Norovirus and Norovirus-Like Illness (NLI) in Michigan

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Norovirus

- Incubation: 12–48 hours (median 33–36 hours)
- Duration: 12–60 hours
- Symptoms: diarrhea, vomiting, nausea, abdominal cramping, low grade fever
- Survival on surfaces:
  - 40°F, >60 days
  - 68°F (room temp), 21-28 days
  - 98.6°F, less than 1 day
Norovirus

- Viral shedding: up to 2–3 weeks (peaks at 4 days)
- $10^{10}$ viral particles per gram of feces
- Infectious dose: 18–1,000 virus particles
  - Less than 20 virions (virus particles) can be infectious
  - Virions can stick together like Velcro and form a clump (usually containing 20–30 virions)
- Short-term immunity: <6–12 months
Disease Burden Estimates per Year, United States

- 21 million cases
- 1.7 million outpatient visits
- 414,000 ED visits
- 71,000 hospitalizations
- 800 deaths
Required Outbreak Reporting: Public Health

- R 325.173 Details the reporting requirements for health care providers, health care facilities, and clinical laboratories
- R 325.174 Gives local and state public health officials the authority to investigate possible cases of illness
- www.michigan.gov/orr
Disease Reporting

“...report any unusual occurrence, outbreak, or epidemic of any disease or condition including healthcare-associated infections.”

Report within 24 hours of outbreak detection

Report to LHD or MDCH

Any information pertinent to the outbreak should be reported

E.g., Number ill, onset, incubation, duration, organism, control measures
Disinfection

- Virus is viable up to 7 days on inanimate objects
- Must remove visible contaminants of vomitus and diarrhea prior to disinfection
- Use dilute bleach (inexpensive and effective)
- Alternatives:
  - EPA-registered disinfectants
  - Accelerated Hydrogen Peroxide
  - Glutaraldehyde (0.5%)
  - Iodine (0.8%)
  - Lysol® or Pinesol® (2–4x manufacturer's recommended concentration)
Disinfection Concentrations

- Stainless steel, food/mouth items, toys
  - 200ppm
  - 1 tablespoon of bleach to 1 gallon of water
- Non-porous surfaces, tile floors, countertops, sinks, toilets
  - 1000ppm
  - 1/3 cup bleach to 1 gallon of water
- Porous surfaces, wooden floors
  - 5000ppm
  - 1 and 1/2 cup bleach to 1 gallon of water
Norovirus-Like Illness (NLI) Outbreak Definition

Gastrointestinal illness (GI) clusters are defined as NLI outbreaks when:

- Cases present with signs and symptoms consistent with norovirus infection
- Are not laboratory confirmed as norovirus
- For facilities (e.g., hospitals, schools, daycares, prisons), GI activity is above normal baseline
NLI Outbreaks per Year, Michigan 2004–2019*

* As of April 9, 2019
NLI Outbreaks and Case Counts¹, Michigan 2014–2019*

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Outbreaks</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>129</td>
<td>3,292</td>
</tr>
<tr>
<td>2015</td>
<td>163</td>
<td>3,820</td>
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<tr>
<td>2016</td>
<td>180</td>
<td>3,924</td>
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<tr>
<td>2017</td>
<td>145</td>
<td>4,543</td>
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<td>2018</td>
<td>154</td>
<td>2,513</td>
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<tr>
<td>2019*</td>
<td>73</td>
<td>1,128</td>
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</table>

¹ Case counts based on initial report
* As of April 9, 2019
NLI Outbreaks by Onset Date per Month, Michigan Jan 2015–April 2019*
NLI Outbreaks by Onset Date per Month, Michigan Jan 2017–April 2019*

* As of April 9, 2019
NLI Outbreaks by Onset Date per Month, Michigan 2015–2019*

* As of April 9, 2019
Percentage of NLI Associated Settings, Michigan 2015–2019*

* As of April 9, 2019
NLI Outbreaks by Region, Michigan 2016–2019*

* As of April 9, 2019
Percentage of PCR Confirmed Norovirus Outbreaks, Michigan 2019*

- 70% Not Tested
- 22% Norovirus GI
- 4% Norovirus GII
- 3% Sapovirus
- 1% Negative

N = 73

* As of April 9, 2019
Percentage of PCR Confirmed Norovirus Outbreaks, Michigan 2018

- Norovirus GI: 69%
- Norovirus GII: 22%
- Negative: 3%
- Sapovirus: 1%
- Not Tested: 5%

N = 154
Percentage of PCR Confirmed Norovirus Outbreaks, Michigan 2017

- Norovirus GI: 81%
- Norovirus GII: 13%
- Norovirus GI and GII: 3%
- Not Tested: 1%
- Norovirus Negative: 1%
- Astrovirus: 1%

N = 145
Percentage of PCR Confirmed Norovirus Outbreaks, Michigan 2016

- Norovirus GI: 71%
- Norovirus GII: 22%
- Norovirus GI and GII: 4%
- Not Tested: 2%
- Norovirus Negative: 1%

N = 180
Percentage of PCR Confirmed Norovirus Outbreaks, Michigan 2015

- 60% Norovirus Negative
- 30% Norovirus GII
- 8% Norovirus GI
- 2% Not Tested

N = 163
## NLI Outbreak Laboratory Results, Michigan 2016–2019*

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<tr>
<td>Norovirus GI</td>
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<td>4</td>
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<td>Norovirus GII</td>
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<td>19</td>
<td>35</td>
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<tr>
<td>Sapo/Astro Virus¹</td>
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<td>1</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Noro, Astro, Sapovirus Negative</td>
<td>5</td>
<td>2</td>
<td>8</td>
<td>3</td>
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<tr>
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<tr>
<td>Total</td>
<td>180</td>
<td>145</td>
<td>154</td>
<td>73</td>
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¹Outbreaks that test negative for norovirus are then tested for astrovirus and sapovirus.

* As of April 9, 2019
## Sequences Identified, Michigan 2016-2018

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<tr>
<th>Year</th>
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Norovirus Resources

www.michigan.gov/cdinfo

- General Norovirus Fact Sheet
- Guidelines for Environmental Cleaning and Disinfection of Norovirus
- Guidelines for the Control of a Suspected or Confirmed Outbreak of Viral Gastroenteritis in a Nursing Home
- Norovirus Investigations in Long Term Care Facilities: Things to Consider
Questions

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