illness risk factors in food handling	Bakery, Annual Itinerant Low Risk (AILR) bars, all banquet dishup areas, main kitchen, pantry garde manger (vegetable prep), Edge Steakhouse, Fresco Italiano Kitchen, main dish room, convention center snack bar, butcher shop, bulk warehouse, Benihana, 888 Noodle Bar, Zen Lounge, Rikki Tiki Sushi Bar, Silk Road Asian Bistro, Sid's Café, central potwash, room service, Fortuna Snack Bar, Court Deli, Sportsbook Bar, Tempo Bar, Showcase Bar, Cabaret bars, Timeshare Sales Buffet and Bar, Pool Bar and Grill, Employee Dining Room, Court Deli
7/5/18	Hotel disinfection survey	Guest rooms, housekeeping
7/5/18	Pool survey	Pool, men's and women's spas
7/7/18	Follow up surveys of food outlets to assess potential foodborne illness risk factors in food handling	Edge Steakhouse, Fresco Italiano,
7/8/18	Follow up surveys of food outlets to assess potential foodborne illness risk factors in food handling	Sportsbook Grill, Sid's Café, Pool Grill and Bar
7/10/18	Follow up surveys of food outlets to assess potential foodborne illness risk factors in food handling	Sid's Café, Employee Dining Room, Pool Grill and Bar, Benihana
7/17/18	Reinspection of Buffet	Buffet

**Table 1.** Summary of Environmental Health site visits.

In addition to on-site visits, EH staff also provided assistance to Westgate management through phone and email communications. These communications involved reviewing chemical information to ensure effectiveness against norovirus and reviewing policies and procedures for food safety, emetic event clean up, and training.

No environmental health follow-up was conducted at the various events as they had all concluded by the time of response.

## **RESULTS**

### **Epidemiologic Results:**

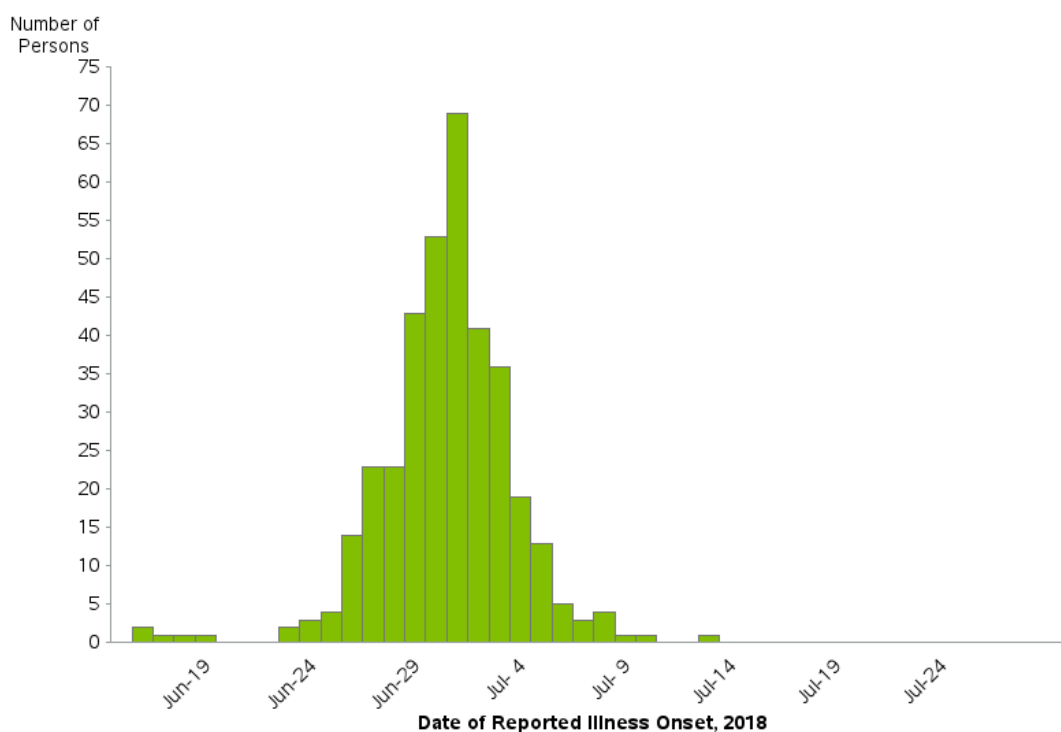
No additional complaints regarding foodborne illness were found on Yelp or I Was Poisoned from June 2, 2018 through July 2, 2018. On June 21, 2018, OEDS received an online complaint reporting GI illness from a guest who stayed at Westgate and reported eating at two food establishments on property. The complainant reported symptom onset on June 18, 2018. The average incubation period for norovirus is 12 to 48 hours. Based on the incubation period for norovirus, OEDS reviewed complaints in the database from June 16, 2018 to July 12, 2018. OEDS identified an additional 83 complaints in the form of incoming phone calls from complainants, online complaints submitted through SNHD's online foodborne complaint system, and follow-up with complainants by phone interview. Of the additional 83 complaints, 44 met an outbreak case definition; suspect or confirmed.

### **Survey Results:**

On Wednesday, July 18, 2018, OEDS closed the survey and the investigation was closed. There was a total of 614 survey responses received with a 62% completion rate. Of the 614 total survey responses, 378 responses were completed and reported GI illness. Of these 378 complete responses, 319 met an outbreak case definition; suspect or confirmed. Through survey responses, phone interviews, and online reports the total number of complaints meeting an outbreak case definition was 363. Of these cases, 358 were suspected and five were lab-confirmed.

The epidemic curve is shown in Figure 1, which displays the case finding results. Approximately 92% of reported onsets occurred between June 26, 2018 and July 5, 2018. Survey respondents consisted of approximately 92% guests ( $n=335$ ) and 8% employees ( $n=28$ ). The last reported case associated with the outbreak was July 13, 2018 but was not considered to contribute to ongoing exposure at the Westgate. This case's symptoms developed post resort and casino stay. The last reported case where ongoing exposure could occur at the Westgate was July 10, 2018. The median duration of symptoms was two days.

**Figure 1. The number of ill persons associated with Norovirus GII, by date of reported illness onset. Westgate Las Vegas Resort and Casino. Las Vegas, NV. June 16 - July 10, 2018.**



The median age of reported ill persons was 44 years ( $n=363$ , range 1-83 years). Among the 363 reported cases approximately 56% were female ( $n=205$ ) and 44% were male ( $n=158$ ). Approximately 94% reported diarrhea ( $n=340$ ) and 79% reported vomiting ( $n=286$ ). Table 2 provides the summary of reported symptoms among reported onsets.

Reported symptoms	# of complaints ( $n = 363$ )	% of complaints
Fever	181	49.9
Diarrhea	340	93.7
Vomiting	286	78.8
Abdominal cramps	283	78.0
Muscle aches	215	59.2
Headache	234	64.5
Fatigue	294	81.0
Nausea	310	85.4

**Table 2.** Reported symptoms by guests and employees associated with the Westgate, June 18th through July 8th.

Survey participants were asked to complete the survey regardless of illness. There were 38 respondents who did not report experiencing symptoms.

Between June 18, 2018 and July 8, 2018, the Westgate simultaneously hosted two events onsite. Complainants also reported attending five nearby off-site events. Table 3 provides a summary of guests who reported GI illness by reported event.

<b>Reported Event*</b>	<b># of complaints (n= 363)</b>	<b>% of complaints</b>
Not mentioned	198	54.55
Onsite #1	23	6.34
Onsite #2	40	11.02
Offsite #1	32	8.82
Offsite #2	1	0.28
Offsite #3	36	9.92
Offsite #4	12	3.31
Offsite #5	21	5.79

**Table 3.** Complaints associated with reported events, June 18th through July 8th.

\*events held on-site and guests staying at resort with events off-site

Approximately 55% of the reported complaints of GI illness did not mention attending an event.

Table 4 provides complaints associated with food establishments located in the Westgate. Initial responses of information from phone complaints and online complaints submitted to SNHD's foodborne illness complaint system suggested the Fresh Buffet as a starting point for EH inspection. Approximately 33% of ill individuals (n=119) reported eating at the Fresh Buffet. Survey responses for non-ill individuals did not provide enough information to run statistical analysis for measures of association among the food establishments reported. Table 4 shows reported food establishments located in the Westgate but does not include food establishments reported by complainants who ate off property.

