Learning Objectives

• Overview of Norovirus
• Noro-like outbreak follow-up
  • Reporting
  • Data Entry into MAVEN
  • Investigation
    • Source of the outbreak
    • Infection control measures
    • Restrictions/exclusions

• Resources
Outbreak: An increase in illness above what is expected, by facility, regarding place and time resulting from a common exposure.

Gastrointestinal illness outbreaks that are suspected (based on clinical information) or laboratory-confirmed to be caused by norovirus are collectively referred to as noro-like outbreaks.
Overview - Norovirus

• Commonly referred to as the “Stomach bug”

• Non-enveloped single stranded RNA virus
  • Genetic diversity- 5 genogroups comprised of ~35 genotypes

• Leading cause of vomiting, diarrhea, and foodborne illness in the United States
  • 58% of all foodborne illnesses with 5 million illnesses estimated annually

• Causes acute gastroenteritis
  • Inflammation of the stomach or the intestines

• Humans are the only known reservoir
Norovirus Basics

- Incubation period (12-48 hours)
- Illness duration (1-3 days)
- Symptoms
  - Vomiting
  - Diarrhea
  - Nausea
  - Stomach pain/ cramping

- Infectious period-symptom onset through 72 hours post symptom resolution
  - MDPH’s 105CMR300.200
  - Continued shedding after resolution
  - Persistence in the environment
“Noroviruses are perhaps the perfect human pathogens. “

- **Possess all attributes of an ideal infectious agent:**
  - ✔️ **Highly contagious**
    - Extremely low infectious dose (≥18 viral particles)
  - ✔️ **Rapidly and prolifically shed**
    - Up to 5 billion infectious doses shed in each gram of feces of an infected individual
    - Asymptomatic infection
  - ✔️ **Constantly evolving**
    - Genetically diverse and rapidly evolves
  - ✔️ **Provides limited immunity**
    - Lack of prolonged protection after infection
  - ✔️ **Moderately virulent**
    - Allows those infected to fully recover and therefore maintains a large pool of susceptible hosts

Aron J. Hall, Noroviruses: The Perfect Human Pathogens?, *The Journal of Infectious Diseases*, Volume 205, Issue 11, 1 June 2012, Pages 1622–1624, [https://doi.org/10.1093/infdis/jis251](https://doi.org/10.1093/infdis/jis251)
Transmission

Most norovirus outbreaks happen when infected people spread the virus to others through direct contact

- Fecal/vomit-oral transmission
- Mode of transmission
  - Person-to-person
  - Foodborne/waterborne
    - Ill food handlers surface contamination
  - Fomites (toys, utensils etc.)
  - Airborne (aerosolized vomit)

Most norovirus is spread by people who didn't wash their hands after going to the bathroom.

WASH YOUR HANDS.

cdc.gov/norovirus
Challenges to reducing norovirus transmission

- Environmentally stable
- Can survive freezing and heating (but not thorough cooking)
- Resistant to many common chemical disinfectants
- Can persist on surfaces for up to 2 weeks
- Alcohol-based hand sanitizer is ineffective
Common Norovirus Outbreak Settings

- Healthcare facilities
- Restaurants and catered events
- Schools and childcare centers
- Cruise ships
GI/ Norovirus Seasonality in Massachusetts and Nationwide

Confirmed and Suspect Norovirus Outbreaks by Month and Year of First Illness Onset, Massachusetts

Number of Suspected or Confirmed Norovirus Outbreaks Reported by NoroSTAT-Participating States Per Week, 2012–2024

Data are current as of October 13, 2023, and are subject to change.
Reporting & Documentation of Noro-like Outbreaks in Non-Food Establishments
What is reportable?

300.134: Illness Believed to Be Part of a Suspected or Confirmed Cluster or Outbreak

In addition to the diseases listed in 105 CMR 300.100, every person who is a health care provider or who is in a supervisory position at a school, day care, hospital, institution, clinic, medical practice, laboratory, labor or other camp, employers, or, if necessary, other entities determined by the Department, who has knowledge of the occurrence of any suspected or confirmed cluster or outbreak of any illness, shall report the same immediately by telephone, by facsimile or other electronic means to the local board of health in the community in which the facility is located or contact the Department directly. If the Department is notified directly, it shall notify the local board of health within 24 hours.

How are GI illness outbreaks reported?

- **Healthcare settings** can report using MDPH’s online Gastrointestinal Illness Healthcare Reporting Form
  - This replaced the GI Teleform

- Information submitted generates a MAVEN “GI Illness” cluster/outbreak event
  - MDPH epi will notify LBOHs
  - Outbreak events do not go into a workflow. LBOHs can run a report

How are GI illness outbreaks reported?

