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 virons (virus particles) can be infectious
- Virons can stick together like Velcro and form a clump (usually containing 20–30 virons)
- 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

2017 REPORTABLE DISEASES IN MICHIGAN – BY PATHGEN

A Guide for Physicians, Health Care Providers and Laboratories
Report the following conditions to the Michigan Disease Surveillance System (MDSS) or local health department (see reverse) within 24 hours (unless otherwise noted). If the agent is identified by clinical or laboratory diagnosis.

- Arthropod-borne viruses
- Bacteria
- Fungi
- Chlamydia
- Mycobacteria
- Parasites
- Rickettsia

LEGEND

- (1) Reporting within 3 days is required.
- (2) Reporting within 7 days is required.
- (3) Heartly uninvestigated infection for which suspected partner testing is authorized. See www.michigan.gov/heartly for details.
- (4) A laboratory shall immediately submit suspect or confirmed notifiable infectious disease specimens to the Michigan Department of Health and Human Services (DHHS) Laboratory Services. May be submitted to the NHHS for appropriate agents. For more information, visit www.michigan.gov/nhhs.
- (5) Report shipment status, if available.
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, counter-tops, 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 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 and Case Counts\(^1\), Michigan 2013–2018* 

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Outbreaks</th>
<th>Cases</th>
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<tbody>
<tr>
<td>2013</td>
<td>165</td>
<td>4,846</td>
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<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>
</tr>
<tr>
<td>2018*</td>
<td>116</td>
<td>1,761</td>
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</tbody>
</table>

\(^1\) Case counts based on initial report  
* As of June 27, 2018
NLI Outbreaks by Onset Date per Month, Michigan Jan 2014–June 2018*

Number of Outbreaks

Year and Month

* As of June 27, 2018
NLI Outbreaks by Onset Date per Month, Michigan Jan 2016–June 2018*

* As of June 27, 2018
NLI Outbreaks by Onset Date per Month, Michigan 2014–2018*

* As of June 27, 2018
Percentage of NLI Associated Settings, Michigan 2014–2018*

* As of June 27, 2018
NLI Outbreaks by Region, Michigan 2015–2018*

* As of June 27, 2018
Percentage of PCR Confirmed Norovirus Outbreaks, Michigan 2018*

- 70% Norovirus GI and GII
- 28% Norovirus GII
- 1% Not Tested
- 1% Norovirus Negative

N = 116

* As of June 27, 2018
Percentage of PCR Confirmed Norovirus Outbreaks, Michigan 2017

- Norovirus GI: 81%
- Norovirus GII: 1%
- Norovirus GI and GII: 1%
- Not Tested: 3%
- 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: 1%
- Not Tested: 4%
- Norovirus Negative: 2%

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

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

N = 163
## NLI Outbreak Laboratory Results, Michigan 2015–2018*

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<tbody>
<tr>
<td>Norovirus GI and GII</td>
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<td>1</td>
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<td>4</td>
<td>7</td>
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<td>Norovirus GII</td>
<td>48</td>
<td>41</td>
<td>19</td>
<td>32</td>
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<tr>
<td>Sapo/Astro Virus(^1)</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
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<tr>
<td>Norovirus Negative</td>
<td>13</td>
<td>5</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Pending</td>
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<td>0</td>
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<tr>
<td>Not Tested</td>
<td>98</td>
<td>126</td>
<td>117</td>
<td>82</td>
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<tr>
<td>Total</td>
<td>163</td>
<td>180</td>
<td>145</td>
<td>116</td>
</tr>
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\(^1\)Outbreaks that test negative for norovirus are then tested for astrovirus and sapovirus.

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<thead>
<tr>
<th>2018*</th>
<th>2017</th>
<th>2016</th>
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<tbody>
<tr>
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<tr>
<td>GII.3</td>
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<td>GII.6</td>
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<tr>
<td>GII.4 New Orleans</td>
<td>GII.1</td>
<td>GII.3</td>
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<tr>
<td>GII.4 Sydney</td>
<td>GII.2</td>
<td>GII.4 Sydney</td>
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<tr>
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<td>GII.4 New Orleans</td>
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<td>GII.7</td>
<td>GII.4 untypeable</td>
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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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