<b>Reported establishments</b>	<b># of complaints (n= 363)</b>	<b>% of complaints</b>
Edge Steakhouse	5	1.38
Fortuna	13	3.58
Fresh Buffet	119	32.78
Rikki Tiki Sushi	2	0.55
Sid's Café	42	11.57
Silk Road Asian Bistro	3	0.83
Starbucks	42	11.57
Superbook Bar	8	2.2

**Table 4.** Complaints associated with reported food establishments, June 18th through July 8th.

Additional responses of information suggested emetic events were witnessed by guests at the pool prompting an EH survey of all bodies of water. Approximately 11% of survey participants (n=41) reported going to the pool.

## **Environmental Health Results:**

### *Food*

EH staff attempted to conduct an environmental assessment at the Fresh Buffet on July 3, 2018, but the outlet was closed for the day. Instead, EH staff met with chefs and discussed controls necessary to contain a potential foodborne norovirus outbreak.

EH staff returned on July 4, 2018 to observe the buffet in operation. Multiple foodborne illness risk factors were observed, including both contamination and proliferation concerns. The numerous contamination issues observed included: staff not washing hands when required, staff washing hands improperly, improper cleaning and sanitizing of food utensils (rinsing utensils in the hand sink rather than washing, rinsing, and sanitizing them in the dishwasher), sanitizing surfaces with wiping cloths that had little to no sanitizer residual, not cleaning and sanitizing surfaces when necessary, and excessive occasions of tong handles stored touching ready to eat food after customer use throughout the buffet. Numerous proliferation concerns were also noted including foods stored beyond their expiration date, foods stored in malfunctioning refrigeration, inability to maintain foods at safe cold-holding temperatures (one malfunctioning walk-in, two malfunctioning reach-ins), and foods stored at room temperature after cooking with no tracking of time spent in the temperature danger zone. Due to the complaints of illness associated with dining at this outlet, paired with the observed food safety concerns and the malfunctioning refrigeration, SNHD and Westgate management mutually agreed to close the buffet.

Westgate has dozens of food outlets on property, all under the same management except for a few leased spaces. To ensure that the same risk factors for foodborne illness observed in the buffet were not occurring in other food outlets, SNHD began food safety surveys of all food outlets on July 5, 2018. A summary of the observations noted on July 5, 2018 are summarized in Appendix D.

### *Aquatic Health*

On July 5, 2018, Aquatic Health staff surveyed the pool and spas. EH staff reviewed disinfection logs and no issues were noted. Complainants reported witnessing emetic and fecal events at the pool however no emetic or diarrheal events were logged in disinfection records by Westgate staff. EH staff advised that all bodies of water be treated for a fecal incident protocol per CDC guidelines. Educational resources were provided (see Appendix E).

### *Public Accommodations*

On July 5, 2018, EH Public Accommodations staff followed up with Westgate management to verify disinfection procedures. Disinfectants in use were verified to be effective against norovirus. Housekeeping carts were observed to be set up properly to prevent cross contamination between dirty and clean linens. The biohazard containment room for soiled linens was observed to be tidy with no hazards.

### *Corrective Actions taken by Westgate*

On July 17, 2018, EH staff conducted a successful reopening inspection on the buffet. Westgate management opted to keep the buffet closed until Friday July 20, 2018 to continue implementing corrective actions and training with food staff. By this time, Westgate management had implemented the following corrective actions in the buffet:

1. One additional food worker was added to monitor customer tong usage and discard foods where tong handles had fallen into the food,
2. One room chef was stationed at the buffet at all times to provide active managerial control,
3. Refrigeration logs were implemented, to be filled out by the runners every 2 hours, to be reviewed by the room chef daily, and to be spot checked by the executive chef as needed,
4. Time as a Public Health Control plan has been updated and addresses all foods not under temperature control,
5. Buffet layout was updated to make all dishes easier to reach, with the intentions of increasing customer compliance of proper tong handle storage,
6. Training was conducted for all food staff on proper handwashing and sanitation and ongoing monitoring of food safety by leadership was implemented,
7. Malfunctioning equipment was repaired,
8. Facility deep cleaned repeatedly,
9. Food safety consultant was hired.

The following corrective actions were taken facility-wide:

1. Biohazard response plan was updated to require a disinfection radius of 30 feet after emetic events,
2. Environmental services staff were stationed in restrooms to disinfect stalls between uses,
3. Room service flagged rooms with guests who ordered room service items indicative of a stomach ache to be deep cleaned before turning the room over to the next guest,
4. All flagged rooms, rooms with a sick guest, or rooms with an emetic event were taken off line to be deep cleaned by disinfection before turning over to the next guest,
5. Biohazard log was updated to include emetic events occurring at the pool,
6. Contractors were hired to fog disinfectant in multiple areas across the hotel,
7. Demerits that were typically given to staff calling in sick from work were removed for any staff member calling in with foodborne illness symptoms,
8. Bars switched to using single-use cups,
9. Disinfection frequency of high-touch areas (elevator buttons, door handles, etc.) was increased,
10. Chemicals used for disinfection were updated to those that were effective against norovirus.

### **Microbiological Results:**

OEDS distributed six stool specimen kits to ill individuals and received four kits back. Of the four stool specimens collected and submitted to the SNPHL for testing, three specimens tested positive for norovirus genogroup GII and one tested negative for norovirus. All stool cultures and STEC tests were negative.

Positive specimens were sent to the California Department of Public Health – Viral and Rickettsial Disease Laboratory for genetic sequencing. Of the three positive specimens for Norovirus GII, two specimens were confirmed norovirus GII.P17 and one was unknown.

OEDS received lab results from two ill individuals who did not reside in Clark County, NV. Submitted lab results showed positive PCR tests for norovirus GII. It is unknown if genetic sequencing was done for the two out of jurisdiction cases. Lab results revealed no evidence of any other enteric pathogens for both individuals.

## **Discussion and Recommendations**

The causative etiologic agent of this outbreak was identified as norovirus genogroup GII. Norovirus outbreaks are known to be associated with significant morbidity<sup>5</sup> as observed with the substantial number of complaints ( $n=363$ ) that met an outbreak case definition. Identifying an exact source is often challenging with norovirus because it is a highly contagious microorganism with a very low infectious dose and multiple modes of transmission.<sup>6,7</sup> The epidemic curve observed in this outbreak suggests a continuous source transmission associated to exposure to the Westgate.

The epidemiological data collected during this outbreak investigation were insufficient in determining an exact environmental source within the Westgate property. No environmental samples were collected during the investigation. OEDS identified 363 cases associated with this outbreak, five of which were lab-confirmed to have norovirus GII. It is unclear how norovirus entered the Westgate. There are several possible explanations for how norovirus transmission occurred during this outbreak.

One notable potential route of transmission identified during the investigation was the Fresh Buffet. The Westgate was running a promotion at the time that included a buffet coupon when booking a hotel reservation through a certain website, likely increasing the number of guests visiting the buffet leading up to the outbreak. Approximately 33% of complainants reported dining at the Fresh Buffet. EH conducted an environmental assessment at the Fresh Buffet resulting in its closure. During the assessment, EH staff identified multiple contributing factors that may have contributed to foodborne transmission: the handles of multiple customer tongs were stored touching ready to eat foods and improper sanitization by food workers was observed. While multiple proliferation concerns were also observed at the Fresh Buffet, they likely had negligible effect on this outbreak since norovirus cannot replicate outside of a host. It is likely that norovirus was introduced to the buffet by an ill patron or employee and spread via contamination of utensils, food, and surfaces.

SNHD was unable to prove or disprove that the Fresh Buffet was the initial source of the outbreak. The public emetic and fecal events reported at the pool also could have contributed to the spread of norovirus; 11% of cases reported going to the pool. Additionally, there could have been transmission associated with the banquet events that went uninvestigated due to timing; 6% of complaints reported participating in Onsite Event #1. Additionally, telephone interviews revealed complainants heard that a sizeable proportion of ill persons were mostly staying in one specific guestroom tower. OEDS did not have enough information to confirm or deny this theory.

The closure of the buffet and the extensive property-wide corrective actions involving food safety, aquatic health, and housekeeping implemented by Westgate management likely assisted in the short outbreak duration. The outbreak was identified on July 1, 2018 and the investigation was closed on July 18, 2018, four incubation periods after the last symptom onset.

The investigation benefitted from open communication between Westgate management and SNHD. Early site visits established clear lines of communication between the entities to ensure prompt responses. The Westgate was receptive to SNHD recommendations and cooperative throughout the investigation.

