Transmission can occur when people touch these contaminated feet where they can subsequently contaminate a surface. Contamination of food by a food handler. Also, norovirus outbreaks of norovirus illness are likely caused by direct contact with food, equipment or packaging materials. Many foodborne viruses in foods. Additionally, food can be contaminated at its source; for example, oysters harvested from norovirus-contaminated waters have been associated with widespread outbreaks of gastroenteritis. Fresh produce items, such as berries and leafy greens, may become contaminated from dirty irrigation water or when infected food handlers handled the product.

**PRIMARY ROUTES OF TRANSMISSION**

Noroviruses are present in the feces or vomitus of infected people. These individuals can play a key role in management of this tenacious infection. These routes are not infect a person through the respiratory system (that is, by breathing in virus particles), but virus particles contained in aerosol droplets can enter the gastrointestinal tract by contact with the tissues in the mouth or nose. Outbreaks have frequently been associated with consumption of ready-to-eat foods, including various salads, sandwich-fixing products and other shelf-stable foods. Liquid or semi-solid items (i.e., cake mixes) in which the virus is dispersed throughout the food have also been implicated as a cause of outbreaks. Additionally, food can be contaminated at its source; for example, oysters harvested from norovirus-contaminated waters have been associated with widespread outbreaks of gastroenteritis. Fresh produce items, such as berries and leafy greens, may become contaminated from dirty irrigation water or when infected food handlers handled the product.

**SYMPTOMS & DISEASE PROCESS**

Norovirus infection causes acute gastroenteritis: nausea, frequent, sudden and occasionally violent vomiting, and/or diarrhea. Other symptoms include low-grade fever, chills, headache, muscle ache and fatigue. Symptom onset can occur as soon as 12 hours after exposure, but more often it is 24 to 48 hours after ingestion of the virus. The illness usually lasts one to two days, and in most cases recovery occurs without further complications. However, dehydration and related complications can be a risk in very young, elderly or immunocompromised persons. Norovirus is extremely contagious due to its low infectious dose of as few as 10 to 200 viral particles. This means that low-level contamination of food, water, and surfaces could lead to outbreaks if others come in contact with the norovirus particles.

People can start to shed the virus before they start feeling ill and can continue for days to weeks after symptoms resolve. Individuals can become re-infected with norovirus since immunity lasts for just a short time.

**CONTROL OF NOROVIRUS**

Having a written plan and being prepared to implement the plan are important elements for effectively responding to and managing situations involving potential norovirus contamination. Norovirus is also a common cause of gastroenteritis in schools.

- Have the necessary equipment on hand (i.e., disinfectant products effective against norovirus, personal protective equipment, biohazard cleanup kits, etc.)
- Properly train employees properly before an incident.
- Exclude ill individuals from food handling activities and the food establishment itself. (Facilities should have policies in place prohibiting individuals ill with norovirus symptoms from working.)
- Implement proper hand washing protocols and ensure that all individuals working in a food establishment are trained following FDA’s Food Code. Limit or prohibit bare hand contact with ready to eat foods, per local health department regulations.
- Follow guidance to assist the retail food industry in preparing for and effectively handling the cleaning and sanitation of potential norovirus incidents, which are associated with water and food materials. The recommendations in this guidance can be incorporated into cleaning and sanitation procedures for foods implicated in suspected norovirus infection and/or associated with contaminated hard surfaces including, but not limited to: restrooms, floors, walls, countertops, display cases and food preparation areas and equipment.
- With norovirus being so prevalent, focused effort by food handlers and pest control staff is needed to stem the norovirus tide of norovirus outbreaks in food establishments. These individuals can play a key role in management of this tenacious infection.

**What is your Food Safety Culture?**

**THE Pacific Region Wellness**

**Fall Report**

Local college and university efforts to focus on nutrition and healthy habits.
Preventing and Mitigating a Norovirus Outbreak in Colleges and Universities

By: Daniel E. Acton, MPH, RDH, Senior Manager of Food Safety, Workplace Safety & Environmental Compliance, Stanford University R&D

How does Norovirus transmission in universities/institutions differ from restaurants?

