

**Outbreaks Associated with *Norovirus* in Seventeen Long-Term Care Facilities in Clark County, Nevada, 2010 and 2011**

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**Current Situation**

Since the beginning of 2010, the Southern Nevada Health District (SNHD), Office of Epidemiology, identified outbreaks of acute gastroenteritis illness in 17 long-term care facilities (LTCFs) in the Las Vegas area. The affected facilities included six Skilled Nursing Facilities, five Assisted Group Care (AGC), five AGCs for Alzheimer's (AGZ), and one facility that had both AGC-AGZ units. Of 3,852 residents and staff, 803 (21%) people were ill, 20 residents required hospitalization for treatment of their illness, and one death was reported.

*Norovirus (NoV)* was suspected as the etiological agent in all 17 outbreaks, and testing by the Southern Nevada Public Health Laboratory (SNPHL) confirmed *NoV* at nine of the affected facilities. The investigation into these outbreaks revealed evidence of *NoV* transmission between facilities by staff members who worked at multiple affected facilities. Additionally, some residents had also been transferred between facilities while infectious, potentially resulting in transmission to staff and/or patients in the receiving facility.

The SNHD, the SNPHL, and the Nevada State Health Division's Bureau of Health Care Quality and Compliance collaborated on the investigation and response to these outbreaks.

**Clinical Presentation**

*NoV* infection is usually a self-limited disease with clinical symptoms that include nausea, vomiting, non-bloody diarrhea, abdominal pain, myalgia, headaches, malaise, and low-grade fever. It is estimated that 32% of infected individuals may be asymptomatic. Symptoms can often occur with little or no prodrome and characteristically last 24 to 72 hours in healthy persons. However, prolonged illness lasting 4-6 days can occur, particularly among young children and hospitalized patients. *NoV*-associated infections in elderly populations, who often have underlying medical conditions, can be severe resulting in hospitalization and death.

**Transmission**

Transmission of *NoV* can occur through three general routes: person-to-person, foodborne, and waterborne transmission. Person-to-person might occur through the fecal-oral route, through ingesting particles of vomitus that have been aerosolized, or through contact with contaminated environmental surfaces. Foodborne transmission typically occurs by contamination from infected food handlers during preparation and service, but foods can become contaminated with *NoV* at any point during production, processing, distribution, and preparation. Shellfish (particularly oysters) from contaminated beds, raw fruits and vegetables, contaminated milk or milk products have served as vehicles for *NoV* spread. Recreational and drinking water can serve as vehicles of *NoV* transmission and result in large community outbreaks.

The incubation period is usually 24-48 hours (range 10-50 hours). The period of communicability is greatest during the acute stage of the disease, however the length of time an infected person is contagious after symptoms resolve is unknown. The low inoculum ( $\geq 18$  viral particles) required for transmission and prolonged shedding period (an average of four weeks following infection) make the spread of *NoV* infections difficult to control.

**Diagnosis**

Many public health and clinical laboratories perform real-time reverse transcription-polymerase chain reaction (RT-PCR) assays for *NoV* detection. Enzyme immunoassay (EIA) might be useful for preliminary screening of multiple fecal samples associated with an outbreak of acute gastroenteritis. Because of their poor sensitivity, negative EIA results should be confirmed by RT-PCR reference methods. For this reason, EIAs are not recommended for clinical diagnosis of *NoV* infection in sporadic cases of gastroenteritis.

Whole stool specimens for laboratory diagnosis of *NoV* should be obtained during the acute phase of illness (i.e., within 48-72 hours after onset) while

the stools are still liquid or semisolid and viral excretion is at its peak. Specimens collected later in illness or after resolution (i.e., up to 7–10 days after onset) might still provide a diagnosis and an opportunity to confirm *NoV* infection.

### Clinical Management

There is currently no vaccine that will prevent *NoV* infections. Treatment for *NoV* mainly involves supportive care. Oral rehydration therapy is an effective and the most common treatment for *NoV* infection. Intravenous fluids and hospitalization may be needed if the person cannot maintain an adequate oral intake of fluids.

### Infection Control

Strict hand hygiene is the most important method to prevent *NoV* infection and control transmission. Proper hand washing with soap and running water for at least 20 seconds is the most effective way to reduce hand *NoV* contamination. Hand sanitizers might serve as an adjunct in between proper hand washings, but should not be considered a substitute for frequent soap and water hand washing.

Isolation or cohorting of symptomatic patients and staff are often the most practical means of interrupting transmission of virus and limiting contamination of the environment. Isolation of both exposed and unexposed well persons might be useful during outbreaks in LTCFs. Ill patients generally should not be transferred to unaffected units in the facility or to other facilities except in the case of medical necessity and after consultation with infection-control staff. If possible, units within the facility (or the whole facility during outbreaks) may be closed to new admissions to prevent the introduction of new susceptible patients. Ill staff members should be excluded during their illness and for 48–72 hours following resolution of symptoms. Food-service workers who test positive for *NoV* must be excluded or restricted from work per the FDA Food Code, and may require permission from the SNHD to return to work. Nonessential personnel and facility visitors should be screened for symptoms and excluded if symptomatic. They should also be cautioned about how *NoV* is transmitted and be made aware of the heightened importance of hand hygiene through washing with

soap and water.

The efficacy of sodium hypochlorite (chlorine bleach) has been widely documented to disinfect human *NoV* from environmental surfaces. When possible, chlorine bleach solution should be applied to hard, nonporous, environmental surfaces at a concentration of 1,000–5,000 ppm (5–25 table-spoons household bleach [5.25%] per gallon of water). A list of EPA-approved commercial cleaning products that are effective against feline caliciviruses is available at [http://www.epa.gov/oppad001/list\\_g\\_NoV.pdf](http://www.epa.gov/oppad001/list_g_NoV.pdf). Personnel performing environmental services should adhere to the manufacturer's instructions for dilution, application, and contact time.

Additional infection control measures for healthcare and LTCFs are included in the *SNHD Guidelines for the Prevention and Control of NoV in Extended Care Facilities and Nursing Homes* available online at <http://www.southernnevadahealthdistrict.org/health-care-providers/norovirus-guidelines.php>

### Reporting

Individual cases of *NoV* are not nationally notifiable; however, all outbreaks of acute gastroenteritis must be reported per the Nevada Administrative Code 441, which specifies that illnesses that are related to known or suspected outbreaks must be reported to the SNHD Office of Epidemiology at (702) 759-1300, option 2. This number is available 24-hours a day, seven days a week. Please contact the Office of Epidemiology if you would like additional information or have questions about reporting.

### References

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*Southern Nevada Health District Guidelines for the Prevention and Control of NoV in Extended Care Facilities and Nursing Homes*. (2010, March). Retrieved May 10, 2011, from <http://www.southernnevadahealthdistrict.org/health-care-providers/norovirus-guidelines.php>