### *Limitations*

There were several limitations in our investigation. Sampling issues, survey access, survey fraud, and absence of an interviewer are some disadvantages to relying on surveys as a tool for outbreak investigations. Survey participants were required to provide their role as a survey participant (guest or employee), first name, last



name, state of residence, and phone number. Although confidentiality was assured, participants may have been reluctant to participate and admit illness as suggested by apprehension expressed in phone interviews. It was also reported that the management of one event instructed attendees not to report their illness to SNHD for fear of that event being associated with the outbreak and potential ramifications. Aside from the survey responses, the other sources of information used in case finding were also limited. Security logs and biohazard logs do not differentiate between vomiting due to excessive heat exposure, excessive drinking, or communicable illness. Employee call-in logs do not require employees to provide a reason for calling in to work.

Multiple factors make norovirus outbreaks challenging to control: low infectious dose, multiple routes of exposure, and general symptoms resulting in the illness being under-diagnosed. To prevent similar outbreaks in the future, it is recommended to follow established food safety guidelines in buffet settings, especially regarding customer utensil usage, to follow proper emetic event clean up protocols, and to exclude ill staff and encourage guests to follow proper hand hygiene. These simple measures, may substantially reduce transmission of norovirus.

### **References:**

1. American Public Health Association., & Heymann, D.L. (2015). *Control of communicable diseases manual* (20th ed.). Washington, DC: American Public Health Association.
2. Centers for Disease Control and Prevention. *Burden of Norovirus Illness in the U.S.* Retrieved July 31, 2018, from <https://www.cdc.gov/norovirus/trends-outbreaks/burden-US.html>.
3. Centers for Disease Control and Prevention. *Transmission.* Retrieved July 31, 2018, from <https://www.cdc.gov/norovirus/about/transmission.html>.
4. Centers for Disease Control and Prevention. *Norovirus in Healthcare Facilities Fact Sheet.* Retrieved July 31, 2018, from <https://www.cdc.gov/hai/pdfs/norovirus/229110-ANoroCaseFactSheet508.pdf>.
5. Ong, C.W. (2013). *Norovirus: a challenging pathogen.* Healthcare Infection (18): 133-142.
6. Glass, R. I., Parashar, U. D., & Estes, M. K. (2009). *Norovirus Gastroenteritis.* The New England Journal of Medicine, 361 (18), 10.1056/NEJMra0804575. <http://doi.org/10.1056/NEJMra0804575>
7. Teunis PF, Moe CL, Liu P, et al. *Norwalk virus: how infectious is it?* J Med Virol. 2008; 80:1468–1476. <https://doi.org/10.1002/jmv.21237>

# FactSheet

## Para Su Información

### Norovirus

**What are noroviruses?**

The noroviruses, also sometimes referred to as Norwalk-like viruses, are a group of viruses that cause vomiting and diarrhea.

**Who gets norovirus infection?**

Anyone who becomes ill from infection with a norovirus.

**How are the viruses spread?**

Norovirus can easily be spread from person to person. Ways that noroviruses can spread include:

- Eating food or drinking liquids that have been contaminated by the feces or vomit of an infected person.
- Touching or surfaces contaminated with the virus, and then placing parts of the hand in their mouth.
- Ingesting particles of vomitus that have been aerosolized.
- Direct contact with a sick person (such as caring for a sick individual or sharing food, water or eating utensils).

**What are the symptoms of norovirus infection?**

Symptoms include vomiting, diarrhea, nausea and abdominal cramps that generally last for one or two days. Other symptoms such as low-grade fever, headache, muscle aches, chills and fatigue may also be present. Typically, children experience more vomiting than adults, though most people infected with a norovirus have both diarrhea and vomiting. Dehydration is the most common complication of infection with norovirus.

**How soon do symptoms appear?**

Symptoms usually appear within one to two days after exposure to the virus, but illness can occur as soon as 12 hours afterwards.

**How long can an infected person spread the virus?**

The infectious period begins with onset of symptoms and usually ceases three days after symptoms are gone, however, some people are still infectious two weeks after their symptoms have ended.

**What is the treatment for norovirus infection?**

Norovirus illnesses are generally self-limited, lasting one a few days. Treatment consists of drinking fluids to prevent dehydration. Fruit juices and sugary soft drinks should be avoided. Noroviruses cannot be treated with antibiotics since these medications are not effective against viruses.

**How can the spread of norovirus be stopped?**

Individuals infected with a norovirus should stay home while they are ill. Children should be kept out of the child care or school setting as long as diarrhea or vomiting is present. People working as food handlers, medical practitioners, and those who work in child care centers or schools should exclude themselves from work until 72 hours after symptoms have resolved. Individuals should wash their hands with soap and warm water after using the toilet, and before meals and snacks. Surfaces that may have been contaminated by feces or vomit should be disinfected with a bleach-based household cleaner.

**Where can I get more information?**

Contact your doctor or the Southern Nevada Health District Office of Epidemiology at (702) 759-1300.



(702) 759-1000 | [www.SNHD.info](http://www.SNHD.info)

Updated 2-13

SOUTHERN NEVADA HEALTH DISTRICT



## Southern Nevada Health District

### Guidelines for the Prevention and Control of Norovirus in Hotel/Casinos

The Southern Nevada Health District has developed these guidelines in order to provide direction for hotel/casinos in the prevention and control of norovirus outbreaks. This document does not present formal recommendations, but provides areas of consideration for properties in the prevention of outbreaks. The recommendations are made in addition to the Southern Nevada Health District regulations entitled “Regulations Governing the Health and Safety of Public Accommodation Facilities”.

Proper handwashing is an effective, simple, and inexpensive method of preventing disease, and is one of the most important steps in preventing an outbreak from spreading. Because each outbreak of norovirus is unique to the circumstances and the property, it is not possible to predict which of the environmental controls would be most important in preventing the spread of disease. However, following as many of the recommendations as possible will increase the chances of preventing and/or controlling an outbreak.

During an outbreak, a number of these recommendations, as well as other items not on this list, may be formally required by the Health District. Many of the items in the recommendations will not be appropriate for a particular property, and thus would not be required. The columns labeled “SOP” and “Date Implemented” are intended to assist in complying with these requirements, allowing a facility to identify parts of the recommendations that are part of the Standard Operating Procedure (SOP) of the facility, or the date on which the item was implemented.

There are two appendices to these recommendations. The first is a list of products that are approved by the EPA as effective against norovirus. The second is a standardized illness questionnaire that can be used to track guest or employee illness.

Representatives from the Southern Nevada Health District are available to help answer any questions about norovirus, these guidelines, or the process of surveillance and outbreak investigation/control. For additional information, contact the Environmental Health Specialist assigned to your facility, or the Office of Epidemiology at 759-1300. Office of Epidemiology staff are available 24/7/365 to take reports of outbreaks.

<b>Section 1: General Recommendations</b>		<b>SOP</b>	<b>Date Implemented</b>
1.1	Increase employee hand washing in <b>all</b> employees to:	<input type="checkbox"/>	<hr/>
1.1.1	At least once per hour		
1.1.2	Upon entering a kitchen		
1.1.3	After using the restroom		
1.1.4	After shaking hands or other physical contact with peers and guests		
1.1.5	After sneezing		
1.1.6	After touching the face		
1.1.7	After blowing the nose		
1.1.8	After rubbing hands on clothing and similar activities		
1.1.9	After handling raw foods		
1.1.10	After handling dirty kitchen utensils and kitchenware		
1.1.11	After cleaning, sweeping, or mopping		
1.1.12	After a break		
1.1.13	After smoking, eating or drinking		
1.1.14	Before handling any food, especially ready-to-eat foods and ice		
1.1.15	After handling money (tips)		
1.1.16	When entering and leaving the gaming floor		
1.1.17	Before going on break		