- Transmission is most usually by person to person contact rather than through food or food handler point source.
- In a single instance of vomiting by an infected student in a restroom, billions of viral particles can be aerosolized and released into the surroundings.
- If this were to occur in a servery or around food, any of the food in the surrounding area would be potentially contaminated regardless of the cleanup.
- Students who touch objects in the vicinity and put their hands in their mouths will be infected.
- Students or staff who have Norovirus can shed billions of viral particles in their stool prior to the onset of symptoms and up to 14 days after symptoms disappear.
- Infected staff or students can easily contaminate surfaces, food, serving utensils and other common touch points.

Suggestions for preventing and mitigating Norovirus outbreak in a university or institutional setting:

Have an effective Food Safety program in place that:

- Continuously educates and trains food handlers on frequent and proper hand washing (excluding personal hygiene and referendum policy).
- Has an effective employee illness policy in place that encourages team members to stay home when sick, inform management if experiencing vomiting, diarrhea, fever with a sore throat and jaundice; and if diagnosed with one of the CDE’s five reportable foodborne illnesses: http://www.cdph.ca.gov/Programs/IFCD/IFCD0100/Documents/5IV.pdf
- Prevents bare hand contact with ready-to-eat foods. Encourages use of serving utensils or gloved hands to handle ready-to-eat foods.
- Replaces serving utensils when food on a buffet line is changed.
- Has cleaning guidelines in place for accidental discharge of vomitus in the dining hall, residential hall or other common areas.
- Has an effective process based on retail HACCP for sourcing, receiving, storing, cleaning and removing of leafy greens.

Establish an early notification system with a residential Peer Health Educator (PHE), Student Health Center and Residential Education staff:

- A student experiencing an onset of diarrhea and vomiting immediately informs the residential staff person, detailing the time of illness onset, food eaten, location and symptoms.
- Residential staff immediately forwards information to the head of the infection control working group at the Student Health Center who determines if a Health Alert is warranted.
- A health alert from the Student Health Center is immediately sent to senior management including Residential Dining and Student Housing Health & Safety Managers.
- Health Alert protocols are immediately implemented in the dining halls and student housing.
- Educates students about modes of transmission and require hand washing prior to entering serving area.
- Note that hand sanitizers and alcohol swabs are not effective against Norovirus.

Establish Meals Delivery Service (MDS) for sick students:

- Keep sick students out of the dining halls by offering them the opportunity to order food to be delivered to their halls by dining staff.
- Establish and practice the MDS before an emergency occurs.

Employee health check:

- Determine if any dining staff currently has gastrointestinal symptoms or has had GI symptoms in the past 3-14 days.
- Require students who are symptomatic to fill out a foodborne illness questionnaire.

Voluntary closure of dining hall:

- If Norovirus is suspected or confirmed, be proactive. Voluntarily close the dining hall and thoroughly clean and sanitize. Do not wait for your local health department to shut the dining hall down.

Sanitize the dining hall:

- Thoroughly sanitize the dining hall with 1,000 – 5,000 ppm of freshly prepared household bleach solution.
- Add a final rinse of household bleach solution to a gallon of water will be approximately 2,000 ppm.
- Sanitize staff and students before returning to the rooms and common areas of the dining hall servery and kitchen concurrently.

Action for other dining halls:

- Sample buffet style service.
- Begin plating service on disposables.

Determine if there were student activities leading to the outbreak:

- Provide the appropriate information to local environmental health officials, public health nurse and epidemiologist.

Communication with students:

- Provide clear, open and concise communication to students.
- Involve resident dean (RD), resident fellows (RF) and resident assistants (RA) in the discussion.

Food borne illness questionnaire link:

- Require peer staff who are symptomatic to fill out a foodborne illness questionnaire.
- Try to determine common food items eaten by ill students and/or students staff.
- Media:
  - Have a plan in place to deal with the media.
  - Be prepared for news media to come on site.

Norovirus:

- Norovirus is foodborne and highly contagious. It can cause severe nausea, vomiting and diarrhea in infected people.
- Norovirus is spread through contaminated food or water, person-to-person contact and by contact with contaminated surfaces.
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