• GI Illness outbreaks in all other settings can be reported via phone or other means to MDPH or the LBOH
  • Schools
  • Daycares
  • Camps
  • Correctional facilities
  • Shelters
• Clusters reported via phone in non-food establishment settings should be documented in MAVEN as an outbreak/cluster event

Outbreaks associated with food establishments warrant the creation of a Foodborne Illness Complaint Event and notification to the Division of Epidemiology (617) 983.6800 or Food Protection Program (617) 983-6712
Creating MAVEN Cluster/Outbreak Events

If illnesses reported meet the definition of an outbreak, create a MAVEN cluster/outbreak event:

1. From the Dashboard, click on “Create Cluster/Outbreak Event” from the left-hand menu.

2. Use Cluster Naming Conventions found in MAVEN Help when naming outbreak events: FACILITYTYPE_FACILITYNAME_TOWN

3. If there are two or more lab-confirmed norovirus cases associated with the facility, select “Calicivirus/Norovirus” as the Event. Else, use “GI Illness Cluster” if norovirus is suspected.
Creating MAVEN Cluster/Outbreak Events

4. Complete required fields in **GI Illness** Question Package

**Required Fields**
- Total number of cases
- Total units/wings in facility
  - Number affected
- Total clients
  - Ill clients
- Total staff
  - Ill staff
- First onset date
- Last onset date
- Symptoms
Creating MAVEN Cluster/Outbreak Events

Complete required fields in Standard Question Package

Required Fields
- Exposure setting name
- Exposure setting type
Outbreak Investigation Steps
Goals of GI Illness Outbreak Investigation

- Rule out a point source/foodborne outbreak
- Confirm etiology is likely norovirus
- Prevent further transmission
How to tell if outbreak is norovirus without stool testing

- Most reported GI outbreaks do not have any stool testing performed

**Kaplan** Criteria
1. A mean/median illness duration of 12-60 hours,
2. A mean/median incubation period of 24-48 hours
3. More than 50% of people with vomiting and
4. No enteric bacteria found

**Lively** Criteria
1. A greater proportion of cases with vomiting than with fever,
2. Bloody diarrhea in less than 10% of cases, and
3. Vomiting in greater than 25% cases.

About 30% of Norovirus outbreaks do not meet Kaplan’s criteria. If criteria are not met, it does not rule out Norovirus as the cause.
...what if outbreak does not seem like Norovirus?

• Strongly encourage stool testing if it has not been performed yet
  • Discuss possibility of stool testing at the MA State Public Health Laboratory with assigned MDPH epidemiologist

• Hypothesize possible etiology using symptoms, epidemic curve, illness duration, and common exposures among those ill
  • [CDC Guide to Confirming an Etiology in Foodborne Disease Outbreak](#)

• Notify your assigned MDPH epidemiologist
Link diagnosed cases to the Cluster/Outbreak event

• Any outbreak-associated case with a positive lab result for a reportable condition (e.g., result is in MAVEN) should be linked to the cluster/outbreak event.
  • Your assigned MDPH epi can help with linking any events outside of your jurisdiction
    • Make sure to obtain Name, DOB and town/city
Consider the outbreak’s epidemic curve

- An epidemic curve, or “epi curve,” is a visual display of the onset of illness among cases associated with an outbreak.
- Use census data in the GI Illness question package to roughly evaluate what the outbreak’s epi curve looks like.

CDC Using an Epi Curve to Determine Mode of Spread
Point Source

• In a point source outbreak, persons are exposed over a brief time to the same source, such as a single meal or an event. The number of cases rises rapidly to a peak and falls gradually. The majority of cases occur within one incubation period of the disease.

Propagated Source

• In a propagated outbreak, there is no common source because the outbreak spreads from person-to-person. The graph will assume the classic epi curve shape of progressively taller peaks, each being one incubation period apart.

CDC Using an Epi Curve to Determine Mode of Spread
## Rule out a point-source outbreak

<table>
<thead>
<tr>
<th>Propagated Source</th>
<th>How</th>
<th>Who</th>
<th>When</th>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person to person transmission</td>
<td>Illnesses among clients and staff.</td>
<td>Begins with a couple people ill, then 24 hours later (1 incubation period), additional illness onsets observed.</td>
<td>Most illnesses among individuals on the same floor/unit/classroom or part of the same grade.</td>
<td></td>
</tr>
</tbody>
</table>

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</tr>
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<tbody>
<tr>
<td>Foodborne transmission</td>
<td>More illnesses among clients than staff. Kitchen staff may report illness.</td>
<td>Most onsets occur within 24 hours of each other.</td>
<td>Spread across facility (multiple floors/units/classrooms or grades). Individuals share a common exposure (cafeteria, attendance at an event, etc.).</td>
<td></td>
</tr>
</tbody>
</table>

“Client” can include residents, students, or attendees at a facility.
Control Measures Across Settings

1) Hand Hygiene
2) Exclusion and Isolation
3) Environmental Disinfection
4) Reduce transmission opportunities
Control Measures Across Settings

HAND HYGEINE

- Provide education, post signs encouraging proper and frequent hand washing for 20 seconds.
  - Hand sanitizer does not work well against norovirus and is not a substitute for hand washing.
Control Measures Across Settings

For all settings:

• Cohort ill individuals away from well individuals.
• Ill individuals should be excluded from others while symptomatic.
  • Should continue to be excluded for 72 hours after symptom resolution or special precautions should be taken if they return (depends on setting)
• Exclude staff who meet the 105 CMR 300 definition of a food handler
A food handler is defined as any person directly preparing or handling food; any person handling clean dishes or utensils; any person who dispenses medications by hand, assists in feeding, or provides mouth care.