- |        |   |                          |  |
|--------|---|--------------------------|--|
| 1.1.18 | Before starting a shift   | <input type="checkbox"/> |  |
| 1.1.19 | After ending a shift  | <input type="checkbox"/> |  |
| 1.1.20 | After using a common-use telephone  | <input type="checkbox"/> |  |
| 1.2    | Inform all employees of the need for handwashing and provide instructions on proper handwashing.  | <input type="checkbox"/> |  |
| 1.3    | Maintain employee hand washing vigilance through active management reminders and correction.  | <input type="checkbox"/> |  |
| 1.4    | Consider strict glove use policy for all food preparation. Ensure that gloves are worn properly, changed frequently, and that hands are washed between glove changes.   | <input type="checkbox"/> |  |
| 1.5    | Discontinue the practice of having cocktail servers handle ashtrays and used drink cups. Have a designated person, who is not a cocktail, server perform this task.   | <input type="checkbox"/> |  |
| 1.6    | Contact transportation companies affiliated with the hotel/casino to implement similar clean-up and sanitizing/disinfecting procedures as those implemented in the hotel properties.  | <input type="checkbox"/> |  |
| 1.7    | Regularly inspect all areas of the property (including, but not limited to, elevators, bathrooms, walkways, garages and parking lots, casino floor, and employee break rooms) for evidence of biohazardous accidents. Any accidents should be cleaned up following the procedures as outlined in Section 8. | <input type="checkbox"/> |  |
| 1.8    | Use single-use ticket system for automobile valet check-in and pick-up, in place of using tickets that are reused multiple times.   | <input type="checkbox"/> |  |
| 1.9    | Switch to auto-dispensing paper towel dispensers throughout the hotel, including all patron restrooms, employee restrooms, kitchens, and locker rooms.  | <input type="checkbox"/> |  |
| 1.10   | Use disposable ice buckets and drink cups in all guest rooms, and discard when visibly soiled and between guests.   | <input type="checkbox"/> |  |
| 1.11   | Review existing SOPs and protocols for general cleaning to ensure that they are consistent with these guidelines.   | <input type="checkbox"/> |  |
| 1.12   | Ensure that the SOPs and protocols are being properly implemented by staff through observation and training.  | <input type="checkbox"/> |  |
| 1.13   | Provide and encourage use of ethanol hand towelettes on the casino floor.   | <input type="checkbox"/> |  |
| 1.14   | Install hand sanitizer stations in dining facilities and restaurants, restrooms, break areas, and on the casino floor.  | <input type="checkbox"/> |  |
| 1.15   | Install polite reminders in all restrooms on the need for proper hand washing.  | <input type="checkbox"/> |  |

Section 2: Basic Clean-up and Sanitization Recommendations		SOP	Date Implemented
2.1	Implement recommendations in addition to routine cleaning activities.	<input type="checkbox"/>	
2.2	Increase frequency of cleaning and sanitizing/disinfecting the handles of hand sinks and doors in public restrooms, employee restrooms and throughout all kitchens to at least once per hour during periods of frequent use.	<input type="checkbox"/>	
2.3	Increase frequency of cleaning and sanitizing/disinfecting employee restrooms to at least once per hour during periods of frequent use.	<input type="checkbox"/>	
2.4	Use disposable cleaning cloths and mop heads for all cleaning and sanitizing/disinfection.	<input type="checkbox"/>	

- |      |   |   |  |
|------|---|---|--|
| 2.5  | Frequently clean and sanitize/disinfect high-touch surfaces such as (but not limited to):   | □ |  |
|      | 2.5.1 ATM machines  |   |  |
|      | 2.5.2 Slot and video machine buttons and handles  |   |  |
|      | 2.5.3 Coin trays  |   |  |
|      | 2.5.4 Self-serve coin redemption kiosks   |   |  |
|      | 2.5.5 Drinking fountains  |   |  |
|      | 2.5.6 Door handles and push plates (both in public areas and staff areas)   |   |  |
|      | 2.5.7 Escalator roller bars   |   |  |
|      | 2.5.8 Elevator buttons and panel (service and public)   |   |  |
|      | 2.5.9 Stair rails   |   |  |
|      | 2.5.10 Balcony rails  |   |  |
|      | 2.5.11 Bar rails  |   |  |
|      | 2.5.12 Validation and time clocks   |   |  |
|      | 2.5.13 Public telephones, courtesy phones, and common-use phones in employee areas  |   |  |
|      | 2.5.14 Light switches   |   |  |
|      | 2.5.15 Restaurant menus   |   |  |
|      | 2.5.16 Casino cage counters   |   |  |
|      | 2.5.17 Gaming chair backs   |   |  |
|      | 2.5.18 Contact areas of gaming tables   |   |  |
|      | 2.5.19 Table game cup holders   |   |  |
|      | 2.5.20 Counters in public areas (e.g. Registration, Bell Desk, Concierge)   |   |  |
|      | 2.5.21 Counters in staff areas (e.g. Assignment Desks, Uniform Counters)  |   |  |
| 2.6  | Spray or hand wipe as applicable the entire casino gaming area including high frequency human contact equipment and employee areas with an appropriate sanitizer at least daily. Carefully follow all manufacturer instructions on cleaning, rinsing, and sanitizing/disinfecting equipment being careful not to damage sensitive electronic components. Although this is a labor intensive effort, it is essential to breaking the chain of environmental contamination by ill guests and employees over time. | □ |  |
| 2.7  | Clean and sanitize/disinfect the inside of all dish and glass washers once per shift. The currently recommended sanitizers for non-high-temperature dishwashers are not effective against norovirus. Therefore if any contaminated item has been placed in the dishwasher, the equipment may be contaminated with Norovirus.  | □ |  |
| 2.8  | Discontinue the use of any dish or glass washing machine for ashtray cleaning/sanitizing unless the machine is dedicated solely for that purpose.   | □ |  |
| 2.9  | Clean and sanitize floor surfaces in all public areas at least once per shift.  | □ |  |
| 2.10 | Wash, rinse, and then sanitize/disinfect coin cups daily (if applicable).   | □ |  |
| 2.11 | Discard the ice in all ice machines once per week throughout all kitchen facilities followed by thorough cleaning and sanitizing/disinfection of the machine. Discard ice stored in bins, sinks used to store ice, and other associated equipment once per day followed by a thorough sanitizing of the bin or sink. Sanitize/disinfect all such bins and sinks again prior to use.   | □ |  |

<b>Section 3: Routine Guest Room Cleaning Procedure</b>		<b>SOP</b>	<b>Date Implemented</b>
3.1	Use disposable cleaning cloths.	<input type="checkbox"/>	_____
3.2	Use one cloth for cleaning and a new cloth for sanitizing/disinfecting surfaces.	<input type="checkbox"/>	_____
3.3	Use separate colored cleaning cloths in toilet areas.	<input type="checkbox"/>	_____
3.4	Use a new set of cleaning cloths for each guest room.	<input type="checkbox"/>	_____
3.5	Clean and sanitize/disinfect high touch areas such as taps, faucets, door and drawer handles, door latches, toilet or bath rails, telephones, rails on balconies, light and lamp switches, thermostats, remote controls, curtain pulls and wands, covers on guest information books, alarm clocks, hair dryers, irons, and pens.	<input type="checkbox"/>	_____

<b>Section 4: Guest Room Cleaning Procedures for Rooms with Known Ill Guests</b>		<b>SOP</b>	<b>Date Implemented</b>
4.1	Treat all areas of rooms with known ill guests as if they are contaminated with a highly infectious organism.	<input type="checkbox"/>	_____
4.2	Staff entering the room should wear appropriate personal protective equipment (PPE), including a disposable mask, gloves, eye shield, disposable shoe covers, and plastic disposable apron.	<input type="checkbox"/>	_____
4.3	Emetic or fecal accidents should be reported and cleaned as per Section 8.	<input type="checkbox"/>	_____
4.4	Once the ill guest has checked out, treat the room as a "hot room" and deep clean to ensure that any contamination has been removed.	<input type="checkbox"/>	_____
4.4.1	Consideration should be given to having a specially trained team available for cleaning of rooms with known ill guests.		
4.4.2	Discard all disposable paper products (e.g. tissues or toilet paper).		
4.4.3	Remove all towels, linens, pillows, bedspreads, and blankets, and launder in accordance with Section 9.1.		
4.4.4	Examine the mattresses for fecal or emetic accidents, and discard in accordance with Section 9.3 if visibly soiled.		
4.4.5	Clean and sanitize/disinfect all high touch surfaces throughout the room as described in Section 3.5.		
4.4.6	Clean the carpet in accordance with Section 9.4.		
4.4.7	Use an aerosol or fogging device to sanitize/disinfect all surfaces in the room.		

Note: A sample response plan can be found in the Southern Nevada Health District regulations entitled "Regulations Governing the Sanitation and Safety of Public Accommodation Facilities 2006 Appendix G: Example Guest Room Clean-up Standard Operating Procedure (SOP)"

<b>Section 5: Surveillance for Employee and Guest Illness</b>		<b>SOP</b>	<b>Date Implemented</b>
5.1	Monitor employee illness logs and interview employees to identify potential cases of norovirus.	<input type="checkbox"/>	_____
5.2	Have managers look for obvious signs of employee illness such as increased frequency of restroom use. Send ill employees home as per the recommendations in Section 7.	<input type="checkbox"/>	_____
5.3	Use a standardized illness questionnaire (Appendix B) to collect information	<input type="checkbox"/>	_____



- on employee and guest illness symptoms.
- |     |  |                          |       |
|-----|--|--------------------------|-------|
| 5.4 | Use room service orders to identify potentially ill guests. Provide a questionnaire to any guest reporting not feeling well or ordering items such as ginger ale, broth, or dry toast.               | <input type="checkbox"/> | _____ |
| 5.5 | Distribute illness questionnaires to guests purchasing medications for gastroenteritis (e.g. anti-diarrheals, antacids, upset stomach relief) at gift shops.   | <input type="checkbox"/> | _____ |
| 5.6 | Monitor gift shop sales of over the counter medications for gastroenteritis (e.g. anti-diarrheals, antacids, upset stomach relief) and beverages such as ginger ale to identify potential outbreaks. | <input type="checkbox"/> | _____ |

Section 6: Dealing with Guests During Outbreaks		SOP	Date Implemented
6.1	Provide information* to guests upon check-in, in guest rooms and through signs on: <ul style="list-style-type: none"> <li>6.1.1 The symptoms and transmission of norovirus</li> <li>6.1.2 Prevention of norovirus, including proper handwashing</li> <li>6.1.3 The procedure for reporting illness to the hotel and or health district</li> <li>6.1.4 How to obtain medical assistance, if necessary</li> </ul>	<input type="checkbox"/>	_____
* Southern Nevada Health District staff are available to work with hotel management to develop appropriate messages for guests, and to assist in the development of educational materials.			
6.2	Encourage ill guests to stay in their rooms if they become ill by: <ul style="list-style-type: none"> <li>6.2.1 Staff taking illness reports should request that ill guests stay in their rooms while symptomatic.</li> <li>6.2.2 Send a room service tray containing fluids (hot tea, water, electrolyte maintenance solutions such as Pedialyte®) and foods such as crackers, dry toast, and/or broth to any person reporting an ongoing illness.</li> <li>6.2.3 Provide a mechanism by which ill guests can get items from the gift shop (newspapers, magazines, light snacks, over-the-counter medications, etc.) without leaving their rooms.</li> </ul>	<input type="checkbox"/>	_____
6.3	Where appropriate, and space permitting, relocate non-ill guests sharing the room with the ill guest to a different room	<input type="checkbox"/>	_____

Section 7: Dealing with Employees During Outbreaks		SOP	Date Implemented
7.1	During an outbreak, provide regular updates to employees, providing: <ul style="list-style-type: none"> <li>7.1.1 The status of the outbreak response</li> <li>7.1.2 Talking points to be used in dealing with guests</li> <li>7.1.3 Reminders on proper handwashing</li> <li>7.1.4 Procedures for reporting illness</li> </ul>	<input type="checkbox"/>	_____
7.2	Require that all employees, <i>regardless of job duty</i> , who report having experienced vomiting, diarrhea, or “stomach flu” symptoms, remain off duty for 72 hours after their symptoms end.	<input type="checkbox"/>	_____
7.3	Evaluate policies for the compensation and medical evaluation of ill employees.	<input type="checkbox"/>	_____

- 7.4 Prohibit employee potlucks, and do not allow employees to bring in food (either prepared at home or commercially) to share with others for the duration of the outbreak. Temporarily remove candy dishes and fruit baskets at individual desks or common areas. *Note: This recommendation does not include removing office coffee pots.* ☐ \_\_\_\_\_

**Section 8: Emesis and Feces Removal, and Follow-up Environmental Contact Surface Clean-up and Disinfection**

		SOP	Date Implemented
8.1	Treat all fecal and vomitus events as if they are contaminated with a highly infectious organism.	<input type="checkbox"/>	_____
8.2	Consideration should be given to having a specially trained cleaning team available at all times.		
8.3	Ensure that all biohazardous accidents are only remediated by staff trained and properly protected for such clean-up activities.	<input type="checkbox"/>	_____
8.4	Have staff report all biohazardous accidents to management. Document all biohazardous events in a log including date, time, location, persons affected (if known), the names of the persons reporting the event, a short description of the incident, the names of the responders, and how a short description of the response to the accident.	<input type="checkbox"/>	_____
8.5	In the event of an emetic or fecal accident, the area must be cleaned as a matter of urgency. Because of the potential for the aerosolization of the virus, the area where such an incident has occurred should be closed, or cordoned off in a 25 foot radius from the site of the incident. Guests and non-essential staff should be excluded from these areas for the duration of the cleanup.	<input type="checkbox"/>	_____
8.6	Individuals, who clean up emesis or feces should use the following procedures:	<input type="checkbox"/>	_____
8.6.1	Wear appropriate personal protective equipment (PPE), including a disposable mask, gloves, eye shield, disposable shoe covers, and plastic disposable apron.		
8.6.2	Use disposable cleaning cloths or paper towels to soak up excess liquid. Transfer these and any solid matter directly into a Biohazard bag.		
8.6.3	To remove gross debris, clean the soiled area with detergent and hot water, using a disposable cloth.		
8.6.4	Disinfect the contaminated area.		
8.6.5	Dispose of mop heads, cleaning cloths, other materials used in the cleanup, and PPE into the Biohazard waste bag.		
8.6.6	Wash hands thoroughly after completing the clean-up procedure and again after completing the disposal procedure.		

Note: A sample response plan can be found in the Southern Nevada Health District regulations entitled "Regulations Governing the Sanitation and Safety of Public Accommodation Facilities 2006 Appendix I: Biohazard Event Response Plan for Public Areas"



<b>Section 9: Treatment of Contaminated Materials</b>		<b>SOP</b>	<b>Date Implemented</b>
9.1	Contaminated linen and other fabric materials should be placed carefully into separate laundry bags. They should be washed separately in a hot wash, and dried separately at 170°F. If an outside laundry is used, they should be advised that the laundry is potentially infectious.	<input type="checkbox"/>	_____
9.2	Soft furnishings should be removed for appropriate sanitization/disinfection.	<input type="checkbox"/>	_____
9.3	Soiled mattresses should be wrapped in heavy gauge plastic and discarded via normal solid waste disposal procedures.	<input type="checkbox"/>	_____
9.4	Contaminated carpets should be cleaned in a three step process. First, carpets must be cleaned with carpet detergent and hot water. Second, carpets must be disinfected by applying an appropriate disinfectant. Finally, carpets should be steam cleaned (158°F for 5 minutes or 212°F for 1 minute is needed for complete inactivation).	<input type="checkbox"/>	_____
9.5	Contaminated hard surfaces should be washed with detergent and hot water, using a disposable cloth, and then disinfected. Cleaning cloths should be disposed of as biohazardous waste. Mop heads should be discarded after use.	<input type="checkbox"/>	_____
<b>Section 10: Responding to Emetic Events in Food Preparation or Service Areas</b>		<b>SOP</b>	<b>Date Implemented</b>
10.1	Stop all food preparation and service until clean-up is completed.	<input type="checkbox"/>	_____
10.2	Follow the procedures outlined in Section 6 for cleaning.	<input type="checkbox"/>	_____
10.3	Destroy all exposed food, food that may have been contaminated, and food that has been handled by the infected person.	<input type="checkbox"/>	_____

### Appendix A Products Approved by the EPA for use Against Norovirus

A number of commercially-available products have been approved by the EPA for use against norovirus. Because norovirus is difficult to grow in laboratory conditions, these products have been tested against Feline Calicivirus (FCV), a surrogate for norovirus. The complete EPA testing methodology can be found at [http://www.epa.gov/oppad001/pdf\\_files/confirmatory\\_virucidal\\_test.pdf](http://www.epa.gov/oppad001/pdf_files/confirmatory_virucidal_test.pdf).

This list is provided solely as a courtesy to hotel/casinos. The Southern Nevada Health District does not endorse or recommend any particular product or manufacturer, and inclusion on this list should not be taken as such an endorsement. This list is based on products known to staff of the Health District at the time this document was created, and should not be assumed to be comprehensive. These products vary in their cost, contact time needed, ability to clean and sanitize/disinfect, and shelf life. Each product must be used in accordance with the manufacturer's instructions and state/local regulations, and appropriate training and personal protective equipment must be provided to staff before they are used. If you have questions or concerns about the use of a particular product, please contact the Environmental Health Specialist assigned to your facility.