- **In healthcare:** this includes those who set up trays for patients to eat, feed or assist patients in eating, give oral medications or give mouth/denture care.
- **In daycare facilities, schools, and community residential programs:** this includes those who prepare food for clients to eat, feed or assist clients in eating, or give oral medications.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Minimum Period of Isolation of Patient</th>
<th>Minimum Period of Quarantine for Contacts</th>
</tr>
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<tbody>
<tr>
<td>Noroviruses</td>
<td>Food handlers must be excluded from food handing duties for either 72 hours past the resolution of symptoms or 72 hours past the date the specimen positive for norovirus was produced, which ever occurs last.</td>
<td>Contacts with diarrhea or vomiting who are food handlers shall be excluded from food handling duties for 72 hours past the resolution of symptoms.</td>
</tr>
</tbody>
</table>

**Recommended:** Food handlers with noro-like symptoms with no lab confirmation should be excluded in the same manner as a lab-confirmed case.
Control Measures Across Settings

Healthcare Facilities

- Cohort symptomatic residents/patients
  - Restrict staff to caring for only ill or well cohort
- Use standard plus contact precautions for the duration of resident/patient illness and remain on precautions until 72 hours after symptom resolution

Childcare/Schools

- Children with norovirus infection who have diarrhea should be excluded until 72 hours after resolution of symptoms.
- Children with norovirus infection who have no diarrhea and are not otherwise ill may remain in childcare/school if special precautions are taken.
- Students who handle food and have norovirus must not prepare food for others for 72 hours after symptom resolution (e.g., home economics).

Guide to Surveillance and Reporting (MDPH is in the process of updating disease-specific chapters)
Control Measures Across Settings

1) Increase routine cleaning and disinfection to at least twice a day
2) Clean and disinfect immediately after someone vomits or has diarrhea

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<thead>
<tr>
<th>Environment</th>
<th>Measures</th>
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| Surfaces    | - Chlorine bleach solution or [EPA-registered disinfecting product against norovirus](https://www.epa.gov/organisms-causing-human-disease), followed by hot water and soap  
  - Reminder: follow guidance on label for disinfection contact time (5 minutes for bleach) |
| Laundry     | - Wash with detergent and hot water at maximum available cycle length  
  - Machine dry at the highest heat setting |
| Carpet and furniture | - Clean using steam at 158F for five minutes or 212F for one minute, or  
  - Disinfect with an EPA-registered product (hydrogen peroxide products)  
  - Do not vacuum (could aerosolize particles) |

Wear PPE while cleaning, wash your hands afterwards!
Control Measures Across Settings

REDUCE TRANSMISSION OPPORTUNITIES

• Limit movement
  • Limit staff floating between groups
  • Limit sharing of objects/fomites
• Consider notification to visitors, parents/guardians, etc.
• Cancel or reschedule group activities or events
• Review sick worker/sick child policies
When is an investigation complete?

• Complete outbreak investigation goals:
  • The expectations for GI outbreaks is to ensure that facilities implement MDPH infection control measures.
    • LBOHs do not need to monitor the outbreak until it is over.
  • It is possible to complete an investigation with a single phone call to collect data and ensure IC measures have been implemented after initial report to LBOH/MDPH.

• Provide your contact information to the facility to report:
  • Any notable increase in cases
  • Any positive lab results
  • For schools: any school closures or notices that go out to parents
MAVEN TIP SHEET for Noro-like Outbreaks in Non-Food Establishment Settings
Resources

MDPH Division of Epidemiology: (617) 983-6800

Guide to Surveillance and Reporting  (MDPH is in the process of updating disease-specific chapters)

MDPH Infection Prevention in Long Term Care: Gastrointestinal Disease

CDC Healthcare-associated Infections: General Information about Norovirus

MDPH Implementing the Exclusion of Food Handlers with Reportable Conditions

DPH School Health Manual:

- Diseases Spread Through the Intestinal Tract: page 8-27
- Norovirus: page 8-34
- Sample letter for parent/guardian: page 8-101

Disinfection & Sanitization in Childcare Environments
Norovirus Kit Supplies

Effective

- Clorox Disinfecting Wipes
- Gloves
- Soap and Water

Not Effective

- Vacuum
- Hand Sanitizer

Effective Not Effective Norovirus Kit Supplies

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Thank you

esther.j.rei@mass.gov
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