Method/Chemical	Product and Manufacturer
Bleach (Sodium hypochlorite)	Generic – 1000 ppm
Ethanol	Generic – 75% Ethanol
Heat	> 170°F
Hydrogen peroxide	Accelerated Hydrogen Peroxide™ (Virox Technologies)
Hypochlorous acid	Sterilox (PuriCore)
Phenols	Mikro-Bak® II (Ecolab)
Parachlorometaxylenol (PCMX)	EcoTru® (EnviroSystems)
Potassium peroxomonosulphate	Virkon® (Antec International)
Quaternary Ammonia (hospital grade)	HB or TB Quat Disinfectant Cleaner (3M™) ** Note: regular quaternary ammonia is not effective against norovirus **

# Standardized Visitor Illness Report

<b>Demographic Information</b>	Name			List all hotels and restaurants visited in the 72 hours before the illness started
	Address			
	City	State	Zip	
	Date of Birth / Age	Gender <input type="checkbox"/> Female <input type="checkbox"/> Male		
	Home Phone	Occupation		
<b>Travel Information</b>	Arrival Date		Departure Date	
	Travel Method <input type="checkbox"/> Plane <input type="checkbox"/> Car <input type="checkbox"/> Bus		Travel Method <input type="checkbox"/> Plane <input type="checkbox"/> Car <input type="checkbox"/> Bus	
	If Plane, Airline Name		If Plane, Airline Name	
	Flight/Bus Number		Flight/Bus Number	
	Hotel Name		Room Number	
	Events Attended (with Dates) Conferences, Meetings, Weddings etc.			
<b>Medical History</b>	Did you seek medical care for your illness? <input type="checkbox"/> Yes <input type="checkbox"/> No			
	If yes, when and where was care sought?			
	Do you have any underlying medical conditions? <input type="checkbox"/> Yes <input type="checkbox"/> No			
	If yes, please list			
	Did any of your travel companions have a similar illness? <input type="checkbox"/> Yes <input type="checkbox"/> No			
	If yes, provide names and phone numbers			
<b>Hotels and Restaurants Visited</b>				

Illness Information												
Have you recently had any of the following symptoms?				If yes, when did they begin?			If yes, how long did they last?					
	Yes	No	Don't Know	Before Arrival	In Las Vegas	After Departing	Date	<1 Day	1 Day	2 Days	3 or More Days	Ongoing
<b>General</b>												
Fever.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chills.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Body Ache.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fatigue.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Joint Pain.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chest Pain.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Back Pain.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anxiousness.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Gastrointestinal</b>												
Nausea.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vomiting.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diarrhea.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bloody Diarrhea.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Abdominal Cramps.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Abdominal Pain.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yellow skin or eyes.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Dermatologic</b>												
Rash.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Itchy Rash.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Itchy Skin.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hives.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Neurologic</b>												
Headache.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confusion.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paralysis.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of Consciousness.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vision Problems.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Weakness.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Numbness.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dizziness.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Memory Loss.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Respiratory</b>												
Shortness of Breath.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty Breathing.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cough.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sore Throat.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Congestion.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Runny Nose.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sneezing.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Itchy/Watery Eyes.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## June and July 2018 Gastrointestinal Illness Survey

### Introduction

The Southern Nevada Health District (SNHD) is conducting this confidential survey to gather information on recent reports of gastrointestinal illnesses among persons who visited Westgate Las Vegas Resort & Casino. The information provided will assist us in determining the extent of illness. Please complete the survey regardless of whether you became ill.

Any information provided on this survey is considered to be confidential health information per NRS 441A.220, and cannot be shared outside the investigation. If you need to go back to modify an answer, please use the buttons provided on the page. Using the back function on your browser will cause the survey to malfunction. Your participation is greatly appreciated.

*\*1. What is your responsibility as survey participant*

☐

Employee

☐

Guest

2. If you are an employee, what is your job title?

*\*3. What is your first name?*

*\*4. What is your last name?*

*5. What is your gender?*

☐

Male

☐

Female

☐

Other (please specify)

6. What is your age?

*\*7. What is your state of residence?*

\*8. What is the best phone number at which to reach you (in case we need additional information)?

9. What is your email address (in case we need additional information)?

10. Did you develop any of the following signs/symptoms?

	Yes	No	Don't Know
Fever?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diarrhea?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vomiting?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nausea?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Abdominal Cramps?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Muscle aches?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Headache?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fatigue?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chills/Sweats?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dizziness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other (please specify)

At what date and time did the earliest of these signs/symptoms begin?

Click or tap to enter a date.

12. Are you still ill?

13. At what date and time did your symptoms end? Date / Time

Click or tap to enter a date.

14. Did you seek medical attention outside the event for your illness?

☐ Yes

☐ No

15. If you sought medical care, did you provide a stool specimen for laboratory testing?

☐ Yes

☐ No

16. If yes, what is the name of the provider that took the sample?

**If you stayed in a hotel, please provide the following information. If not, then proceed to question #20.**

17. At which hotel did you stay during your time in Las Vegas?

18. What day did you check-in the hotel you stayed at?

Date / Time

Click or tap to enter a date.

19. What date did you check out from the hotel?

Date / Time

Click or tap to enter a date.

20. Did you attend/work in an event?

☐ Yes

☐ No

Other (please specify)

21. Which event(s)? Please provide dates for each event.

22. Did you see any one vomit in a public place?

23. If you saw someone vomit in a public place, describe the location.

24. What food establishment(s) did you consume any food or drink during your stay (prior to illness)? Please provide establishment(s) name and date(s).

25. If there is any other information you would like to share with the investigating team, please provide it here.

*Please limit these comments to those which would be helpful in the investigation of the causes of illness. The Southern Nevada Health District thanks you for your time and cooperation. If you have any additional questions, we can be reached at 702-759-1300, option 2.*




## Appendix D

### UNCONTROLLED RISK FACTORS OBSERVED WESTGATE JULY 5, 2018

Uncontrolled Risk Factor	Food Safety Concern Observed	# of Observations	Location
Poor Personal Hygiene – Handwashing			
	Washing hands improperly	Multiple	Court Deli
	Changing gloves without washing hands	Multiple	Sids
		Multiple	Court Deli
	Active food and beverage preparation occurring without hand sinks present in area	3	Ballroom AILR
	Wiping gloves on soiled apron	1	Sids
	Touching food contact surface of clean plate ware	1	Sids
Poor Personal Hygiene – Hand sink issues impeding proper use			
	Hand sinks with significant leaks/clogs/plumbing issues deterring their use	1	North Banquet Dishup
		1	Pavilion Banquet Dishup
		1	Showroom Bar
	Hand sinks not stocked (missing soap or paper towels)	1	Pavilion Banquet Dishup Coffee Production Room
		1	888 Noodle Bar
		1	Zen Lounge
	Using hand sink to fill bucket	1	Pantry Garde Manger
	Hand sinks with insufficient hot water (less than 100)	Multiple	888 Noodle Bar
		1	Silk Road Asian Bistro
		Multiple	Benihana
	Dump sinks and food prep sinks stocked with soap dispensers	Multiple	Sportsbook Bar

UNCONTROLLED RISK FACTORS OBSERVED WESTGATE JULY 5, 2018

Contamination – Hand sink specific			
	Missing splashguard at hand sink with food or food contact surfaces within 18" of hand sink	1	Bakery
		Multiple	Sportsbook Bar
	Using hand sink to rinse food contact surfaces	1	Pantry Garde Manger
Contamination – Utensil specific			
	Utensils stored in splash zone of hand sink	Multiple	Sportsbook Bar
	Tong handles stored touching ready to eat foods	Multiple	Court Deli
	Utensils stored on pipes	Multiple	Sportsbook Bar
	Chemical spray bottle stored on food contact surfaces	1	Tempo Bar
Contamination - General			
	Uncovered food and garnishes stored outside of a sneeze guard	1	Time Share Sales Buffet and Bar
		1	Pool Bar
	Wiping food contact surfaces with soiled, dry cloth	1	Pool Grill
	High touch surfaces served to multiple guests without sanitizing between uses (beer buckets, pitchers)	Multiple	Pool Bar
Improper Holding Temperature			
	PHF/TCS foods in the temperature danger zone	Multiple	Silk Road Asian Bistro
	Refrigeration unable to maintain foods below 41	1	Silk Road Asian Bistro

	<p style="text-align: center;"><b>Southern Nevada Health District</b>  <b>Guidelines for the Prevention and Control of</b>  <b>Gastroenteritis/Norovirus</b></p>
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**Cleaning and Disinfecting an Emetic and/or Fecal Event**

1. Ensure that all biohazardous accidents are only remediated by staff trained and properly protected for such clean-up activities.
2. Have staff document all biohazardous accidents in a log, including date, time, location, including room number if applicable, and persons affected. Treat all fecal and vomitus events as if they are contaminated with a highly infectious organism.
3. Disposable cleaning cloths should be used.
4. Dedicated disposable cleaning cloths should be used in toilet areas.
5. If anyone has an emetic or fecal accident, the area must be cleaned and disinfected with a virucidal agent\* immediately. The area where such an incident has occurred should be closed, or cordoned off, for at least one hour and all windows opened to allow thorough air circulation. Staff and guests should be excluded from the area for the duration of the cleanup.
6. Individuals who clean up emesis or feces should use the following procedures:
  - a. Wear disposable mask, gloves, eye shield, shoe covers and plastic disposable apron.
  - b. Use paper towels to soak up excess liquid. Transfer these and any solid matter directly into a plastic waste bag.
  - c. Clean the soiled area with detergent and hot water, using a disposable cloth.
  - d. Disinfect the contaminated area with a virucidal agent\*.
  - e. Dispose of apron, gloves, mop heads and disposable cloths into a plastic waste bag.
  - f. Wash hands thoroughly using soap and water for at least 1 minute and then dry them thoroughly after completing the clean-up procedure and again after completing the disposal procedure, followed by optional use of alcohol-based sanitizer.
  - g. Contaminated carpets should be cleaned in a three step process. First, carpets must be cleaned with carpet detergent and hot water. Second, carpets must be disinfected by applying an appropriate disinfectant. Finally, carpets should be finally steam cleaned (158°F for 5 minutes or 212°F for 1 minute is needed for complete inactivation).
7. Contaminated linen and other materials should be placed carefully into separate laundry bags. They must be cleaned by a commercial laundry with washing machines capable of reaching 160 degrees Fahrenheit. These materials must be dried completely in a commercial dryer. The commercial laundry must be informed that the laundry is potentially infectious.
8. Soiled cushions, mattresses, and other soft furnishings should be removed for disinfection using an appropriate virucidal agent\* and subsequent steam-cleaning. If soiling on a mattress exceeds one quart in volume, you must do one of the following:
  - Treat the mattress in place or
  - Wrap the mattress in heavy gauge plastic and have the mattress sterilized or
  - Discard via normal solid waste disposal procedures.
9. Contaminated hard surfaces should be washed with detergent and hot water, using a disposable cloth, then disinfected with a virucidal agent\*. Cloths and mop heads should be disposed of as biohazardous waste.
10. Furniture and soft furnishings in the vicinity of the soiled area should be cleaned with detergent and hot water, using a disposable cloth, and disinfected using an appropriate virucidal agent\*. These items must then be air dried in the sun for a few hours.



## Southern Nevada Health District Guidelines for the Prevention and Control of Gastroenteritis/Norovirus

11. Fixtures and fittings in toilet areas should be cleaned with detergent and hot water using a disposable cloth, then disinfected using a virucidal agent\*.

*\*Follow manufacturer's directions for use of the virucidal agent.*

### Appendix A Products Approved by the EPA for use Against Norovirus

A number of commercially-available products have been approved by the EPA for use against norovirus. Because norovirus is difficult to grow in laboratory conditions, these products have been tested against Feline Calicivirus (FCV), a surrogate for norovirus. The complete EPA testing methodology can be found at

[http://www.epa.gov/oppad001/pdf\\_files/confirmatory\\_virucidal\\_test.pdf](http://www.epa.gov/oppad001/pdf_files/confirmatory_virucidal_test.pdf).

This list is provided solely as a courtesy to child care centers. **The Southern Nevada Health District does not endorse or recommend any particular product or manufacturer, and inclusion on this list should not be taken as such an endorsement.** This list is based on products known to staff of the Health District at the time this document was created, and should not be assumed to be comprehensive. These products vary in their cost, contact time needed, ability to clean and sanitize/disinfect, and shelf life. Each product must be used in accordance with the manufacturer's instructions and state/local regulations, and appropriate training and personal protective equipment must be provided to staff before they are used. If you have questions or concerns about the use of a particular product, please contact the Environmental Health Specialist assigned to your facility.

Method/Chemical	Product and Manufacturer
Bleach (Sodium hypochlorite)	Generic – 1000 ppm
Ethanol	Generic – 75% Ethanol
Heat	> 170°F
Hydrogen peroxide	Accelerated Hydrogen Peroxide™ (Virox Technologies)
Hypochlorous acid	Sterilox (PuriCore)
Phenols	Mikro-Bak® II (Ecolab)
Parachlorometaxylenol (PCMX)	EcoTru® (EnviroSystems)
Potassium peroxomonosulphate	Virkon® (Antec International)
Quaternary Ammonia (hospital grade)	HB or TB Quat Disinfectant Cleaner (3M™) ** Note: regular quaternary ammonia is not effective against norovirus **





## HEALTHY SWIMMING

### Fecal Incident Response Recommendations for Aquatic Staff

What do you do when you find poop in the water?



**Check for existing guidelines from your local or state regulatory agency before use. CDC recommendations do not replace existing state or local regulations or guidelines.**

These recommendations are for responding to fecal incidents in chlorinated aquatic venues (for example, pools and water playgrounds).

Improper handling of chlorine-based disinfectants can cause injury. Follow proper occupational safety and health requirements when following these recommendations. For more pool chemical safety information, visit [www.cdc.gov/healthywater/swimming/aquatics-professionals/preventing-pool-chemical-events.html](http://www.cdc.gov/healthywater/swimming/aquatics-professionals/preventing-pool-chemical-events.html).

**CLOSURES:** Fecal incidents are a concern and an inconvenience to both aquatic staff and patrons. Aquatic staff should carefully explain to patrons why the aquatic venue needs to be closed in response to a fecal incident. Explaining the reasons for closing the venue (for proper disinfection and protection of swimmer health) is likely to promote patron understanding and minimize their frustration. Closures allow chlorine to do its job—kill germs and help prevent recreational water illnesses (RWIs).

Hot tubs/spas, and some water playgrounds, can have much smaller amounts of water. In response to formed or diarrheal fecal incidents in small-volume venues, it might be more efficient to completely drain as much water as possible from the venue and associated plumbing; scrub and clean all accessible surfaces in contact with contaminated water; replace or clean filter media when appropriate, and refill with uncontaminated water from an approved source (for example, municipal water system).



U.S. Department of Health and Human Services  
Centers for Disease Control and Prevention

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Released September 15, 2016 CS266599A



## What do I do about...

### formed fecal matter (poop) in the water?

Formed fecal incidents pose a risk for spreading germs, including moderately chlorine tolerant *Giardia*. To disinfect the water following a formed fecal incident, aquatic staff should follow the steps below, which are based on killing or inactivating *Giardia*.

**Step 1:** Close the aquatic venue to swimmers. If you have multiple venues that use the same filtration system—all of the venues will have to be closed to swimmers. Do not allow anyone to enter the venue(s) until the disinfection process is completed.

**Step 2:** Remove as much of the fecal matter as possible (for example, using a net or bucket) and dispose of the fecal matter in a sanitary manner. Clean and disinfect the item used to remove the fecal matter (for example, after cleaning, leave the net or bucket immersed in the water during disinfection). **VACUUMING FECAL MATTER FROM THE WATER IS NOT RECOMMENDED.**

**Step 3:** Using unstabilized chlorine (for example, sodium hypochlorite), raise the water's free chlorine concentration to 2 parts per million (ppm), if less than 2 ppm. Maintain free chlorine concentration at 2 ppm and water at pH 7.5 or less for 25–30 minutes.<sup>1</sup> Other concentrations or closure times can be used (see table). State or local regulators may require higher free chlorine concentration in the presence of chlorine stabilizers,<sup>2</sup> which are known to slow the rate at which free chlorine inactivates or kills germs.

**Step 4:** Confirm that the filtration system is operating while the water reaches and is maintained at the proper free chlorine concentration and pH for disinfection.

**Step 5:** Allow swimmers back into the water only after the disinfection process has been completed and the free chlorine concentration and pH are within the operating range allowed by the state or local regulatory authority.

#### Establish a fecal incident log.

Document each fecal incident by recording date and time of the event, whether it involved formed fecal matter or diarrhea and the free chlorine concentration and pH at the time of observation of the event. Before reopening the aquatic venue, record the procedures followed in response to the fecal incident (including the process used to adjust chlorine concentration and pH [if necessary], the free chlorine concentration and pH, and the disinfection time). You can download a Water Contamination Response Log at <http://www.cdc.gov/healthywater/swimming/aquatics-professionals/fecalresponse.html>

#### *Giardia* Kill or Inactivation Time for a Formed Fecal Incident

Free Chlorine Concentration (ppm)	Disinfection Time <sup>3</sup>
1.0	45 minutes
2.0	25–30 minutes
3.0	19 minutes



1. Ideally, the water temperature should be 77°F (25°C) or higher during the disinfection process.

2. Chlorine stabilizers include compounds such as cyanuric acid, dichlor, and trichlor.

3. These closure times are based on 99.9% kill or inactivation of *Giardia* cysts by chlorine at pH 7.5 or less and temperature of 77°F (25°C) or higher. The closure times were derived from the U.S. Environmental Protection Agency (EPA) Disinfection Profiling and Benchmarking Guidance Manual. These closure times do not take into account "dead spots" and other areas of poor pool water mixing.



## What do I do about...

diarrhea in the water when chlorine stabilizer<sup>1</sup> is NOT in the water?

A diarrheal incident is a high-risk event for contamination caused by *Cryptosporidium* (or “Crypto”), an extremely chlorine-tolerant parasite. Therefore, it is important that aquatic staff educate patrons not to swim when ill with diarrhea. To disinfect the water following a diarrheal incident, aquatic staff should hyperchlorinate, or raise the free chlorine concentration to a high concentration for a long period of time. If necessary, before attempting to hyperchlorinate, consult an aquatic professional to determine the feasibility, the most optimal and practical methods, and needed safety considerations.

**Step 1:** Close the aquatic venue to swimmers. If you have multiple venues that use the same filtration system—all of the venues will have to be closed to swimmers. Do not allow anyone to enter the venue(s) until the hyperchlorination process is completed.

**Step 2:** Remove as much of the fecal matter as possible (for example, using a net or bucket) and dispose of the fecal matter in a sanitary manner. Clean and disinfect the item used to remove the fecal matter (for example, after cleaning, leave the net or bucket immersed in the water during hyperchlorination).

### **VACUUMING FECAL MATTER FROM THE WATER IS NOT RECOMMENDED.**

**Step 3:** Using unstabilized chlorine (for example, sodium hypochlorite), raise the water’s free chlorine concentration (see Table below) and maintain water at pH 7.5 or less.<sup>2</sup>

#### **Establish a fecal incident log.**

Document each fecal incident by recording date and time of the event, whether it involved formed fecal matter or diarrhea and the free chlorine concentration and pH at the time of observation of the event. Before reopening the aquatic venue, record the procedures followed in response to the fecal incident (including the process used to adjust chlorine concentration and pH [if necessary], the free chlorine concentration and pH, and the hyperchlorination time). You can download a Water Contamination Response Log at: <http://www.cdc.gov/healthywater/swimming/aquatics-professionals/fecalresponse.html>

**Step 4:** Achieve a concentration × time (CT) inactivation value of 15,300<sup>3</sup> to inactivate or kill Crypto. The CT inactivation value refers to the concentration of free chlorine in parts per million (ppm) multiplied by time in minutes at a specific pH and temperature.

**Step 5:** Confirm that the filtration system is operating while the water reaches and is maintained at the proper free chlorine concentration and pH for hyperchlorination.

**Step 6:** Backwash the filter thoroughly after reaching the CT inactivation value. Be sure to discharge directly to waste and according to state or local regulations. Do not return the backwash through the filter. Where appropriate, replace the filter media.

**Step 7<sup>4</sup>:** Allow swimmers back into the water only after the required CT inactivation value has been achieved and the free chlorine concentration and pH are within the operating range allowed by the state or local regulatory authority.

#### **Use the formula below to calculate the time required to inactivate or kill Crypto<sup>5</sup>**

Concentration × time (CT) inactivation value	÷	Free chlorine concentration (parts per million [ppm])	Time (in minutes)
15,300	÷	20*	= 765 (or 12.75 hours)
15,300	÷	10	= 1,530 (or 25.5 hours)

1. Chlorine stabilizers include compounds such as cyanuric acid, dichlor, and trichlor.

2. Ideally, the water temperature should be 77°F (25°C) or higher during the hyperchlorination process.

3. Alternative options could include circulating the water through a secondary disinfection system (for example, ultraviolet light or ozone) to theoretically reduce the number of Crypto oocysts in the aquatic venue(s) below one oocyst/100 mL as outlined in the Model Aquatic Health Code (MAHC) standard 4.7.3.3.2.4 (current edition of the MAHC is available at [www.cdc.gov/mahc/currentedition/index.html](http://www.cdc.gov/mahc/currentedition/index.html)) or draining the aquatic venue(s).

4. CDC does not recommend testing the water for Crypto after hyperchlorination is completed. Although hyperchlorination destroys Crypto’s infectivity, it does not necessarily destroy the structure of the parasite.

5. Shields JM, Hill VR, Arrowood MJ, Beach MJ. Inactivation of *Cryptosporidium parvum* under chlorinated recreational water conditions. J Water Health. 2008;6(4):513–20.

\* Many conventional test kits cannot measure free chlorine concentrations this high. Use chlorine test strips that can measure free chlorine in a range that includes 20–40 ppm (such as those used in the food industry) or make dilutions for use in a standard DPD test kit using chlorine-free water.



## What do I do about...

### diarrhea in the water when chlorine stabilizer<sup>1</sup> is in the water?

A diarrheal incident is a high-risk event for contamination caused by *Cryptosporidium* (or "Crypto"), an extremely chlorine-tolerant parasite. Therefore, it is important that aquatic staff educate patrons not to swim when ill with diarrhea. To disinfect the water following a diarrheal incident, aquatic staff should hyperchlorinate, or raise the free chlorine concentration to a high concentration for a long period of time. If necessary, before attempting to hyperchlorinate, consult an aquatic professional to determine the feasibility, the most optimal and practical methods, and needed safety considerations.

**Step 1:** Close the aquatic venue to swimmers. If you have multiple venues that use the same filtration system—all of the venues will have to be closed to swimmers. Do not allow anyone to enter the venue(s) until the hyperchlorination process is completed.

**Step 2:** Remove as much of the fecal matter as possible (for example, using a net or bucket) and dispose of the fecal matter in a sanitary manner. Clean and disinfect the item used to remove the fecal matter (for example, after cleaning, leave the net or bucket immersed in the water during hyperchlorination).

**VACUUMING FECAL MATTER FROM THE WATER IS NOT RECOMMENDED.**

**Step 3:** Using unstabilized chlorine (for example, sodium hypochlorite), raise the water's free chlorine concentration (see bullets below) and maintain water at pH 7.5 or less.<sup>2</sup>

**Step 4:** Hyperchlorinate.<sup>3</sup> Chlorine stabilizer slows the rate at which free chlorine inactivates or kills Crypto, and the more stabilizer there is in the water the longer it takes to kill Crypto.

**If the cyanuric acid concentration is 1–15 parts per million (ppm)<sup>4</sup>**

- Raise the free chlorine concentration to 20 ppm<sup>5</sup> and maintain it for 28 hours or
- Raise the free chlorine concentration to 30 ppm<sup>5</sup> and maintain it for 18 hours or
- Raise the free chlorine concentration to 40 ppm<sup>5</sup> and maintain it for 8.5 hours

**If the cyanuric acid concentration is more than 15 ppm, lower the concentration to 1–15 ppm by draining partially and adding fresh water without chlorine stabilizer before attempting to hyperchlorinate.**

**Step 5:** Confirm that the filtration system is operating while the water reaches and is maintained at the proper free chlorine concentration and pH for hyperchlorination.

**Step 6:** Backwash the filter thoroughly after hyperchlorination has been completed. Be sure to discharge directly to waste and according to state or local regulations. Do not return the backwash through the filter. Where appropriate, replace the filter media.

**Step 7<sup>6</sup>:** Allow swimmers back into the water only after hyperchlorination has been completed and the free chlorine concentration and pH are within the operating range allowed by the state or local regulatory authority.

#### **Establish a fecal incident log.**

Document each fecal incident by recording date and time of the event, whether it involved formed fecal matter or diarrhea and the free chlorine concentration and pH at the time of observation of the event. Before reopening the aquatic venue, record the procedures followed in response to the fecal incident (including the process used to adjust chlorine concentration and pH [if necessary], the free chlorine concentration and pH, and the hyperchlorination time). You can download a Water Contamination Response Log at <http://www.cdc.gov/healthywater/swimming/aquatics-professionals/fecalresponse.html>

1. Chlorine stabilizers include compounds such as cyanuric acid, dichlor, and trichlor.

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4. Murphy JL, Haas CN, Arrowood MJ, Hlavsa MC, Beach MJ, Hill VR. Efficacy of chlorine dioxide tablets on inactivation of *Cryptosporidium* oocysts. *Environ Sci Technol*. 2014;48(10):5849–56.

5. Many conventional test kits cannot measure free chlorine concentrations this high. Use chlorine test strips that can measure free chlorine in a range that includes 20–40 ppm (such as those used in the food industry) or make dilutions for use in a standard DPD test kit using chlorine-free water.

6. CDC does not recommend testing the water for Crypto after hyperchlorination is completed. Although hyperchlorination destroys Crypto's infectivity, it does not necessarily destroy the structure of the parasite.